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# Fiscal Policy and Long-Term Growth

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INTERNATIONAL MONETARY FUND



# IMF POLICY PAPER

## FISCAL POLICY AND LONG-TERM GROWTH

June 2015

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- The **Staff Report** on Fiscal Policy and Long-Term Growth, prepared by IMF staff and completed on April 20, 2015 for the Executive Board's consideration on June 3, 2015.
- A Case Study **Supplement**.

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## FISCAL POLICY AND LONG-TERM GROWTH

### EXECUTIVE SUMMARY

**This paper explores how fiscal policy can affect medium- to long-term growth.** It identifies the main channels through which fiscal policy can influence growth and distills practical lessons for policymakers. The particular mix of policy measures, however, will depend on country-specific conditions, capacities, and preferences. The paper draws on the Fund's extensive technical assistance on fiscal reforms as well as several analytical studies, including a novel approach for country studies, a statistical analysis of growth accelerations following fiscal reforms, and simulations of an endogenous growth model.

**Fiscal policy is an effective tool for supporting growth.** While it is difficult to disentangle the impact of fiscal reforms from other factors and to determine causality with certainty, the analysis suggests that they could lift medium- to long-term growth by  $\frac{3}{4}$  of a percentage point in advanced economies and even more in developing economies.

**Fiscal policy promotes growth through macro and structural tax and expenditure policies.** At the macro level, it plays an important role in ensuring macroeconomic stability, which is a prerequisite for achieving and maintaining economic growth. At the micro level, through well-designed tax and spending policies, it can boost employment, investment, and productivity. Notably:

- Lowering the tax wedge and improving the design of labor taxes and social benefits can strengthen work incentives and induce a positive labor supply response;
- Reforming capital income taxes to tax rents reduces distortions and encourages private investment; well-targeted tax incentives can stimulate private investment and enhance productivity through research and development (R&D);
- Efficient public investment, especially in infrastructure, can raise the economy's productive capacity;
- More equitable access to education and health care contributes to human capital accumulation, a key factor for growth;
- If growth-friendly reforms require fiscal space, revenue measures should focus on broadening the tax base and minimizing distortions; and expenditure measures should aim at rationalizing spending and improving efficiency.

**Design and social consensus matter for the success and durability of fiscal reforms.**

To reap full growth benefits, fiscal reforms also need to be internally consistent and complemented by relevant structural reforms (e.g., labor or trade) and supportive macroeconomic policies. Balancing efficiency and equity objectives and fostering public support through social dialogue are critical.

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## INTRODUCTION

**1. Fiscal policy can play an important role in supporting strong, lasting and equitable growth.** In the aftermath of the global financial crisis, potential output in many affected countries declined sharply. Restoring robust growth is essential for addressing the fiscal challenges ahead. Fiscal policy can make an important contribution to lifting potential growth. At the macro level, fiscal policy helps ensure macroeconomic stability, an essential prerequisite for growth; at the micro level, tax and expenditure policies can boost growth by altering work and investment incentives, promoting human capital accumulation, and enhancing total factor productivity. Consistent with earlier studies, fiscal policy is defined to encompass overall budget balance, tax, and expenditure policies (Cottarelli and Keen, 2012; Tanzi and Zee, 1997).

**2. Endogenous growth theory provides the analytical framework for studying the effects of fiscal policy on long-run growth.** In contrast to neoclassical growth theory, in which policy can only have a transitory effect on growth since long-term growth is driven by exogenous and policy-invariant factors, endogenous growth theory provides a framework to analyze how government policy can affect long-term growth, making it the framework of choice in the public finance literature (Barro and Sala-i-Martin, 1992; Rebelo, 1991). In practice, however, it is difficult to distinguish between permanent and transitory, but persistent, effects on growth.

**3. This paper draws on the Fund's expertise in providing hands-on advice on fiscal reforms, complemented by a multi-pronged analysis.** The Fund has significant expertise and a unique perspective on structural fiscal reforms, including through its extensive technical assistance program.<sup>1</sup> The paper also draws from an extensive review of the literature on the topic and several analytical studies. First, the paper presents 9 country studies covering advanced, emerging market, and low-income countries (LICs), spanning 12 reform episodes.<sup>2</sup> The analysis uses a novel technique to estimate the post-reform impact on medium- to long-term growth, which is proxied by 10-year average growth rates following reforms. Second, a statistical analysis identifies the share of fiscal reform episodes that are followed by growth accelerations within the next 5 years. Finally, an endogenous growth model simulates the growth impact of several revenue and spending reforms. However, fiscal policy is only one amongst many factors that drive growth. Despite attempts at isolating the effect of fiscal policy by using three complementary analytical techniques, the results should be interpreted with care given the difficulty in disentangling the impact of fiscal reforms from other factors.

<sup>1</sup> The Fund fielded some 250 technical assistance missions from headquarters in revenue and expenditure areas in FY2015, in addition to supporting member countries through 9 regional technical assistance centers in Africa, Asia, Latin America, and the Middle East and through numerous short- and long-term expert assignments.

<sup>2</sup> See SM/15/92, Supplement 1. The country studies cover Australia, Chile, Germany, Ireland, Malaysia, the Netherlands, Poland, Tanzania, and Uganda.

**4. The paper differs in important ways from other studies.** First, the coverage in terms of both regions and policies is wider than in other studies where the focus is on a particular country group or region (e.g., Abdon and others, 2014; and IDB, forthcoming) or on specific issues such as the design of tax structures that support growth (OECD, 2010a), and the long-term growth effects of public spending (Barbiero and Cournède, 2013). Second, the discussion of policy measures is organized around the main growth channels rather than by policy instrument as is common in the literature. Third, the paper explicitly looks into the equity implications of fiscal policy reforms, an issue that has received less attention in the literature. Finally, all country studies use a consistent analytical framework to assess the impact of fiscal reforms on potential growth.

**5. The growth dividend from fiscal reforms could be substantial.** The country studies suggest that there are significant potential gains from fiscal reforms. In advanced countries, per capita growth is estimated at about  $\frac{3}{4}$  percentage points higher following fiscal reforms. The growth dividend could be even higher in emerging markets and LICs. As mentioned above, these results should be interpreted with caution. Other coterminous reforms also played an important role in many cases, and the available analytical tools are limited in the degree to which they can disentangle the effects of fiscal policy from other factors. Simulations of an endogenous growth model, which does isolate the impact of fiscal reforms, show that even a budget-neutral tax reform package aimed at enhancing the efficiency of the tax system may lift long-term growth by as much as  $\frac{1}{2}$  percentage point. Shifting the composition of spending toward infrastructure investment could add  $\frac{1}{4}$  percentage point. Finally, a statistical analysis shows that there is a relatively high likelihood that fiscal reforms are followed by growth accelerations.

**6. The effectiveness of growth-friendly fiscal policy is enhanced when reforms reinforce each other and are accompanied by complementary structural reforms.** Combining fiscal reforms (e.g., scaling up infrastructure investment while improving the public investment process) increases their effectiveness. Complementary reforms such as liberalizing trade, labor and product markets can magnify the impact of fiscal reforms by promoting savings, stimulating investment, and unlocking productivity gains.

**7. Policy design and social consensus matter for the successful implementation of reforms.** Appropriately designed fiscal reform packages can serve both growth and equity objectives. Social consensus enhances the likelihood of reforms being implemented and sustained. A number of strategies can help foster public support for reforms, including effective communication with stakeholders and the inclusion of compensatory measures for those expected to lose from reforms.

**8. The paper is organized as follows.** Section II draws on existing empirical evidence, country studies and statistical analysis to examine the key channels through which fiscal policy, both at the macro and micro level, influences medium- to long-term growth. Since some reforms may require fiscal space, the paper next discusses how additional resources can be generated with the least adverse impact on growth. The section ends with the implications of fiscal reforms for equity. Section III examines the design of fiscal reforms and political economy considerations. Section IV summarizes policy lessons, and Section V offers issues for discussion.

# FISCAL POLICY AND LONG-TERM GROWTH: WHAT WORKS?

## A. Macroeconomic Stability – A Prerequisite for Sustained Growth

*Fiscal sustainability and macroeconomic stability are key for medium- to long-term growth. Policy uncertainty and high levels of public debt deter private investment and slow growth. Fiscal consolidation can help, but its impact on growth depends notably on its pace, composition and financing modalities. In many advanced and emerging economies, ensuring fiscal sustainability would require addressing age-related spending pressures without harming equity. In contrast, many LICs with low debt levels and strong growth prospects may have scope for additional productive spending.*

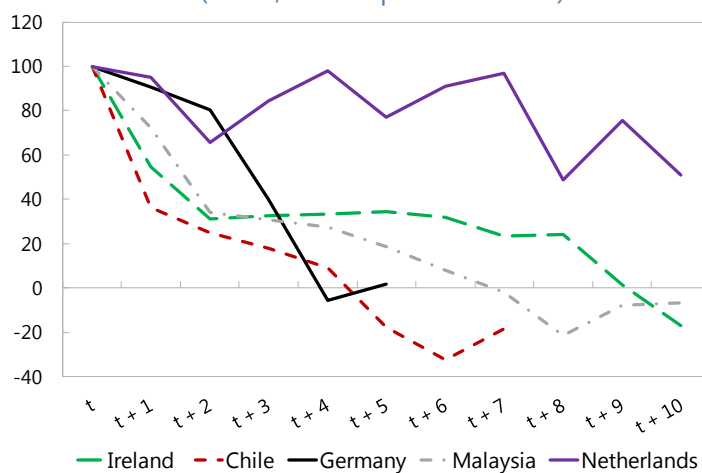
### 9. Macroeconomic stability is an essential prerequisite for strong and lasting growth.

Large fiscal deficits reduce aggregate savings in the economy and may lead to inflation, high interest rates, and balance of payments pressures, with negative growth consequences.<sup>3</sup> Indeed, policy uncertainty created by macroeconomic instability affects growth through the volatility of returns on investment and misallocation of resources as price signals become distorted (Fischer, 1993; and Fatas and Mihov, 2013). This underscores the role of automatic stabilizers in reducing macroeconomic volatility: fiscal

frameworks that facilitate the symmetric functioning of automatic stabilizers eliminate an important source of public debt accumulation and foster medium-term growth (IMF, 2015a). The potential growth dividends from fiscal stabilization are especially large in advanced economies where an increase in the responsiveness of fiscal policy to output by one standard deviation could boost annual growth by about 0.3 percentage point.

Dividends appear much smaller in emerging markets and LICs, where fiscal stabilization is less effective and is dominated by developmental priorities (IMF, 2015a; Aghion and others, 2014).

**Figure 1. Fiscal Deficits Post-Reform 1/  
(Index, reform period  $t = 100$ )**



Source: IMF staff calculations; Supplement 1.

1/ Chile refers to 1975-1980; Germany to 2004-2008.

<sup>3</sup> The relationship between fiscal policy, macroeconomic stability, and long-run growth runs in both directions because low growth can weaken the fiscal position and may put fiscal sustainability at risk.



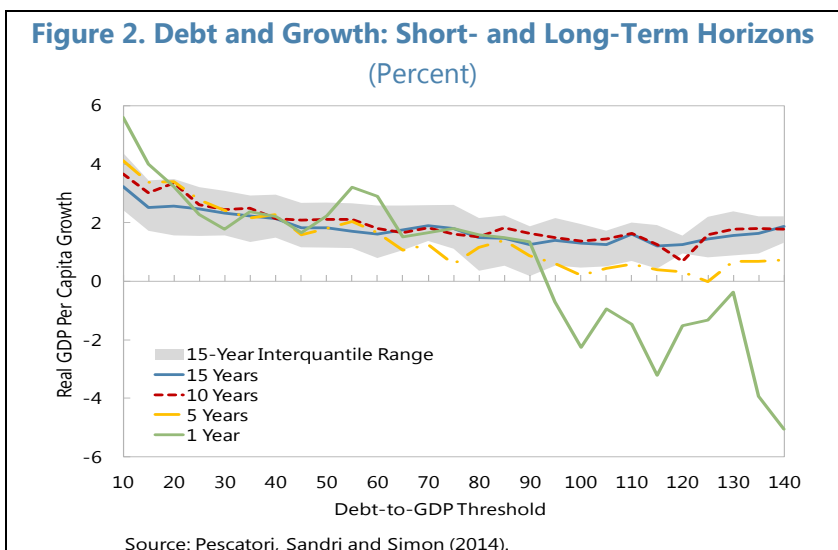
- Fiscal deficit reductions featured prominently in many country studies (Figure 1). In Chile, macroeconomic stability was pursued before growth took off. Notably, large cuts in spending and measures to broaden the tax base resulted in an improvement of the primary balance by about 28 percentage points of GDP over five years in the 1970s. After an initial decline, GDP growth picked up markedly and Chile's growth performance became one of the strongest in Latin America.

**10. In developing economies, the relationship between fiscal deficits and growth is likely to be non-linear and dependent on financing modalities.**<sup>4</sup> In contrast to many advanced countries, developing countries tend to have lower debt levels, strong growth prospects, high population growth, and large infrastructure gaps. Empirical evidence suggests that the relationship between fiscal adjustment and growth depends on the level of the fiscal deficit. For example, Adam and Bevan (2013) estimate that for developing economies the long-term growth dividend of cutting the deficit disappears or reverses below a threshold of around 1½ percent of GDP. In addition, the magnitude of the dividend depends on how the deficit is financed: Gupta and others (2005) find that reductions in the deficit that translate into significant cuts in domestic financing tend to be associated with higher growth rates. In Uganda public financial management reforms, including strict expenditure controls, facilitated a reduction in budget deficits and their monetization, which helped lower inflation. Greater macroeconomic stability in turn paved the way for higher growth.

**11. High public debt tends to hamper growth** by increasing uncertainty over future taxation, crowding out private investment, and weakening a country's resilience to shocks (Krugman, 1988).

Figure 2 illustrates the link between debt and growth: at one-year horizons, high debt levels are associated with lower growth; over longer horizons, the relation is less pronounced, but a tradeoff still remains. However, it is rather difficult to ascertain the level of public debt that is prudent to sustain, or for how long it can rise without jeopardizing macroeconomic stability.

Empirical evidence suggests that the level at which the debt-to-GDP ratio starts to harm long-run growth is likely to vary with the level of economic development and to depend on other factors, such as the investor base.<sup>5</sup>



<sup>4</sup> In this paper, the term "developing economies" refers to both emerging market economies and LICs.

<sup>5</sup> For example, for OECD countries, Cecchetti and others (2011) show that when public debt exceeds 85 percent of GDP it may become a drag on growth; in particular, a further 10 percentage point increase in the debt-to-GDP ratio (continued)

**12. The pace of fiscal consolidation is important for medium- to long-term growth.** A vast literature, largely from the pre-crisis period, emphasizes the scope for expansionary fiscal adjustments—not only for advanced economies, but also for emerging market economies and low-income countries.<sup>6</sup> However, in a deep and lasting recession, fiscal consolidation is likely to have a negative short-term impact on growth when there are large negative output gaps and monetary policy is constrained by the zero lower bound and/or inoperative credit channels. In such an environment, consolidation policies can be harmful to longer-term growth due to possible hysteresis effects, whereby temporary layoffs become permanent (De Long and Summers, 2012). Furthermore, in a deep recession, investment is likely to remain low for a prolonged period of time, reducing further potential output. Overall, these arguments highlight the need to carefully calibrate the pace of fiscal adjustment during a deep recession. In particular, countries that are not under market pressure should proceed with gradual fiscal consolidation, anchored in a credible medium-term plan (Blanchard and Cottarelli, 2010; IMF, 2013b; Jaramillo and Cottarelli, 2013).

**13. The composition of adjustment matters as well.** The appropriate mix of revenue and expenditure measures depends on each country's specific conditions. Policymakers need to consider the durability of the selected measures and their impact on growth and equity. For advanced economies, expenditure-based fiscal consolidations have been shown to be more durable (Alesina and Ardagna, 2012), and have been associated with growth in private investment (Alesina and others, 2002). In contrast, for LICs Baldacci and others (2004) find that revenue-based adjustment leads to more durable consolidation episodes, with greater benefits for growth. In addition, credit-constraints matter: in the presence of high private debt and credit supply restrictions, deficit reductions achieved through tax-base broadening while protecting public investment are supportive of medium-term growth in both advanced and emerging economies (Baldacci, Gupta, and Mulas-Granados, 2015). Large expenditure-based consolidations tend to increase inequality, which can undermine long-term growth (Ball and others, 2013; Woo and others, 2013; Berg and Ostry, 2011). Some degree of pragmatism is therefore needed to strike the proper balance between revenue and spending measures.<sup>7</sup>

- Faced with sluggish growth and high fiscal deficits (10 percent of GDP in 1986), Malaysia cut current spending and rationalized inefficient public investment. As a result, the budget registered small surpluses and deficits during the 1990s, the private investment-to-GDP ratio more than doubled, and annual growth averaged around 8 percent. Similarly, in the

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can reduce annual average growth by more than 0.1 percentage point. Kumar and Woo (2010) confirm this effect on a sample of advanced and emerging economies. For developing countries, estimated thresholds are generally much lower: Pattillo and others (2011) find that the marginal effect of additional debt becomes negative when the net present value of debt reaches 20-25 percent of GDP. Clements and others (2004) obtain a similar result for low-income countries and external debt.

<sup>6</sup> Key papers include Alesina and Perotti (1995, 1996); McDermott and Wescott (1996); Alesina and Ardagna (1998); Bleaney, Gemmel, and Kneller (2001); Alesina, Ardagna, Perotti, and Schiantarelli (2002); Baldacci and others (2004); Gupta and others (2005).

<sup>7</sup> For a fuller discussion on the nexus between the composition of fiscal adjustment and growth, see IMF (2013b).

Netherlands, an expenditure cut of 15 percent of GDP between 1982 and 2000 created room for lower taxes and helped pave the way for private investment and private sector job-creation. At the same time, both countries managed to avert adverse consequences on income inequality (as further discussed in Section D on *Growth and Equity*).

**14. Ensuring fiscal sustainability in a number of countries will require putting pension and health systems on a sound financial footing.** In advanced and emerging market economies, age-related spending on public pensions and health care accounts for a large share of government spending (40 percent and 30 percent, respectively; IMF, 2014f). As populations age, these spending pressures can undermine long-term fiscal sustainability—and any fiscal consolidation strategy needs to include reforms in these areas (Blanchard and Cottarelli, 2010). Several countries studied strengthened long-term fiscal sustainability by reforming their pension and health systems. For instance, Poland shifted from a financially unsustainable defined-benefit system to an actuarially solvent defined-contribution system; and Germany put its pension system on a more sound financial footing by linking pension benefits to the old-age dependency ratio, tightening access to early retirement and raising the statutory retirement age. In health care, Germany and the Netherlands introduced a combination of macro- and micro-level reforms to contain cost and enhance efficiency, including price controls on pharmaceuticals, higher co-payments and contributions, and budget caps.

**15. Strong and transparent institutions support macroeconomic stability and the sustainability of fiscal policies.** Because debt and deficits have an impact on longer-term growth, fiscal frameworks and institutions that help mitigate deficit and debt biases can help promote growth. Countries with stronger budget institutions tend to deliver a more growth-friendly fiscal adjustment (IMF, 2014g).<sup>8</sup>

## B. How Can Fiscal Structural Reforms Promote Growth?

*In theory, fiscal reforms can affect growth through four main transmission channels—labor supply, investment in physical and human capital, and total factor productivity. Country studies and statistical analysis find some evidence of higher growth following the implementation of growth-friendly fiscal reforms, with some variation in the relative importance of channels and fiscal policy areas across country groups.*

**16. There are four main channels through which tax and expenditure policy reforms can impact medium- to long-term growth:**

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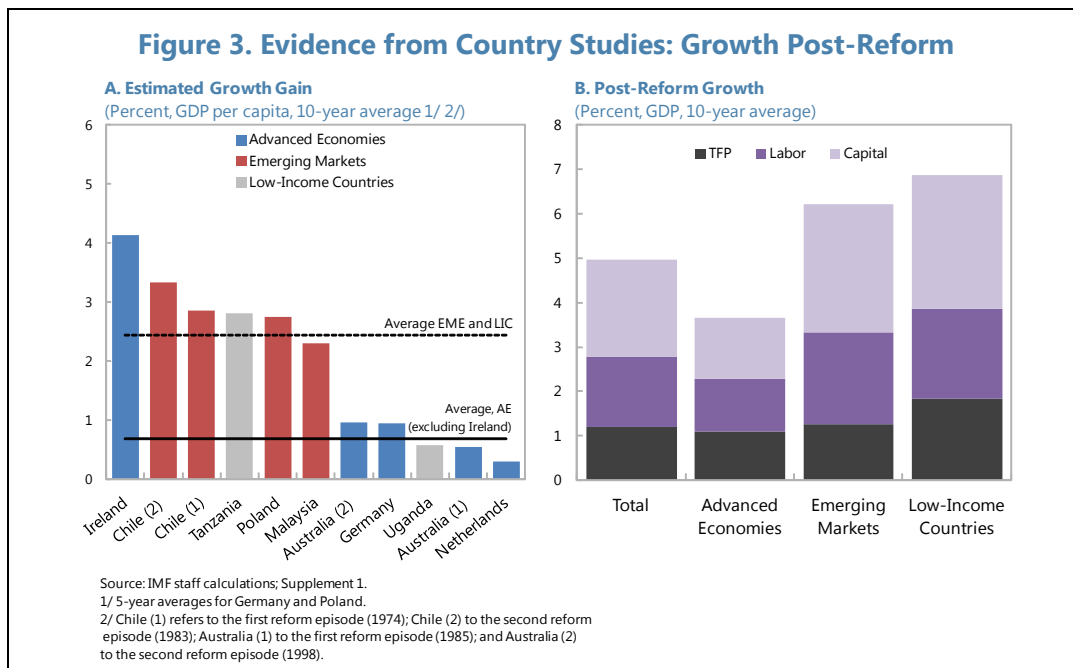
<sup>8</sup> The 12 budget institutions that are included in the IMF (2014g) study are fiscal reporting; macro-fiscal forecasting; fiscal risk management; independent fiscal agency; fiscal objectives and rules; medium-term budget framework; performance orientation; intergovernmental financial arrangements; budget unity; top-down budgeting; parliamentary approval; and budget execution.

- **Labor supply.** The tax-benefit system (including labor income tax and social transfers) influences decisions on whether to participate in the labor market (extensive response) and how much to work (intensive response). Empirical evidence suggests that this transmission mechanism is particularly important at the lower end of the income distribution and for specific groups, such as women and older workers (IMF, 2014a; OECD, 2011). Reforms in labor taxes and/or benefits were undertaken in five of the nine country studies (Australia, Chile, Germany, Ireland, and the Netherlands). Devereux and Love (1994) and Turnovsky (2000) use endogenous growth models to show how fiscal policy through labor tax cuts can lift long-term growth by inducing a positive labor supply response.
- **Physical capital.** Taxation of capital income influences private savings and investment decisions. At the individual level, capital income taxes reduce the return on savings. At the corporate level, profit taxes reduce the rate of return on investment projects, while different tax treatment of financing (i.e., deductibility of interest expenses) creates a bias toward debt financing. This bias leads to inefficiently high debt-equity ratios and discriminates against innovative firms (De Mooij, 2011). On the expenditure side, efficient public investments can boost returns on private investment and thereby enhance long-run growth. All countries studied implemented investment-friendly tax reforms and/or bolstered public capital spending. The models of Rebelo (1991) and Devereux and Love (1994) illustrate how capital tax cuts encourage investment and boost long-term growth.
- **Human capital.** Human capital is one of the main drivers of long-term growth (Lucas, 1988; Barro, 2001). In endogenous growth models, human capital contributes to growth directly as an input in production activities, and indirectly by promoting technical progress with positive externalities. Both tax and spending policies can help raise the human capital stock, given the presence of positive externalities and credit market imperfections. Investment in health and education constituted an important part of the fiscal reform packages in three country studies (Ireland, Tanzania, and Uganda). Pecorino (1993), and King and Rebelo (1990) use endogenous growth models to show how income tax reductions can encourage human capital accumulation and hence growth by increasing the returns to education.
- **Total factor productivity.** One important channel to enhance productivity is through technological progress. There is a strong case for government intervention in the presence of positive externalities from research and development (R&D). Governments can either spend on R&D directly or (more commonly) provide tax incentives to encourage private R&D spending. If designed and implemented well, these can yield high social returns. In addition, as noted above, public infrastructure and services can have a direct effect on private sector productivity and promote technological progress; and public spending on education can help foster a better absorption of new technologies. In six country studies either tax incentives for R&D activities were provided or public R&D spending increased noticeably (Australia, Germany, Ireland, Malaysia, the Netherlands, and Poland). Public infrastructure to support private sector activity improved substantially in Chile, Malaysia, and

Poland. Baier and Glomm (2001), and de Hek (2006) present endogenous growth models where public investment increases total factor productivity and ultimately long-term growth.

**17. Country studies reflect the potential of fiscal reforms to affect growth through these channels (Figure 3; and SM/15/92, Supplement 1).** Using the Synthetic Control Method (SCM), country studies show a significant increase in average growth during the 10 years following fiscal reform episodes, compared with the counterfactual (Figure 3a). However, the limitations of the SCM suggest interpreting the results with care (Box 1). While biases may run in both directions, one should be particularly cautious in attributing the increase in growth entirely to fiscal reforms, as they were often part of broader reform packages (e.g., reforms of labor and product markets) that also played an important role. With this caveat, the country studies find that:

- In advanced countries, excluding Ireland which experienced a significantly higher growth dividend, per capita growth in the post-reform period is about ¾ percentage points higher than the counterfactual. In developing economies, the estimated divergence in growth paths reaches almost 2½ percentage points, on average.
- Relative contributions of capital, labor, and total factor productivity (TFP) to total growth showed different patterns across income groups: while advanced economies experienced relatively balanced contributions, in emerging markets and LICs capital accumulation was the dominant growth driver (Figure 3b).
- Shifts in the contribution of capital, labor, and TFP to growth at times coincided with the focus of fiscal reform efforts: for example, in cases where an overhaul of labor taxation and reductions in the tax wedge were at the core of tax changes (e.g., Ireland, the Netherlands), the contribution of labor in total output growth increased after the reform.



**18. Fiscal reforms are frequently followed by growth accelerations** (Annex I; Figure 4).

Analysis of 146 episodes of growth accelerations in 112 countries shows that revenue reforms are most likely to be followed by a growth acceleration (defined as a durable increase in five-year average growth of at least one percentage point) in emerging market economies, while expenditure reforms displayed the most potential in both advanced and emerging economies (Figures 4a and 4b).

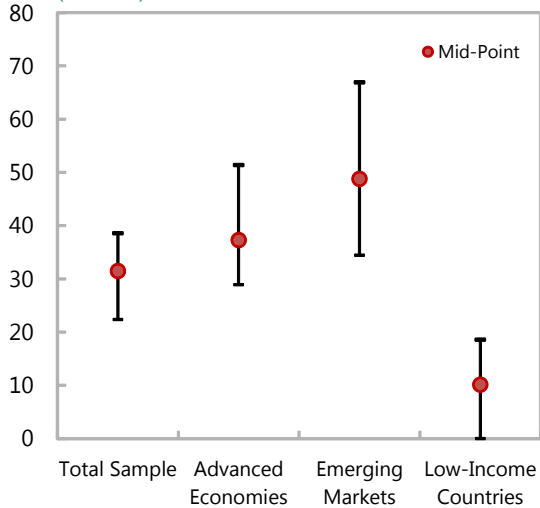
- On the revenue side, 37 percent of episodes involving reductions in the share of income taxation matched by an increase in the share of indirect taxation are followed by a growth acceleration in the sample as a whole (Figure 4c). This is consistent with the findings of recent empirical studies (see for instance, Arnold and others, 2011).
- On the expenditure side, increases in health, education and infrastructure spending are followed by higher growth in 20 to 40 percent of all identified cases.
- Combined revenue and expenditure fiscal reform packages have a higher likelihood (around 60 percent of reform cases) of being followed by growth acceleration.

**19. Model simulations show that even budget-neutral fiscal reforms can yield a significant growth dividend.** A budget-neutral tax reform package aimed at enhancing the efficiency of the tax system may lift long-term growth by about  $\frac{1}{2}$  percentage point. Shifting the composition of spending toward infrastructure investment could add  $\frac{1}{4}$  percentage point.

**Figure 4. Growth Accelerations**

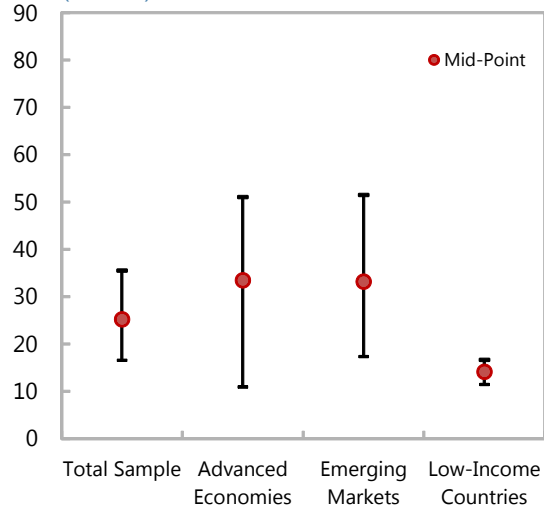
**A. Revenue Reforms Followed by Growth Accelerations**

(Percent)



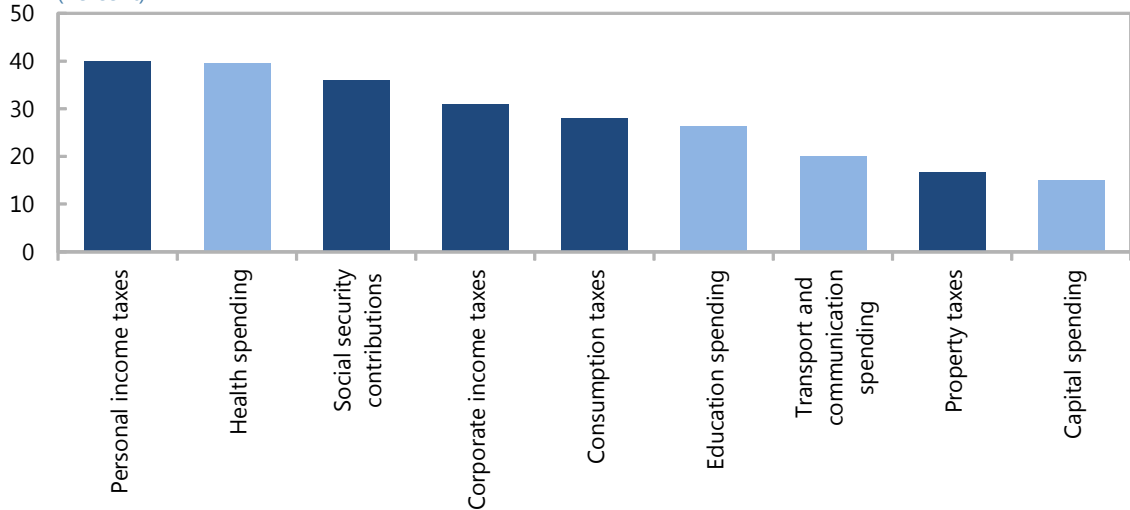
**B. Expenditure Reforms Followed by Growth Accelerations**

(Percent)



**C. Type of Reforms and Conditional Probability of Growth Accelerations**

(Percent)



Source: IMF staff calculations.

Note: Reported are the ratios of fiscal reforms followed by a growth accelerations within a 5-year period to the total number of fiscal reforms (in percent). Panels A and B show the range between 10th and 90th percentiles across different types of revenue and expenditure reforms. The red dots indicate averages.

### Box 1. The Synthetic Control Method

The Synthetic Control Method (SCM) is a formal data-driven procedure to quantify the effect of an event (fiscal reform in this study) on an outcome variable of interest (i.e., medium- to long-term growth, defined as 10-year average growth rates). It is particularly well-suited for comparative case studies since it removes discretion in the selection of comparison groups. The method is based on the creation of an artificial counterfactual (i.e., growth performance in the absence of fiscal reform) using data prior to the event and then comparing the outcomes for the counterfactual and the unit being analyzed (the country that implemented fiscal reforms in this case) after the event has occurred.

The counterfactual or the synthetic unit is constructed as a weighted average of countries that have similar characteristics as the case study but are unaffected by the event. Country weights are chosen to minimize the distance between the case study country and its counterfactual in terms of the outcome variable and its predictors (Abadie and others, 2010). In general, only a few comparator countries receive positive weights.

The effect of an event is obtained as the difference between the outcome variable for the country in question and the weighted average of the outcome variable for the synthetic control group. Robustness of the results is checked using placebo tests where, for example, the time of occurrence of the event is shifted backward or forward, or countries in the synthetic group are replaced with other countries which are unaffected by the event.

The presence of two potential biases suggests interpreting the results with caution, however. First, the impact of fiscal reforms could be overstated, as it is difficult to disentangle their growth impact from that of various other factors affecting growth. Although various tests are used to check the robustness of the results, the difference between post-reform growth in the country of interest and its synthetic counterpart could be due to factors other than fiscal policy. On the other hand, results could be potentially biased downwards if the comparator groups include countries that also underwent growth-enhancing reforms.

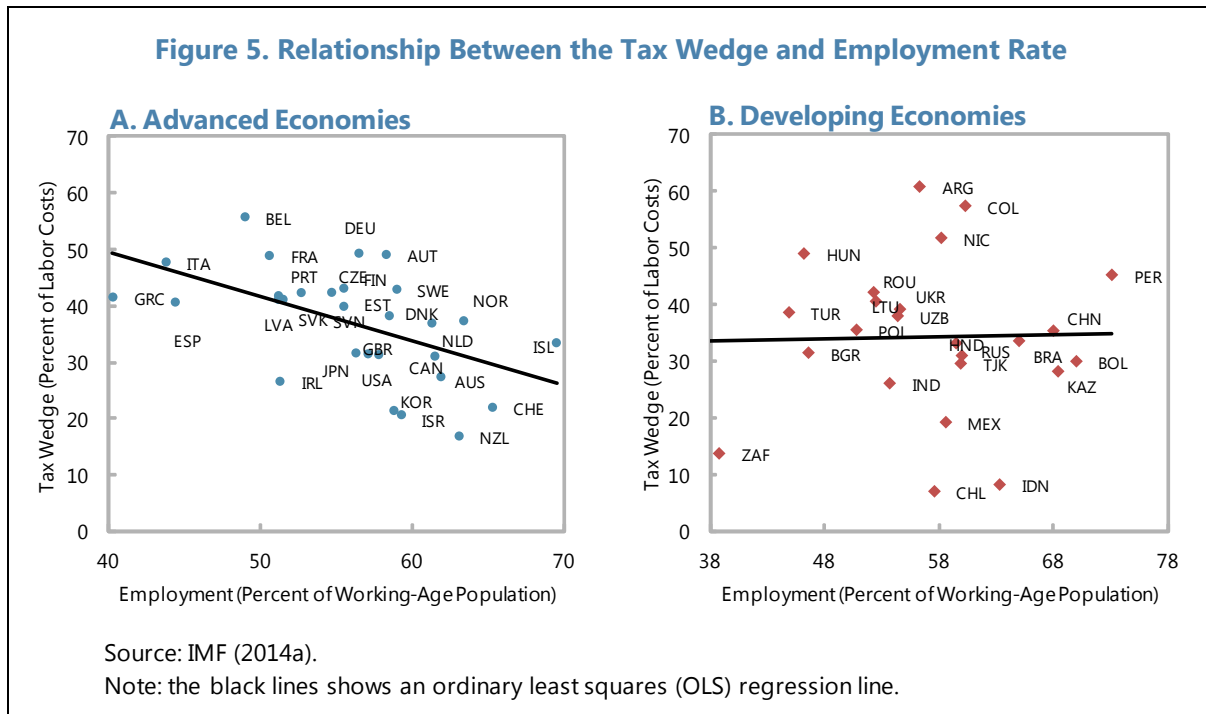
## Policies to Encourage Labor Supply

*In many advanced and emerging economies, sustaining high growth will require offsetting the adverse impact of aging on labor supply and addressing low labor force participation rates, in particular of women. This can be done by cutting taxes on labor, redesigning social benefits, and strengthening active labor market programs (ALMPs). In low-income countries, the focus should be on providing equal access to education and dismantling legal obstacles to female labor force participation (FLFP).*

**20. Lowering overall taxes on labor income can boost labor supply.** The overall labor supply response to cuts in labor tax depends on the elasticity of labor supply and on the degree of competition in the factor and product markets. Reducing the tax wedge can help address the problem with youth unemployment, which has increased sharply in Europe since the crisis (Banerji and others, 2014). Figure 5 shows that, in advanced economies, the labor tax wedge—including social security contributions—is negatively correlated with employment, while in developing economies there is no clear relationship, mainly due to smaller social safety nets and the narrower revenue base of personal income tax (IMF, 2014a).



- Revenue-neutral policy simulations using an endogenous growth model show that reducing tax on labor income by 5 percentage points leads to higher long-run economic growth of about 0.2-0.3 percentage point, as the increase in the after-tax wage induces higher labor supply.
- Country studies show that labor tax cuts were used to boost labor participation, including in Ireland and the Netherlands. For instance, in Ireland labor taxes were cut substantially in the context of a social partnership agreement. This contributed to a strong increase in labor force participation and a noticeably higher contribution of labor to total economic growth.



**21. Unemployment benefits can be designed to strengthen incentives to seek employment without compromising their important contribution to the social safety net.** Unemployment benefits play a key role in advanced economies in protecting individuals from loss of income due to transitory or structural unemployment. However, these programs, if not well designed, can adversely affect employment incentives and outcomes (Meyer, 2002; Abbring and others, 2005; OECD, 2006). The withdrawal of benefits as individuals return to employment can operate like a tax on earned income and create work disincentives, especially for low-wage workers and families with children. Efficient benefit design can help, including through the following design features:

- **Eligibility criteria.** Conditioning eligibility rules (e.g., on previous contributions or participation in ALMPs) can better support and incentivize the return to employment. For instance, in the Netherlands, almost one-fifth of the working-age population received unemployment or disability benefits prior to reforms in the mid-1980s that tightened access and resulted in an increase in participation (Watson and others, 1999).

- **Benefit duration.** Lowering the maximum duration of benefit eligibility can expedite the return to employment. About a third of OECD countries have a maximum duration in excess of 12 months. Reducing replacement rates during the course of unemployment spells can enhance work incentives more gradually. The desired generosity of benefits can be achieved through various combinations of benefit levels and duration.
- **Individual unemployment savings accounts (ISAs).** Increased use of these accounts could help reduce the distortionary impact of contributions by strengthening the link with benefits received and facilitate the expansion of unemployment insurance schemes in developing economies with large informal sectors. Under this system, part of the unemployment insurance contribution could be credited to an individual account on which a person receives interest (Bovenberg and others, 2012). During unemployed periods, individuals can draw money from their account, and once the account is exhausted, they can borrow from the government at the same interest rate. Individual accounts are used in a number of emerging economies, including Brazil and Chile (Hijzen and Venn, 2011).

**22. In particular, advanced economies could intensify the use of ALMPs and in-work benefits to reduce unemployment.** Reforms to replace “passive” benefits which dilute incentives to return to employment with ALMPs and in-work benefits have contributed to a decline in unemployment in a number of advanced countries:

- **Conditioning of means-tested transfers on participation in ALMPs.** In most advanced economies, continued eligibility for benefits is conditioned on participation in ALMPs, including personal employment services, training, job placement, and public employment schemes. Tight activation measures are especially important for helping job-seekers and providing incentives to work. The intensity of activation requirements should increase with unemployment duration to allow an initial period for job search, followed by assistance with job placement and access to individually tailored training opportunities—which are especially important for youth unemployment and the long-term unemployed. Although the use of ALMPs has increased over the last decade, there is still significant room for improvement in many countries (OECD, 2012b). Germany introduced activation conditions, complemented by wide-ranging labor market reforms, including improving job search efficiency, raising work incentives, and fostering labor demand (Hüfner and Klein, 2012). As a result of these reform packages, between 2000 and 2013, labor force participation increased from 66 percent to 74 percent, and the unemployment rate fell to 5.2 percent in 2013, after reaching a peak of 11.2 percent in 2005 (OECD, 2014c).
- **Greater use of in-work benefits.** Many economies that target labor market participation (Germany, the Netherlands, and Sweden) have adopted a system of in-work benefits that allows for the gradual withdrawal of benefits as earnings or employment duration increase (IMF, 2012). This reduces the net tax on additional earnings; even turning it negative for low-income groups, with significant benefits for employment, equity, and poverty reduction.

**23. Targeted tax and spending measures for specific groups could elicit an even greater labor supply response with a positive impact on growth.**<sup>9</sup>

In many countries, labor force participation of women and older workers is still low. For instance, the gender gap in labor force participation rates remains high in most regions, ranging from 51 percentage points in the Middle East and North Africa to 35 percentage points in South Asia and Central America and to 12 percentage points in OECD countries (Elborgh-Woytek and others, 2013; Cuberes and Teigner, 2014). Key obstacles vary across income groups: for instance, in developing economies access to education, legal obstacles and poor infrastructure are more critical for FLFP than e.g. parental leave policies (Das and others, 2015; Gonzalez and others, 2015). At the same time, most countries have witnessed declining old-age employment despite higher life expectancy. Targeted measures can help boost women, older workers' and low-skilled workers' supply response:

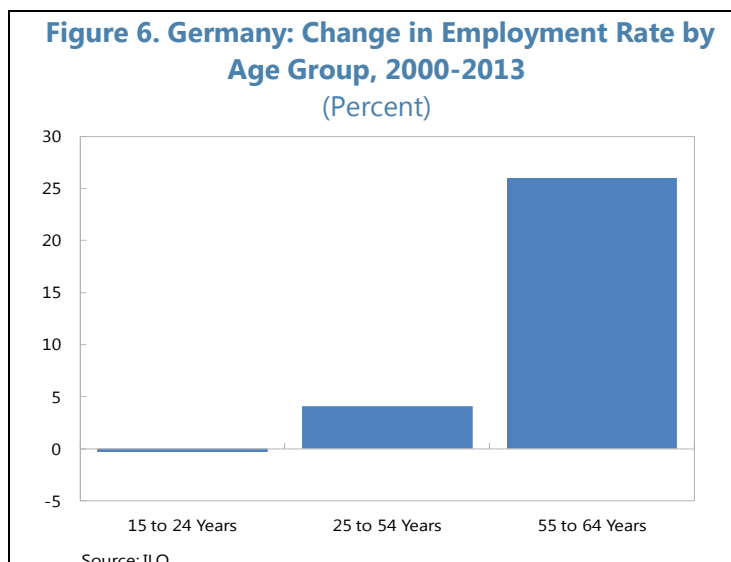
- **Women:** Female labor supply is more responsive to taxes than male labor supply. Hence, tax relief for women could elicit a positive net response, even when financed by higher taxes on men. For instance, India makes a gender distinction by applying a higher tax exemption for women, and most advanced economies replaced family taxation with individual taxation to reduce the tax burden for secondary earners (often women). Special tax relief could also be targeted at single parents. On the expenditure side, interventions that could be critical in increasing FLFP include closing the gender gap in education (e.g., India, Turkey); well-designed family benefits, including paid parental leave up to about two years (e.g. the United States); more flexible work options (e.g., India and Japan); and greater availability of child-care options (e.g., Germany, Japan, and the United States).<sup>10</sup> Policies that have had a beneficial impact on FLFP include social benefit reforms (Germany, and the Netherlands); higher labor market flexibility (Germany, and the Netherlands); better education (Ireland); and a shift from family to individual taxation (Ireland).
- **Older workers:** Older workers are more sensitive to financial incentives than younger workers (Blundell, 2014; IMF, 2014a). Lower tax rates (including implicit taxes on continuing work) can increase incentives to remain in the labor force. Australia, Denmark, the Netherlands, and Sweden, for example, have introduced specific earning tax credits for older workers, aimed at stimulating labor-market participation. On the expenditure side, pension reform could also boost the labor supply of older workers. Options include increasing the effective retirement age, and adjusting pension benefits to actuarially fair levels that do not distort participation decisions. For instance, future pension benefits could be adjusted fully for extra years of contributions, eliminating incentives to retire early. Many advanced and emerging countries enacted legislation to raise statutory retirement ages (including Australia, France, Germany, and Poland). For example, participation of older cohorts

<sup>9</sup> For instance, Elborgh-Woytek and others (2013) report that, in Japan, the annual potential growth rate could rise by about  $\frac{1}{4}$  percentage point if the female labor participation rate were to reach the average for the G7 countries. For OECD countries, full convergence in participation rates by 2030 can increase annual per capita growth rates by 0.6 percent, on average (OECD, 2012a).

<sup>10</sup> Blau and Kahn (2013); Das and others (2015); Elborgh-Woytek and others (2013); OECD (2012).

increased significantly in Germany after it phased out early retirement options (Figure 6). At the same time, targeted measures should protect against old-age poverty, including the expansion of social pension for low-income workers, financed through general revenues rather than labor taxes (e.g., India, Indonesia, and Thailand; Clements, Eich, and Gupta, 2014).

- Low-skilled workers:** Empirical evidence shows that targeted tax credits result in positive net employment effects as low-skilled workers exhibit higher labor supply elasticities than high-skilled workers (OECD, 2011; IMF, 2014a). Most advanced economies have introduced such in-work tax credits. More progressive tax schedules could also be a revenue-neutral way of reducing tax wedges for low-skilled workers (OECD, 2011; Imervoll and Pearson, 2009; Chirinko and Wilson, 2009). Hiring subsidies or targeted reductions in non-wage labor costs (such as social contributions) can stimulate demand for low-skilled labor.



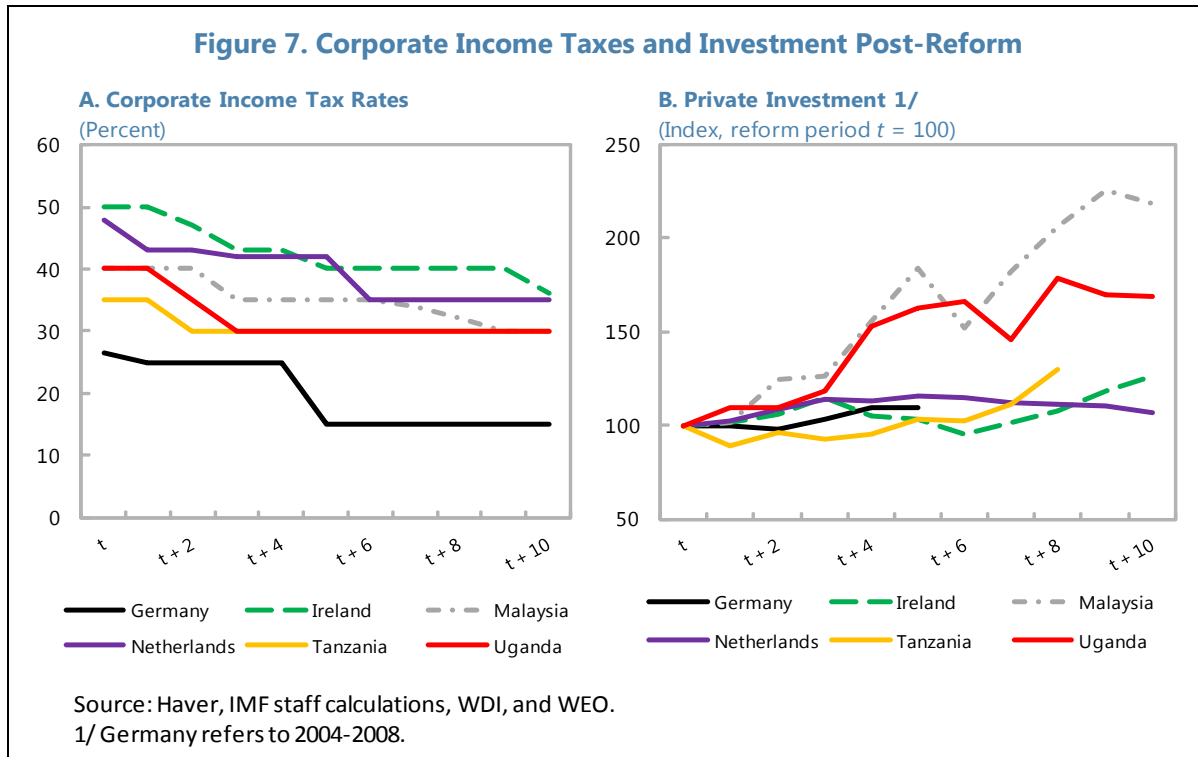
## Policies to Enhance Investment in Physical Capital

*Physical investment—both public and private—is an important driver of growth in all economies and also holds the key to improvements in productivity. This section focuses on the tax policy drivers of private capital accumulation and discusses the importance of efficient public capital investment for the economy's growth potential.*

**24. Taxation of capital income influences private savings and investment decisions.** By increasing the user cost of capital, corporate taxes can have an adverse impact on domestic investment and FDI (Abbas and Klemm, 2012; Vartia, 2008; Schweltnus and Arnold, 2008). Revenue-neutral policy simulations using the endogenous growth model indicate that reducing tax on capital income by 5 percentage points (while increasing the consumption tax to keep fiscal revenue unchanged) adds about 0.2 percentage point to long-run economic growth.<sup>11</sup> Malaysia streamlined and reduced corporate income tax (CIT) to a level comparable to other South-East Asian countries, which contributed to a surge in investment. Similar responses were observed in Germany, Ireland, the Netherlands, and Uganda. In these countries, tax changes were carried out following

<sup>11</sup> This is because the tax cut increases the after-tax rate of return on private capital which encourages investment and growth.

macroeconomic stabilizations which created the necessary supportive environment for investment (Figure 7).

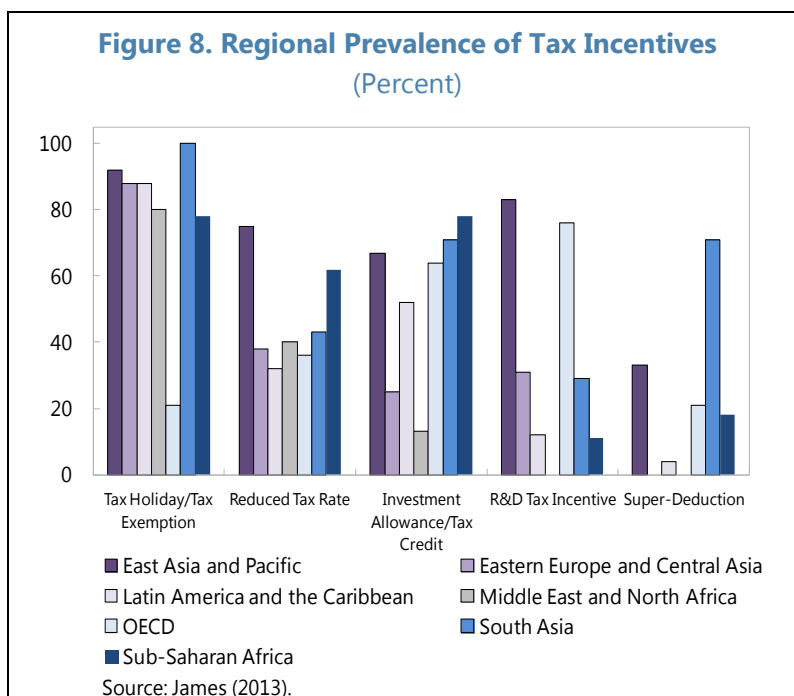


**25. Reforming corporate income taxes to tax “excess returns” could have a significant growth dividend.** While their distortionary impact is widely acknowledged, CITs are an important source of revenue in many economies. Limiting the tax to “excess returns” or rents would reduce investment distortions, thereby promoting long-term growth while still generating revenue (Cottarelli and Keen, 2012). Under the allowance for corporate equity (ACE) scheme, investments that earn a “normal” return are exempt from taxation through a deduction of an imputed return on equity.<sup>12</sup> The ACE also reduces the bias toward debt-financing, created by the deductibility of interest expenses (Klemm, 2006; Mirrlees and others, 2011). Several advanced and emerging economies (including Austria, Belgium, Brazil, Croatia, and Italy), have used variants of this scheme. There is evidence that the ACE has had a positive impact on private investment in Belgium (Aus dem Moore, 2014).

<sup>12</sup> The normal rate of return is the risk-free rate of return (e.g., rate of return on a government bond) while excess returns are defined as anything above this rate (Mirrlees and others, 2011).

**26. Tax incentives can significantly erode the revenue base without achieving offsetting benefits from increased investment, unless they are properly designed and limited.**

Tax incentives take several forms, such as tax holidays, preferential tax treatments in special zones or targeted allowances for certain investments (Figure 8). The choice of incentive, and the design details, matter critically for the effectiveness of tax incentives (IMF, World Bank, OECD, and UN, forthcoming). Well-targeted incentives that directly reduce the cost of capital, such as accelerated depreciation schemes, investment tax credits, and super deductions, have been used with some success in advanced countries (a discussion on incentives for R&D can be found, for example, in the section *Policies to Increase Total Factor Productivity*). In contrast, open-ended and profit-based tax holidays are less effective and can erode the tax base indefinitely. And they can be very costly: for instance, Cubeddu and others



(2008) estimate the cost of CIT incentives in 15 Caribbean countries at around 5½ percent of GDP, on average; and Villela and others (2010) estimate the cost of preferential treatments under the income tax in Latin America to range between ½–6 percentage points of GDP.<sup>13</sup> This argues for a rigorous cost-benefit analysis of tax incentives. The investment climate more generally is an important determinant of the level of foreign investment: FDI is eight times stronger for countries with good investment climates (James, 2013). For example, an assessment of tax incentives that were introduced in Malaysia in 1986 concluded that—while they succeeded in stimulating domestic investment—foreign investors were primarily influenced by other factors (including macroeconomic stability and the quality of infrastructure, World Bank, 1991). At the same time, they came at a very high cost (2.2 percent of GDP).<sup>14</sup>

**27. Lack of international cooperation can erode tax bases and squeeze fiscal space.**

National tax policies can generate cross-border spillover effects: for instance, more favorable tax incentives in one country can divert FDI flows from other countries and thereby dampen their

<sup>13</sup> For further discussion please see IMF (2011).

<sup>14</sup> Cost refers to direct revenue foregone in 1991. The main incentives that were introduced included (i) five-year tax holidays for priority sectors; (ii) investment tax and industrial tax allowances; and (iii) export incentives, such as tax abatements and tax allowances (see World Bank, 1992, Annex 4A for the methodology).

growth prospects and erode their tax base. In addition, multinational enterprises (MNEs) may shift profits from a high-tax jurisdiction to a lower-tax one by using accounting tricks, hence exacerbating the problem of base erosion. For example, in low-income countries this can limit significantly the scope for pro-growth public spending and raise difficult trade-offs between the need to raise revenue by limiting tax avoidance by MNEs and encouraging investment (IMF, 2014c). In a world of increasing tax competition, all countries may end up being worse off. To avoid such an adverse outcome, international cooperation is needed, and initiatives such as the OECD/G20 Base Erosion and Profit Shifting project—which aims at protecting tax bases and ensuring predictability—should be encouraged (OECD, 2014a). In view of the difficulty of achieving and enforcing effective cooperation, however, coordination could initially focus on smaller steps, such as promoting transparency by publishing data on tax expenditures arising from tax incentives and country-by-country reporting on transfer prices used to value intra-firm transactions.

**28. Public investment, in particular in infrastructure, can raise the economy’s productive capacity and growth potential.** There is a positive relationship between public capital and growth, and developing economies with large infrastructure gaps stand to reap high returns from increasing public investment (Romp and de Haan, 2007; Bom and Ligthart, 2010). In the endogenous growth literature, public capital yields a direct permanent growth dividend (Futagami and others, 1993). It has indirect growth effects by increasing the longevity of private capital (Agenor, 2010). Higher infrastructure investment is estimated to raise output by as much as three percent in advanced economies—assuming, however, significant slack and accommodative monetary policies as well as fully efficient public investment (IMF, 2014b). Staff’s growth acceleration exercise finds that among capital spending categories, transportation and communication spending exhibits the highest likelihood of subsequent growth acceleration (20 percent). In Poland, transport infrastructure expansion contributed to higher growth. Malaysia accelerated the provision of infrastructure between 1985 and 1995, more than doubling existing capacity in most sectors (World Bank, 2000). During the same period, annual growth surged to close to 8 percent.

**29. The efficiency of public investment helps raise its productivity.** Not all public investment creates economically valuable capital (Pritchett, 2000, and Dabla-Norris and others, 2012). In particular, in countries with weak public investment management processes, public investment is unlikely to translate fully into productive capital and growth (Agénor, 2010). On the flip side, potential gains are substantial: Gupta and others (2014) show that the marginal product of capital is particularly high in low-income countries. Hence, productive investment could have a high growth dividend. The average country loses about 30 percent of the value of its public investment to inefficiencies in the investment process (IMF, forthcoming). The economic dividends from closing this “efficiency gap” could be substantial—(IMF, forthcoming) estimates that the most efficient countries get twice the growth dividend from investment compared with the least efficient countries. Improving institutional arrangements for allocating public investment projects is most important for enhancing efficiency. Tanzania carried out improvements in the investment process (medium-term planning and improved project selection and prioritization) before scaling up infrastructure spending. In Malaysia, inefficient projects by state-owned enterprises (SOEs) were

dismantled and public investment re-focused on public infrastructure projects vital to private sector development.

### **Policies to Support Human Capital Development**

*Human capital accumulation is a key contributor to growth. At the same time, inequities in education and health outcomes persist in advanced and developing economies. This section focuses on public expenditure and tax policies that can improve equitable access to education and health care.*

#### **30. Fiscal policies can play an important role in promoting investment in human capital.**

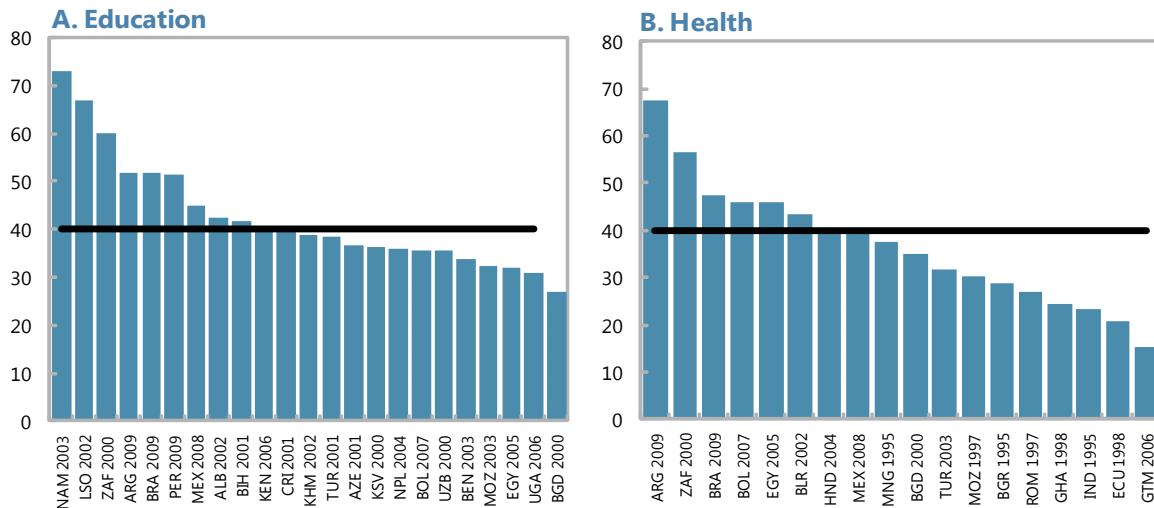
Because of the positive externalities of education, the private sector alone cannot provide the optimal level of human capital, which supports the case for government intervention in the provision of educational services (Gerson, 1998; Fisher and Keuschnigg, 2002). Allowing for deductibility of education expenses or provision of tax credits can mitigate the adverse impact of progressive income taxation on human capital accumulation (Heckman and Klenow, 1997). Public spending on education can directly affect education outcomes and raise the stock of human capital. Specifically, Baldacci and others (2008) show that spending on education has a significant impact on output growth in developing countries, with two-thirds of the effect being realized within the first five years and the remainder over the following five-year span. Analysis of growth accelerations finds that a sustained increase in the share of education spending is followed by a growth acceleration in about a quarter of reform cases. Tanzania increased education spending significantly, provided assistance to open new schools in less developed regions, and decentralized the management of schools to enhance accountability. These reforms helped boost enrollment rates and spur sustained economic growth. Ireland's substantial investment in education from the 1960s onwards helped create a skilled workforce, a key factor for FDI inflows after the implementation of comprehensive fiscal and structural reforms in 1987-89.

**31. Education reform in both advanced and developing economies should focus on improving access for disadvantaged groups.**<sup>15</sup> In developing economies, low-income groups and girls have lower access to education (especially upper secondary and tertiary education), resulting in most of the benefits from education spending going to higher income groups. In most developing economies less than 40 percent of spending is reaching the poorest 40 percent of households (Figure 9). In advanced economies, education spending as a whole is progressive, but spending on tertiary education is regressive and significant inequities in education outcomes persist (OECD, 2014d). Inequitable access to education in both developing and advanced economies reduces opportunities and perpetuates inequality across generations, thereby further constraining the economy's long-term growth. In Ireland, Tanzania, and Uganda, a range of spending reforms focused on improving access to education helped unlock disadvantaged groups' untapped productive capacity, while enhancing the distributional impact of education spending. Education reform options include:

<sup>15</sup> See OECD (2010); Hanushek and Woessmann (2011); and Pritchett (2013) for more detailed discussion.



**Figure 9. Benefit Incidence of Education and Health Public Spending**  
(Percent of Public Spending Going to Poorest 40 Percent of Households)



Source: Davoodi, Tiongson, and Asawanuchit (2010); Lustig and others (2011); World Bank

- **Increasing investment in lower levels of education.** In developing economies a relatively large share of the budget is allocated to higher levels of education. Lower income groups often fail to progress to higher levels of education which are disproportionately accessed by higher income groups. This requires improving access to and progression through primary and lower-secondary education, especially for girls.<sup>16</sup> Increasing access to early childhood education is required in both advanced and developing economies, especially given the substantial evidence that this has a crucial impact on education performance at higher levels.
- **Improving the efficiency of education spending.** Increased spending on education at lower levels should be complemented by efforts to get better results from existing levels of spending. Inefficiencies in spending are substantial, including in developing economies (Gupta and others, 2007; Grigoli, 2014).
- **Increasing cost recovery in tertiary education.** Demand for tertiary education has increased rapidly in both advanced and developing economies, and often faster than public financing capabilities. This has resulted in a decline in the quality of instruction in public institutions and a growth in private education institutions (Woodhall, 2007; OECD, 2011b). Since much of the benefit from tertiary education accrues to graduates in the form of higher earnings and other non-monetary benefits, there is a strong case for financing part of the

<sup>16</sup> Gender gaps in education are directly linked to gender disparities in wages and labor market participation, with adverse implications for long-term growth (Elborgh-Woytek and others, 2013).

cost from tuition fees. Income-contingent student loans (to be repaid once students start earning salaries) can relieve the financing constraint on higher education and provide insurance against the inability to repay loans due to low future income (Barr, 2012). Higher private financing allows tertiary education to expand without increasing public spending.

- **Targeting conditional cash assistance.** Targeting cash assistance to disadvantaged groups, and conditioning this assistance on certain education outcomes, can help to reduce income barriers to education and improve overall educational attainment. Pioneered in the Mexican PROGRESA program in the late 1990s, conditional cash transfer (CCT) strategies are being increasingly used in both advanced and developing economies, including Brazil, Chile, Nicaragua, Peru, the United Kingdom, and the United States. The largest of its kind—*Bolsa Familia* in Brazil—provides assistance to about 14 million families or about 50 million people, and is credited with reducing inequality and halving extreme poverty since its introduction in 2003 (World Bank, 2013). The United Kingdom introduced means-tested education stipends conditioned on education performance; and New York City provides targeted education and health subsidies (IMF, 2014e). However, CCT programs are administratively demanding and may require complementary reforms, such as investment in quality health and education services, and targeted information campaigns to raise awareness amongst eligible populations (Grosh and others, 2008; Fiszbein and Schady, 2009).

**32. Investing in health care also supports human capital accumulation.** Healthier individuals are likely to invest more in their own education and health, thereby further fostering labor productivity and human capital accumulation (Aghion and others, 2010). Empirical studies confirm the potential payoffs for growth from investing in health: Jamison and others (2013) estimate that the economic value of increases in life expectancy in developing economies between 2000 and 2011 was equivalent to a 1.8 percent annual increase in GDP. Staff's growth acceleration analysis suggests that amongst all expenditure categories, health spending is most likely to be followed by growth accelerations (40 percent).

**33. In advanced economies, maintaining the access of the poor to health care services during periods of expenditure constraint is a priority.** Public health care spending accounted for about 17 percent of primary spending in advanced economies or 6 ½ percent of GDP in 2013, and is projected to rise on average by 3 percentage points of GDP between 2015 and 2030 (Clements, Coady, and Gupta, 2012; IMF, 2015a). Health care reforms to curb the growth of spending will be a necessary component of many countries' fiscal adjustment plans. Some of these reforms could take the form of an increase in cost-sharing with the private sector, for example through increased co-payments or a reduction in the scope of services provided by the public sector. These reforms should be designed to ensure that the poor retain access to services, for instance, by exempting them from co-payments.

**34. In developing economies, a focus on universal access to a basic package of health services would yield the highest growth dividends.** Fiscally sustainable progress toward universal access can be achieved through the following measures:

- **Expanding health coverage to low-income households.** The recent Lancet Commission report (Jamison and others, 2013) emphasizes that a fiscally sustainable, publicly financed, basic health package covering essential health care, would benefit the poor and enhance the progressivity of public health spending. In many developing economies the poor often forgo or delay necessary care at an early stage of illness when treatment is more cost effective. Many households fall into poverty because of high out-of-pocket spending or catastrophic illnesses. Access to health care can provide financial protection and free up households from the need to accumulate unproductive precautionary savings.
- **Reducing or eliminating user charges for low-income households.** Health services outside the basic package could be financed by a mix of public and private mechanisms, including insurance contributions, fees, and copayments. However, out-of-pocket spending under the typical health insurance plan may still be too high for low-income households. To further improve the affordability of health care, it may be necessary to reduce or eliminate user charges for certain groups or services. In particular, preventive care, such as immunizations, should be offered free of charge given their large social benefits. In addition, linking utilization of preventive care to eligibility for other social benefits (such as conditional cash transfers) could help increase coverage among low-income households.
- **Addressing supply side barriers in less developed areas.** Since many low-income households reside in less developed areas or neighborhoods, availability of health care facilities and health care professionals—in particular those with similar quality as in more affluent areas—can be a major barrier to access. This may require public provision of health care as the last resort or additional incentives for service provision by private providers in these areas. Tanzania and Uganda managed to expand access to health care. Both countries significantly increased public spending on health and channeled resources through improved public expenditure frameworks. Tanzania increased public health spending almost threefold, from 1.3 percent of GDP in 1998, to a peak of 3.8 percent of GDP in 2006. In Uganda, the increase in public spending was also significant; from 0.1 percent of GDP in 1998 to 1.2 percent in 2003, after free primary health care was introduced.

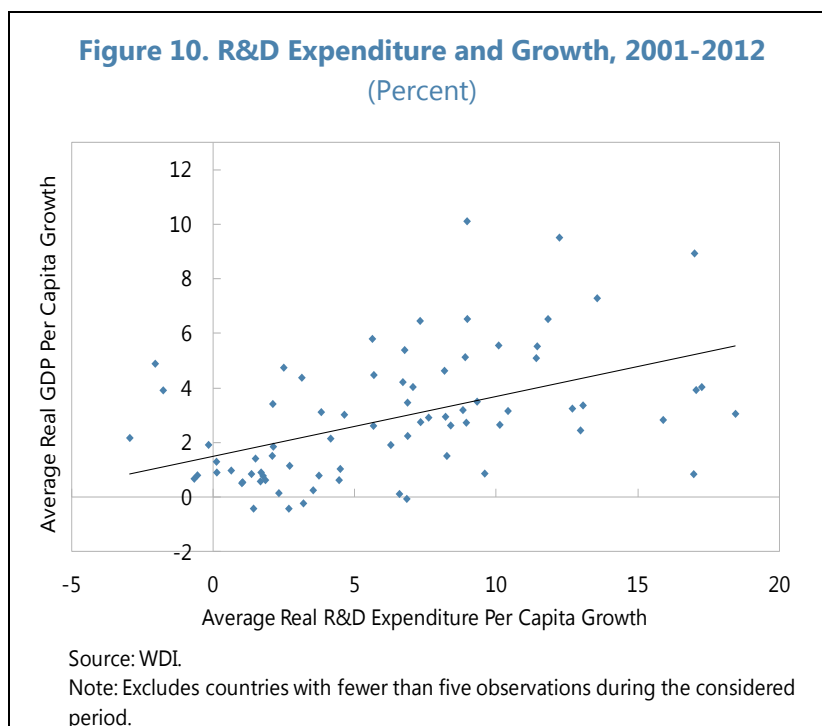
### **Policies to Increase Total Factor Productivity**

*Fiscal policy can raise total factor productivity through several channels, including by stimulating R&D and providing critical infrastructure. It can also help enhance the sustainability of growth by addressing negative environmental externalities.*

**35. The supply of key public goods can raise total factor productivity.** In addition to enhancing the economy's productive capacity as discussed earlier, public investment in physical infrastructure can improve the productivity of private capital and raise its rate of return (Munnel, 1992; Easterly and Rebelo, 1993). Similarly, public spending on education can also accelerate technology catch-up and enhance local productivity by improving the ability of the domestic labor force to absorb cutting edge technologies from the global economy (Everaert and others, 2014; Dhont and Heylen, 2009).

### 36. Well-targeted R&D tax incentives can support lasting growth.

Figure 10 illustrates the positive relationship between spending on R&D and growth. R&D tax incentives generally take two forms: (i) tax credits that reduce the costs of R&D; and (ii) special intellectual property (IP) boxes that reduce the tax burden on profits earned from patents and trademarks. The former are truly geared toward encouraging innovation, while the latter are more likely used as a tool for tax competition. In advanced economies, R&D tax provisions are found to have a positive, albeit relatively small, impact on total factor productivity; this effect is larger for R&D intensive industries (OECD, 2010a).



- Country studies show that a few countries provided tax credits and extended deductions of R&D-related spending with some success (Ireland, Malaysia, and Poland). In Ireland, business expenditure on R&D grew by 80 percent between 2003—the year before the introduction of the tax credit regime—and 2012 (Hynes and O’Connor, 2014). In Poland, five-year growth in real R&D spending accelerated from 32 percent in the pre-reform period (1994-99) to 63 percent in the post-reform period (2005-10).
- In addition to tax measures, a number of countries increased public spending on R&D. For example, in the Netherlands, public spending on R&D increased by 8 percent during a substantial expenditure-based consolidation in the mid-1980s.

### 37. However, similar to tax incentives in general, R&D tax incentives can be distortive and ineffective if not designed carefully.

In addition to the care that is required in designing tax incentives in general (as discussed under *Policies to Enhance Investment in Physical Capital*), the design of incentives targeted at encouraging R&D requires particular attention. Empirical evidence on positive effects of such incentives on innovation and growth remains relatively scant. This could be due to R&D spending actually translating into only modest social benefits. Importantly, in countries where the capacity for carrying out R&D activities is limited by human capital constraints, the case for such tax incentives is less compelling, and other measures (such as incentives for technology transfers) may be better suited to boost productivity.

### C. Fiscal Space for Pro-Growth Reforms

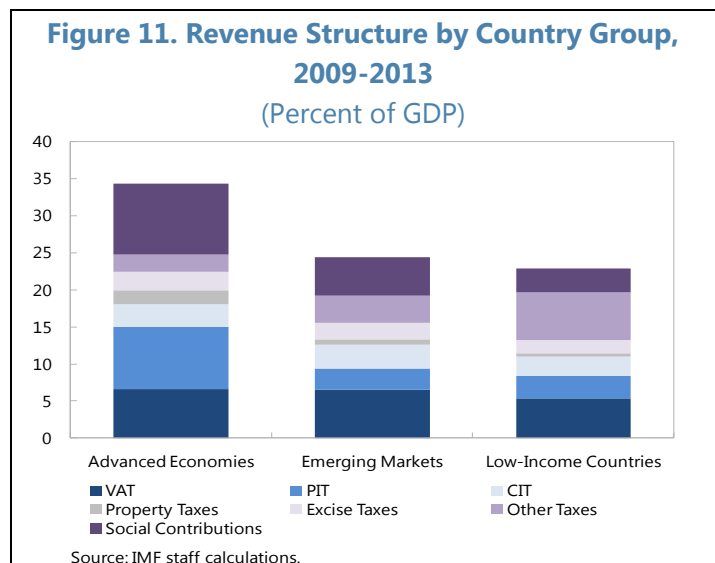
*In some instances, the implementation of growth-friendly fiscal reforms will require fiscal space. While revenue measures should focus on minimizing distortions, expenditure reforms should primarily address inefficiencies in spending. Such policies would not only provide fiscal space but also contribute directly to medium- to long-term growth. Policies to reduce energy subsidies and introduce environmental taxation would address negative externalities, as well as generate resources for growth-enhancing interventions. For countries facing difficulties in expanding fiscal space, the focus should be on budget-neutral fiscal reforms.*

**38. Growth-friendly fiscal reforms may require fiscal space.**<sup>17</sup> For example, given a tight budget constraint, revenue losses from lowering highly distortionary taxes (e.g., labor taxes) would need to be offset by other tax measures and/or spending cuts. Similarly, increased spending on public infrastructure, health, and education would need to be financed either through additional revenue or through reductions in other public spending. Additional borrowing is an option for countries where fiscal sustainability and rollover risk are not a concern.

**39. Countries that opt to create fiscal space through revenue measures should focus on less distortionary taxes and base-broadening measures.** Such measures could include:

- **A shift in the revenue composition toward more growth-friendly taxes.** As noted above, corporate income taxes have the most negative effect on growth, followed by labor income taxes, then indirect taxes, and finally property taxes (IMF, 2013a).

However, most countries rely to a great extent on direct tax revenue (Figure 11). In many countries, closing value-added tax (VAT) policy and compliance gaps would both improve revenue collection and remove inefficiencies (IMF, 2013a). Increasing excise taxes on alcohol, tobacco and even sugar, can be justified on the grounds of their possible harmful health effects. The regressive impact of higher indirect taxes can be compensated by expanding spending on programs that benefit the poor relatively more. In Poland, a reduction in the share of direct taxes in overall tax

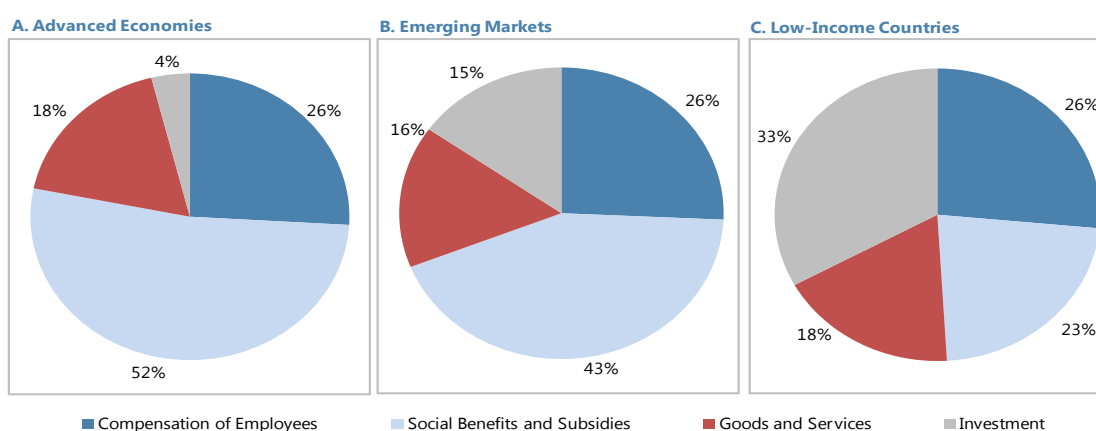


<sup>17</sup> Fiscal space is defined as “the availability of budgetary room that allows a government to provide resources for a desired purpose without any prejudice to the sustainability of a government’s financial position” (Heller, 2005, p. 3). Ostry and others (2010) use an alternative definition: by fiscal space they mean the scope for further increases in public debt without undermining sustainability.

revenues from 45 percent to 36 percent contributed to a significant increase in investment and employment. In Chile, an early introduction of a broad-based VAT with limited exemptions, helped to reduce distortionary effects of sales taxes and yielded substantial revenue gains. In both countries growth improved following the reforms.

- Base-broadening measures.** These often include rationalizing tax exemptions and preferential regimes. Eliminating preferential treatments or improving their targeting could yield higher revenue and improve horizontal equity while enhancing growth. A number of countries combined tax rate reductions with tax base broadening. Australia in the 1980s launched a tax reform which cut tax rates and tightened tax exemptions in such areas as agriculture, forestry and film production. In Malaysia in the late 1980s, growth-friendly tax cuts (profit and trade taxes) were partially offset by broadening the sales tax base; and in Uganda, civil servants' salaries were made taxable, while tax exemptions were curtailed.
- Improvements in revenue administration.** Tax compliance affects the revenue yield, efficiency and fairness of a tax system (IMF, 2015b). Effective revenue administration reforms include the introduction of risk management techniques and segmentation of taxpayers (e.g., establishment of large taxpayer units). In addition, simplification of laws and procedures can help reduce the cost of taxpayer compliance. In Chile, for instance, simplification of taxpayer forms and streamlining of filing and payment procedures contributed to improved enforcement and tax collection. Tanzania and Uganda created a unified revenue authority. Conditionality under Fund-supported programs can help: Crivelli and Gupta (2014) estimate that tax revenues increased by approximately ½ percentage point of GDP in a given year in countries where Fund-supported programs included conditionality on tax policy and administration.

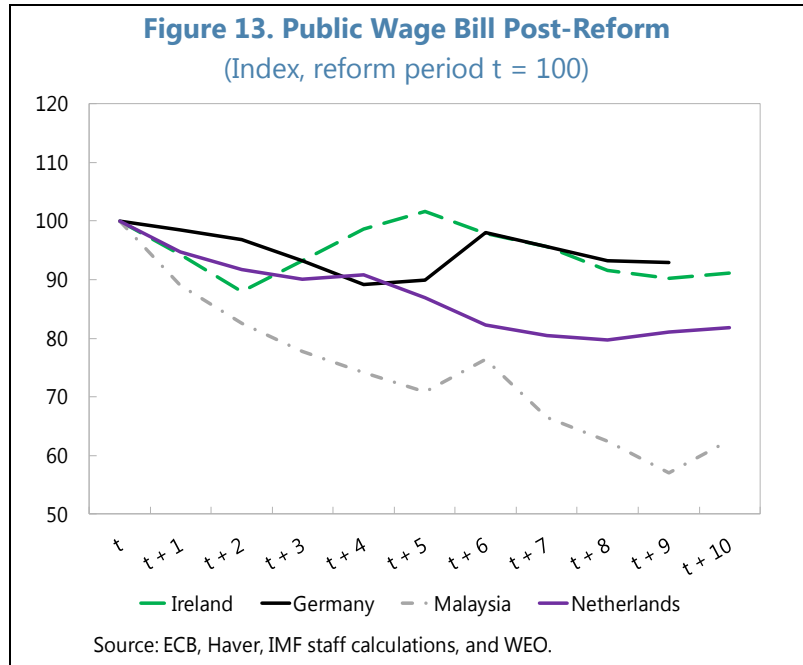
**Figure 12. Public Expenditure Composition, 2007-2013**



Source: IMF staff calculations.

**40. Countries that opt to create fiscal space through spending measures should focus on rationalizing spending and improving efficiency.** Such measures could include:

- Rationalizing spending.** Spending on wages, subsidies and social benefits accounts for around three-quarters of total spending in advanced and emerging economies (Figure 12). Priority areas that could be examined for rationalization therefore include the government wage bill, especially where public sector wages and employment are high relative to the private sector; and social spending, in particular where it is poorly targeted. For example, in advanced economies, only one-fifth of total spending on family benefits was means-tested in 2011; and in low-income countries, social assistance programs are often prone to leakages and insufficient coverage of eligible populations (IMF, 2014f).



Country studies illustrate how public wage bill rationalization helped create fiscal space and contributed to wage moderation in the Netherlands, Ireland, Germany, and Malaysia (Figure 13). The redesign of social transfers formed part of broader adjustment packages in the Netherlands, Chile, Germany, and Poland.

- Improving efficiency.** Many countries could enhance the delivery of essential public services while saving resources by improving the efficiency of spending. For example, at least 20–40 percent of health spending is typically wasted (World Health Organization, 2010), and, as noted earlier, there is scope for substantial gains in health indicators at current levels of spending (Grigoli and Kapsoli, 2013). With regard to education, trends in the wage bill in many advanced countries do not reflect the fact that teacher-student ratios are falling. Implementing a per-student financing formula such as in the Netherlands could ensure that wage costs remain in line with the number of students and potentially generate savings that could be used to enhance the quality of school infrastructure and teaching materials (IMF, 2014f). The potential for efficiency improvements also extends to quasi-fiscal activities. For instance, reform of inefficient SOEs and privatizations provided significant fiscal space in Chile, Tanzania, and Malaysia.

#### 41. Policies to address negative environmental externalities can also create fiscal space.

Fiscal policy has an important role to play in building greener economies and boosting environmentally sustainable growth by pricing environmental externalities and improving resource allocation. At the same time, eliminating energy subsidies and introducing environmental taxation can generate substantial fiscal resources:

- **Generalized energy subsidies** distort consumption and production decisions, and constitute a poor instrument for income redistribution (Arze del Granado and others, 2012). In 2015, spending on energy subsidies (on a post-tax basis) is projected to reach US\$5.3 trillion (or 6½ percent of global GDP).
- **Carbon or congestion taxes** are aimed at reducing greenhouse gas emissions and pollution. Potential revenue gains from these environmental taxes could amount to 2.9 percent of global GDP (Gupta and Keen, forthcoming).

## D. Growth and Equity

*Income inequality affects growth in its own right and an overall assessment of growth-enhancing fiscal reforms needs to reflect their distributional consequences. While some growth-enhancing reforms can have a negative impact on income inequality, country studies illustrate strategies to mitigate equity-efficiency tradeoffs.*

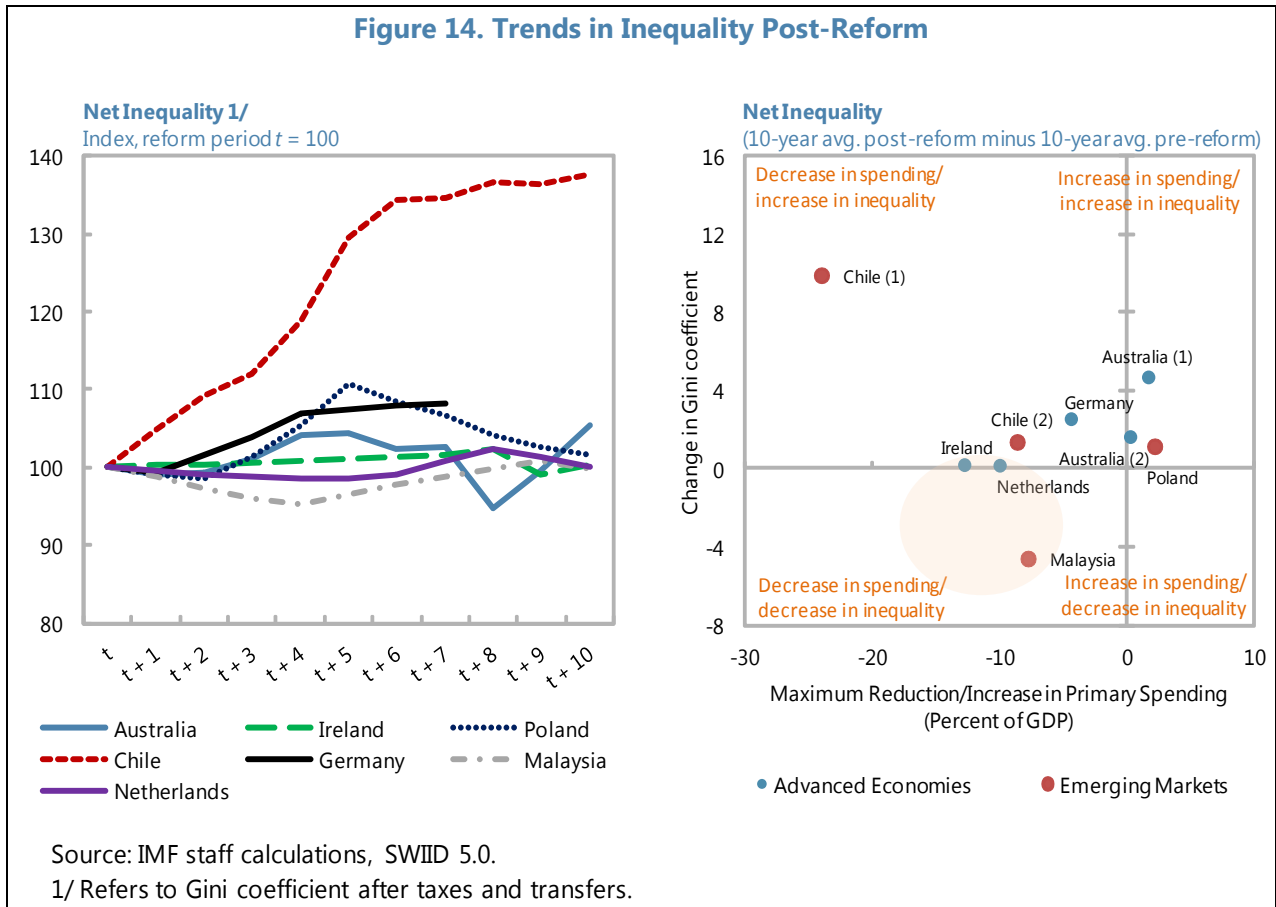
**42. Income equality can lead to higher long-term growth through faster human and physical capital accumulation.** At low levels of income, some degree of inequality can spur growth by raising savings and investment (Kaldor, 1957) and allowing at least a share of the population to start businesses and get a good education (Barro, 2000). However, with rising inequality the relationship may turn negative (Benhabib, 2003). Recent studies indicate that high levels of inequality are, overall, harmful for the pace and sustainability of growth (Berg, Ostry and Zettelmeyer, 2012; Ostry, Berg and Tsangarides, 2014). Education and health outcomes of the poor tend to be better in a more equal society, due to higher personal income, larger transfers from the government, and/or better public services. This can lead to a faster accumulation of human capital (Perotti, 1996; Galor and Moav, 2004; Aghion, Caroli, and Garcia-Penalosa, 1999). In addition, higher income equality can expand the size of domestic demand and support higher physical capital accumulation (Murphy, Shleifer and Vishny, 1989).<sup>18</sup>

**43. Some reforms that increase efficiency have adverse distributional consequences.** For instance, a shift from direct to indirect taxes, aimed at reducing distortions and promoting growth, can reduce the progressivity of the tax system and increase inequality. A reduction in social transfers—aimed at encouraging labor participation—might likewise have a detrimental impact on equity. In particular, measures such as public employment reductions or pension freezes can increase unemployment and reduce the purchasing power of lower income groups, with adverse consequences for the income distribution (Ball and others, 2013; Woo and others, 2013). In the country studies, inequality worsened especially where current spending cuts involved reductions in social benefits, including in Chile and Germany (Figure 14). In Australia, income inequality widened in part because the reforms in the 1980s increased wage dispersion, and the introduction of the GST

<sup>18</sup> Improved equality can also create a more stable social and political environment, which can facilitate greater public acceptance of growth-enhancing reforms (Todaro, 1997; Ramey and Ramey, 1995; Hausmann and Gavin, 1996; Rodrik, 1999).



in the early 2000s reduced the progressivity of the tax system (Singh and others, 1998; Greenville and others, 2013).



**44. Appropriately designed, fiscal reform packages can serve both growth and equity objectives.**<sup>19</sup> Cross-country analysis finds that a reduction in inequality does not diminish the association between fiscal reforms and growth accelerations. For example, if the proceeds of a regressive, yet growth-enhancing tax reform are used to finance higher health and education spending, the overall outcome may be higher growth and lower inequality (Muñoz and Cho, 2004; IMF, 2014e). In particular, providing conditional cash transfers tied to the schooling of young children, especially girls, can reduce inequality and boost human capital. Reducing evasion and tax expenditures or loopholes that largely benefit the rich can simultaneously benefit growth and income equality (Blanchard and Cottarelli, 2010). More generally, a tax system that is perceived to be “fair” is associated with improved tax compliance (IMF, 2015c). Despite a sharp reduction in public spending, income inequality did not increase significantly after Ireland’s first reform episode in the late 1980s. This reflects the composition of fiscal adjustment—specifically the fact that cuts in public

<sup>19</sup> Ostry, Berg and Tsangarides (2014) argue that on average fiscal redistribution has no clear direct negative consequence for growth and thus can indirectly promote sustainable growth.

sector wages and untargeted transfers turned out to be progressive—as well as the sharp increase in employment subsequent to reforms (Bastagli, Coady and Gupta, 2012; IMF 2014e). In Malaysia, spending to reduce ethnic inequality was protected when a 10 percent of GDP cut in primary spending was instituted during the second half of the 1980s. Measures that helped reduce inequality and poverty included the public provision of health and education services, in particular in rural areas; a system of targeted transfers; and education and technical training to facilitate mobility from agriculture to higher-value added activities.

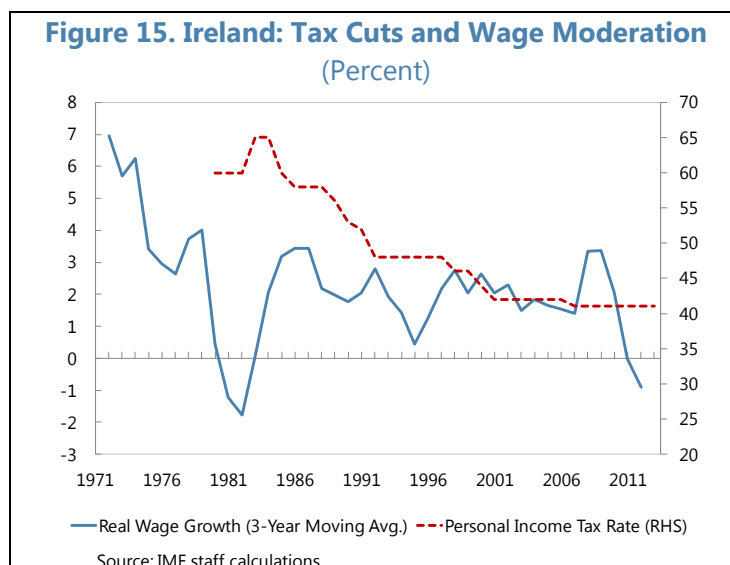
## THE “HOW” MATTERS: DESIGN AND IMPLEMENTATION OF REFORMS

*How fiscal reforms are designed and implemented are key determinants of their success in generating strong and sustained growth. The most critical considerations in this regard include social dialogue around key reform areas; policy complementarities; consistency with structural and macroeconomic policies; and policy credibility.*

### **45. Social dialogue enhances the likelihood of reforms being implemented and sustained.**

In advanced economies public sector employment reforms that involved social dialogue resulted in much deeper and more sustained reductions in the wage bill (IMF, 2014f). Examples of such reform episodes include the Netherlands and Ireland. The Netherlands’ *Wassenaar* agreement (1982) and Ireland’s tripartite agreement (1987) facilitated the implementation of politically difficult measures such as cuts in benefits and wage moderation.

**46. A number of strategies can help foster public support for reforms.** Effective communication with stakeholders that emphasizes the intended benefits of reforms—or the cost of maintaining the status quo—can help mitigate resistance to reforms (as arguably occurred in Germany in 2003). Also, inclusion of compensatory measures for those expected to lose from reforms has been found to be effective in gaining public support for reform packages. In Ireland and the Netherlands, real wage growth reductions were compensated with tax cuts to mitigate the impact on disposable income (Figure 15); and cuts in social benefits were made more palatable by the promise of job-creation in the private sector. Common policy anchors can help forge consensus. In Poland, for instance, the prospect of EU-accession was critical in overcoming resistance to pension reform and reductions in social benefits. In most cases, countries apply a combination of strategies (Clements and others, 2013).



**47. Successful fiscal reforms exploit policy complementarities to maximize their impact on growth, and are generally accompanied by supportive structural reforms and macroeconomic policies:**

- Fiscal policy complementarities.** In all countries studied, policy design helped fiscal measures reinforce each other. For example, in the Netherlands, Ireland and Germany, work incentives were enhanced by reducing benefits and income taxes. Countries simultaneously reduced corporate/personal income taxes and current spending, in order to stimulate private investment and employment while improving public finances (Poland, Australia, Ireland, Netherlands, Chile, and Malaysia). Complementary steps are often necessary to reap positive outcomes: for example, in a country with weak governance, scaling up public investment would need to be preceded by improvements in public financial management—which Tanzania strived to do. Staff’s analysis of growth acceleration episodes points to the potential benefits of policy complementarities: the likelihood of growth acceleration is higher when expenditure and revenue reforms are combined.
- Supportive structural reforms in other areas.** Broader structural reforms can help to boost medium-to long-term growth and magnify the impact of fiscal reforms. In the majority of the country studies, fiscal reforms were implemented together with other structural reforms. To boost employment, countries combined strengthened work incentives with labor market reforms aimed at facilitating job creation, such as streamlined hiring/firing procedures, changes in wage bargaining, and minimum wage cuts (Netherlands, Ireland, and Germany). In other cases, fiscal consolidation to create room for corporate tax reductions was pursued simultaneously with economic deregulation and privatizations (Netherlands, Malaysia, and Chile). In Tanzania, opening up the economy, including through trade liberalization, helped enhance the effectiveness of fiscal reforms and create a favorable environment for private-sector development.

- **Consistent macroeconomic policies.** Reform packages also require a “two-handed approach” (Blanchard and others, 1985) where macroeconomic policies support structural reforms. For example, a transitory loosening of the fiscal stance can buy valuable time to implement labor market reforms. In this regard, a slower pace of consolidation may be required to absorb the potential costs of structural reforms (IMF, 2014a).

**48. The credibility of reforms can boost their effectiveness and impact on medium- to long-term growth.** Recent evidence for advanced economies confirms that the establishment of a credible medium-term adjustment path matters more for instilling market confidence than the initial fiscal adjustment effort (Harris and others, 2013). Policy credibility can thus allow for an even distribution of adjustment effort over time—or even back-loading—and hence minimize the potential negative impact on longer-term growth from hysteresis effects (IMF, 2013b).

**Table 1. Menu of Options: Fiscal Policies for Medium- to Long-Term Growth**

	Advanced Economies	Emerging Economies	Low-Income Countries	Examples from Country Studies
<b>Macroeconomic Stability (Section II.A)</b>				
Reduce large fiscal deficits	xxx	xxx	xxx	Chile, Ireland, Malaysia, Netherlands
Adjust pace and composition of fiscal consolidation to protect growth	xxx	xxx	xxx	Ireland, Netherlands
Contain increase in age-related expenditure	xxx	xx	x	Germany, Poland, Australia
<b>Structural Fiscal Policies (Section II.B)</b>				
<i>Policies to encourage labor supply</i>				
Reduce labor taxes, especially at low income levels	xxx	xx	x	Ireland, Netherlands
Redesign unemployment benefits, including by tightening eligibility and shortening duration	xxx	xx	x	Netherlands, Germany
Provide in-work benefits and tax credits	xxx	xx	x	Germany, Netherlands
Increase use of active labor market programs (ALMPs)	xxx	xx	x	Germany
Stimulate labor force participation of:				
-women, including through individual taxation	xxx	xx	x	Ireland
-older workers, by restricting early retirement and providing tax incentives	xxx	xx	x	Australia, Germany, Netherlands
-low-skilled workers, through targeted ALMPs and use of in-work benefits	xxx	xx	x	Germany, Netherlands
<i>Policies to enhance investment in physical capital</i>				
Design a system that taxes excess returns on capital	xxx	xx	x	
Provide well-designed tax incentives that reduce the cost of capital	xxx	xx	xx	
Protect or increase the public capital stock	xxx	xxx	xxx	Poland, Tanzania, Malaysia
Enhance the productivity of public investment by strengthening the investment process	xx	xx	xxx	Tanzania
<i>Policies to support human capital development</i>				
Provide access to education for disadvantaged groups by:				
-spending more at lower levels	xxx	xxx	xxx	Ireland, Tanzania, Uganda
-increasing cost-recovery for tertiary education	xxx	xx	xxx	
-conditioning cash transfers on school enrollment	xx	xxx	xxx	
Expand access to basic healthcare by:				
-reducing user charges for low-income households	xxx	xxx	xxx	Tanzania, Uganda, Chile
-addressing supply-side barriers in less developed areas	x	xxx	xxx	Tanzania, Uganda
-conditioning cash transfers on preventive health visits	x	xxx	xxx	
<i>Policies to increase total factor productivity and promote technological progress</i>				
Grant tax credits or deductions for R&D	xxx	xx	x	Ireland, Poland, Malaysia
Increase public R&D spending	xxx	xx	x	Netherlands
Provide more efficient public infrastructure	xxx	xxx	xxx	Poland, Tanzania, Malaysia
<b>Fiscal Space (Section II.C)</b>				
<i>Revenue measures</i>				
Use indirect, property/wealth and environmental taxes to raise revenue	xxx	xxx	xxx	Chile, Poland
Broaden tax base, including by reducing exemptions and preferential regimes	xxx	xxx	xxx	Australia, Malaysia, Uganda
Improve revenue administration and simplify forms and procedures	x	xx	xxx	Chile, Malaysia, Tanzania, Uganda
<i>Expenditure measures</i>				
Rationalize the public wage bill	xxx	xxx	xxx	Chile, Germany, Ireland, Netherlands, Malaysia
Improve the design of social spending programs by better targeting	xx	xxx	xxx	Chile, Germany, Ireland, Netherlands, Poland
Improve the efficiency of spending through targeted sectoral reforms, e.g. in health or education	xxx	xxx	xxx	Netherlands
Eliminate generalized subsidies, especially for energy products	x	xxx	xxx	
Reform inefficient SOEs	x	xxx	xxx	Chile, Malaysia, Tanzania
<b>Equity and Growth (Section II.D)</b>				
Include mitigating measures when implementing potentially regressive reforms (e.g. increasing indirect taxes)	xxx	xxx	xxx	Ireland, Malaysia
Growth-enhancing reforms that also help equity include closing tax loopholes used by the wealthy and targeted CCTs	xxx	xxx	xxx	
<b>Policy Design and Complementarity (Section III)</b>				
Build social consensus through effective communication and/or compensating losers	xxx	xxx	xxx	Ireland, Netherlands
Complement fiscal reforms with other structural reforms and consistent macroeconomic policies	xxx	xxx	xxx	Chile, Germany, Ireland, Malaysia, Netherlands

Note: 'xxx' denotes highly relevant policy, 'xx' denotes moderately relevant policy and 'x' denotes less relevant policy.

## LESSONS FOR POLICYMAKERS: AN AGENDA FOR REFORM

**49. There are many ways in which fiscal policy can support medium- to long-term growth (Table 1).** In designing growth-friendly fiscal policies, consideration should be given to country-specific needs, circumstances, and administrative capacities.

- ✓ **Macroeconomic stability is an essential prerequisite for strong and sustained growth.**
  - Large fiscal deficits reduce aggregate savings in the economy and may lead to inflation, high interest rates, and balance of payments pressures. Policy uncertainty, high levels of public debt, and high inflation, can deter private investment.
  - Fiscal frameworks that facilitate the symmetric functioning of automatic stabilizers can reduce macroeconomic volatility and uncertainty and foster medium-term growth.
  - Careful consideration needs to be given to the pace of fiscal consolidation. Countries that are not under market pressure should proceed with gradual fiscal consolidation, anchored in a credible medium-term plan.
  - The composition of adjustment matters for growth. Expenditure-based consolidations are typically more durable and supportive of longer-term growth; however, in some cases revenue-based consolidations may be more appropriate and equity-friendly.
  - Not all countries need to adjust, however: many low-income countries may have fiscal space for productive spending on infrastructure and critical social services.
- ✓ **Policy design and social consensus matter for the successful implementation of reforms.**
  - Structural reforms can promote savings, stimulate investment, and unlock productivity gains. To be successful, fiscal measures should be mutually reinforcing and may need to be accompanied by supportive structural reforms and macroeconomic policies.
  - Appropriately designed fiscal reform packages can serve both growth and equity objectives: for example, if revenue from relatively regressive tax reforms is used to finance higher health and education spending, the overall result can be higher growth and lower inequality.
  - Social consensus increases the likelihood of reforms being implemented and sustained. A number of strategies can help foster public support for reforms, including effective communication with stakeholders, and compensatory measures for those expected to lose from reforms.

✓ **Specific tax and expenditure policies can help growth.**

*Policies to increase the labor supply*

In many advanced economies, significant distortions arise from the tax-benefit system:

- Lowering the labor tax wedge increases after-tax earnings and the supply of labor, particularly for younger workers, women and the low-skilled;
- Redesigning unemployment benefits by conditioning eligibility on participation in ALMPs and increasing the use of in-work benefits can better support job-seekers—especially unemployed youth— and strengthen work incentives;
- Introducing targeted measures can encourage the labor force participation (LFP) of particular groups:
  - *Women*: improving the design of family benefits, including paid parental leave; providing more flexible work options; and ensuring the availability of affordable child care;
  - *Older workers*: lowering implicit taxes on continuing work, increasing the effective retirement age, and adjusting pension benefits to actuarially fair levels that do not distort participation decisions, while ensuring effective protection against old-age poverty; and
  - *Low- skilled workers*: providing in-work tax credits, hiring subsidies, and tailored support through ALMPs.
- Promoting equitable access to education, and dismantling legal obstacles to work for women could increase LFP in developing economies.

*Policies to enhance investment in physical capital*

- In advanced economies, reforming the corporate income tax to tax “excess returns” or rents, e.g., through an allowance for corporate equity (ACE), can reduce distortions and stimulate private investment;
- In developing economies, avoiding open-ended tax holidays that erode the tax base indefinitely and providing instead targeted and transparent incentives that reduce the cost of capital, such as accelerated depreciation schemes, investment tax credits, and super deductions, can promote investment; and
- Putting in place efficient public investment processes and prioritizing infrastructure can help reverse the decline in public capital stocks in advanced economies and help close

infrastructure gaps in developing economies. This can boost growth directly and indirectly by raising the productivity of private capital.

*Policies to support human capital development*

- Human capital accumulation can be supported by improving access to education for disadvantaged groups and increasing investment in lower levels of education; as well as ensuring universal access to a basic package of health services by reducing or waiving user charges for poor households.
- In developing economies, addressing supply-side barriers in remote areas and conditioning cash transfers on school attendance and preventive health visits can further promote access to health and education services; and
- In advanced economies, allowing for deductibility of education expenses or providing tax credits can encourage private investment in education.

*Policies to increase total factor productivity*

- In line with administrative capacities, countries can pursue improvements in productivity through targeted and transparent tax incentives such as tax credits that reduce the cost of R&D and encourage investment in new technologies.
  - In most developing and many advanced economies, better public infrastructure can lift growth through both the investment channel and through total factor productivity.
- ✓ **If growth-friendly reforms require fiscal space, resources should be made available in the least harmful way for growth and equity.**
- Broadening the tax base by rationalizing tax exemptions and preferential regimes raises revenue and boosts horizontal equity.
  - Shifting the tax composition to the least distortionary taxes such as taxes on consumption, increases efficiency. Taxes on property or wealth can also increase the progressivity of the tax system.
  - Improvements in revenue administration including through introducing risk management techniques, segmenting taxpayers, and simplifying laws and procedures, can strengthen taxpayer compliance and enhance revenue collection as well as equity.
  - Rationalizing the government wage bill where public sector wages and employment are high relative to the private sector; and improving the targeting of social spending can increase expenditure efficiency.



- Addressing environmental externalities by phasing out energy subsidies and introducing environmental taxation can create fiscal space while facilitating implementation of growth-enhancing measures, such as lower wage taxation.
- For countries facing difficulties in expanding fiscal space, the focus should be on budget-neutral fiscal reforms.

## ISSUES FOR DISCUSSION

**50. This paper finds that fiscal policy can play an important role in strengthening sustained and inclusive growth.** Directors' views and guidance on the analysis and recommendations contained therein would be welcome. Specifically:

- Do Directors agree that fiscal policy can be an effective tool for supporting medium- to long-run growth?
- Do Directors agree that the mix of fiscal policy options should be tailored to country-specific conditions, administrative capacities and preferences?
- Do Directors agree that the growth dividends of fiscal reforms depend to a large degree on complementary structural reforms and supportive macroeconomic policies?
- Do Directors agree that strategies such as effective communication with stakeholders, and compensatory measures for those made worse off can help foster public support for fiscal reforms?
- Do Directors agree that both growth and equity objectives can be achieved when fiscal reform packages are appropriately designed?
- In cases where countries need to mobilize resources to create space for growth-friendly policies, do Directors agree that the tax and spending policies identified in the paper are the least harmful for growth?

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## Technical Annex I. Fiscal Reforms and Growth Accelerations: A Cross-Country Statistical Analysis

*This annex analyses the empirical relationship between fiscal reforms and subsequent growth accelerations in a set of 112 economies over 1975–2013. Revenue and expenditure reforms are followed by growth acceleration in 26 and 21 percent of reform cases, respectively. A combined package of both revenue and expenditure reforms has a stronger likelihood of being followed by acceleration (60 percent). For these comprehensive reform packages, the association is strongest in advanced countries (80 percent), followed by emerging (67 percent) and low-income (38 percent) countries. Reforms aimed at reducing the share of income taxation and increasing the share of health and education spending are most likely to be followed by growth acceleration. The conditional likelihood of growth acceleration is not significantly altered by the presence of high initial debt, subsequent fiscal expansion and reduction in income inequality.*

### A. Background

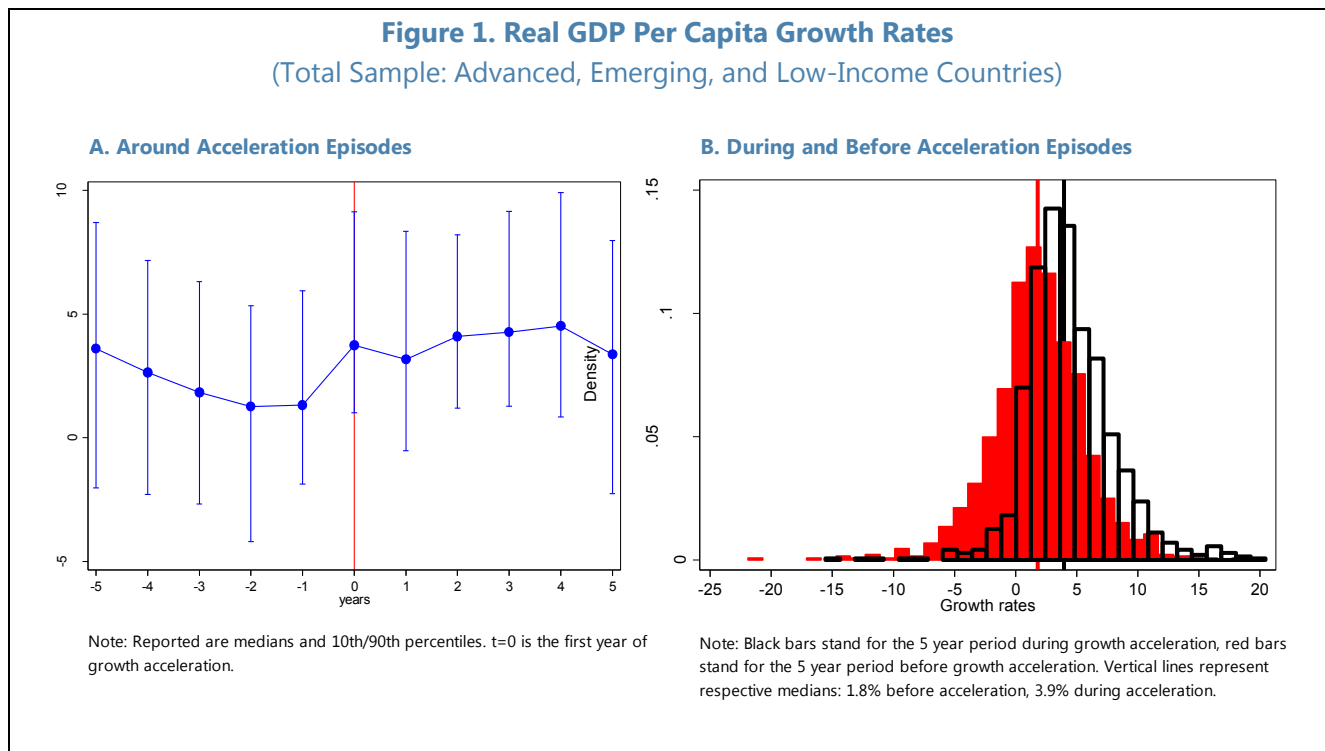
1. **The fiscal response to a rapid slowdown in economic growth has dominated the policy agenda following the global crisis.** The global crisis left a lasting legacy of slow growth in most advanced and many emerging economies. The slowdown in growth poses serious risks to fiscal sustainability and further compounds challenges associated with projected demographic and environmental trends. In response, policymakers are becoming increasingly focused on measures to strengthen growth. With monetary policy options limited due to the zero-lower bound, and fiscal expansion complicated amid rapid build-up of debt, attention has shifted to deficit-neutral fiscal reforms aiming at more growth-friendly composition of government revenue and expenditure.
2. **This note analyzes the empirical relationship between fiscal reforms and long-run growth.** The analysis is performed using the event study methodology on a sample of 112 countries over the period 1975–2013. Periods of protracted growth accelerations are identified and related to incidences of entrenched improvements in revenue and expenditure composition. The outcomes of the indicators approach suggest that: (i) fiscal reforms have a high probability of being followed by a growth acceleration but the exact likelihood varies across country groups (advanced, emerging, and low-income countries) and reform types (subcategories of revenue and expenditure reforms), (ii) the conditional likelihood is robust to high initial debt, as well as subsequent fiscal expansion and reduction in income inequality.

### B. Empirical Methodology

3. **Growth accelerations.** Growth profiles of advanced, emerging, and low-income countries used in the analysis vary widely, making it difficult to use standard time series techniques to measure long-run growth. Therefore, the analysis follows an event study approach (Hausmann and others, 2005) to identify country-specific instances of sustained high growth (Box 1). Using a slightly



less restrictive parameterization compared to the original Hausmann and others (2005) study, the methodology identifies 146 growth acceleration episodes in 112 countries over the period 1975-2013. The largest number of growth accelerations was registered in advanced economies (62 episodes), followed by emerging and low-income countries (42 episodes each). The median growth rate decelerated from 4 percent, five years before acceleration, to close to 1 percent, one year before acceleration (Figure 1A). The median growth rate jumped to 4 percent on the first year of acceleration and peaked at 5 percent on the fifth year, with all countries in the 10<sup>th</sup>/90<sup>th</sup> percentile range recording positive growth rates during the acceleration. The persistent increase in the median growth rate following the acceleration suggests that the 5-year window used in the analysis is sufficiently long to smooth cyclical fluctuations and detect changes in potential growth.<sup>1</sup> The distribution of growth rates shifted markedly subsequent to acceleration, with average growth increasing from 1.8 percent before acceleration to 4.5 percent during acceleration (Figure 2B).



4. **Fiscal reforms.** In the absence of a cross-country dataset of *de-jure* fiscal reforms, the analysis relies on a *de-facto* approach to identify fiscal reform episodes (Box 2). Protracted growth-friendly improvements in government revenue and expenditure composition are used to identify fiscal reforms. The “growth-friendliness” of government revenue and expenditure composition follows theoretical rationale and previous empirical studies (Acosta-Ormaechea and Yoo, 2012; Acosta-Ormaechea and Morozumi, 2013). On the revenue side, growth-friendly composition implies higher share of indirect taxes in total revenue. On the expenditure side, growth-friendly composition

<sup>1</sup> The main results of the analysis are robust to using an 8-year window to identify growth accelerations.

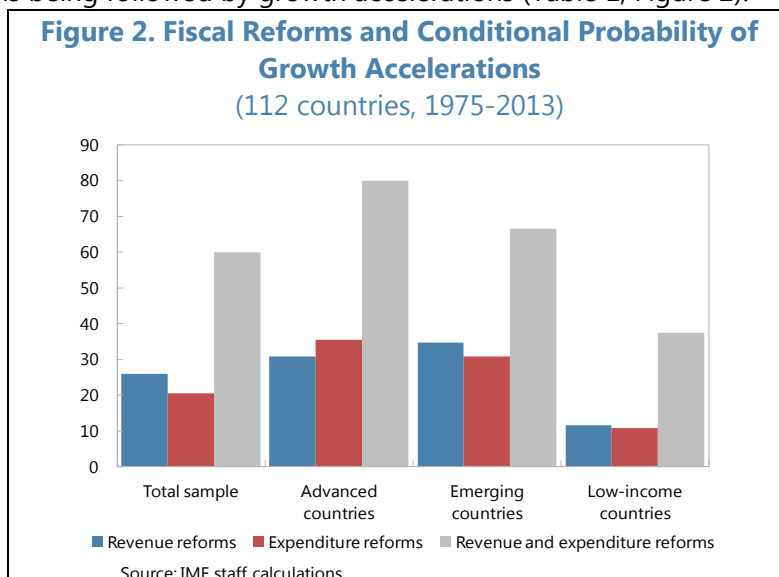
implies higher share of capital, health, and education spending in total expenditure. Using the parameterization described in Box 2, the methodology identifies 168 revenue reforms and 220 expenditure reforms in 112 countries over the period 1975-2013. After fiscal reforms, improved revenue and expenditure composition persists through the fifth year into the reform. The lasting impact of reforms on revenue and expenditure composition is consistent with persistent impact of legal amendments underpinning the reforms.

5. **Empirical model.** An indicators approach is used to analyze the relationship between fiscal reforms and subsequent growth accelerations (Box 3).<sup>2</sup> This non-parametric method was developed by Kaminsky and others (1998) and has been widely applied in previous studies on determinants of crises (see, e.g., Kaminsky and Reinhart, 1999; Berg and Patillo, 1999; Berg and others, 2005). However, previous studies did not analyze the association between fiscal reforms and growth accelerations.

### C. Estimation Results

6. **Fiscal reforms and growth accelerations.** Estimation results suggest a relatively high conditional probability of fiscal reforms being followed by growth accelerations (Table 1, Figure 2).

The total sample includes 3419 observations for which entries for both growth accelerations and fiscal reforms are available, 143 growth accelerations, 131 revenue reforms and 185 expenditure reforms. For the total sample, revenue reforms and expenditure reforms are followed by growth accelerations in 26 and 21 percent of reform cases, respectively. In contrast, 60 percent of reform packages that implement revenue and expenditure reforms jointly are followed by growth accelerations. The analysis was also



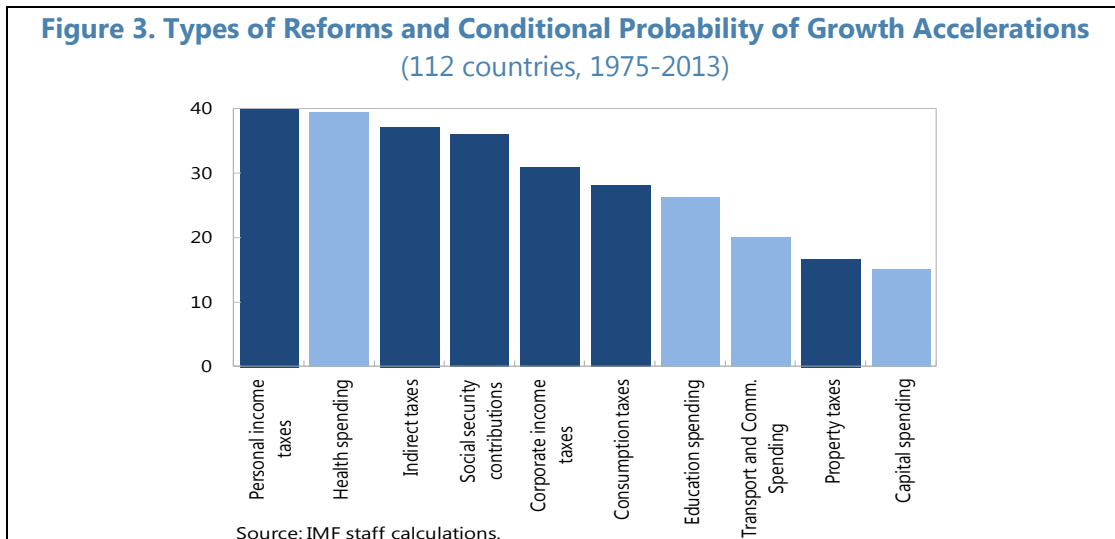
done for subsamples of country groups. The share of combined revenue and expenditure reforms that are followed by growth accelerations is highest in advanced countries (80 percent), followed by emerging (67 percent) and low-income (38 percent) countries. A larger share of expenditure reforms are followed by growth accelerations in advanced economies given the importance of age-related costs for fiscal accounts in advanced economies. By contrast, in emerging and low-income countries

<sup>2</sup> A parametric logistic model was also used to assess the relationship between fiscal reforms and growth accelerations. The results are broadly similar to the non-parametric approach, but definition of the explanatory fiscal reform binary variable in the regression setting is complicated due to the fact that growth accelerations cannot happen more than once over a 5-year time period.

the share of revenue reforms that are followed by growth accelerations is highest amid the prominence of revenue collection issues in these countries.

7. **Types of reforms.** To identify the relationship between individual revenue and expenditure reforms and growth accelerations, separate analysis was done for each type of reforms (Table 1, Figure 3).

- **Revenue reforms.** Measures aimed at reducing the share of income taxation (corporate, personal, and social security contributions) are most likely to be followed by growth acceleration (conditional probabilities range between 31–40 percent). This is consistent with the theoretical prediction of the distortionary impact of income taxation on labor and capital inputs. The conditional probabilities of growth acceleration for reforms in areas of consumption and property taxation are 28 and 17 percent, respectively.
- **Expenditure reforms.** The highest conditional probability of growth accelerations is estimated for health (40 percent) and education (26 percent) spending reforms, which improve the contribution of human capital to the production process. The probability of capital expenditure reforms and targeted reforms of transportation and communication being followed by growth acceleration is relatively lower (15 and 20 percent, respectively).

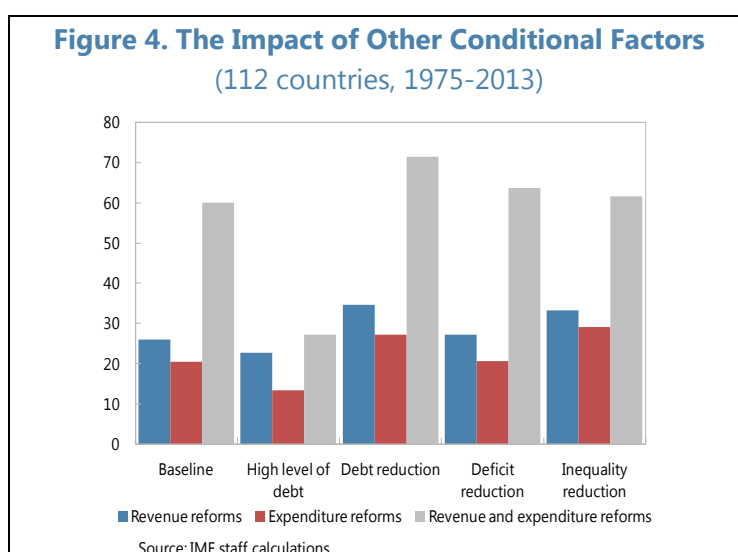


8. **Other conditional factors.** The importance of other conditional factors on the relationship between fiscal reforms and growth accelerations is also assessed (Table 1, Figure 4):

- **High level of debt.** One of the concerns policymakers are facing in exploring fiscal options to jumpstart growth is the high initial level of debt experienced by many advanced and emerging economies in the aftermath of the global crisis. To analyze the relationship between fiscal reforms and growth accelerations in periods of limited room for further debt expansion, the sample is restricted to periods when public debt exceeded 40 percent in low-income countries, 60 percent in emerging countries, and 90 percent in advanced countries. This reduces the total

number of observations to 1774. There have been 55 growth accelerations, 44 revenue reforms and 90 expenditure reforms in periods of high level of debt. Despite the reduction in the number of reforms and accelerations, the conditional likelihood remains relatively high (23 and 13 percent for revenue and expenditure reforms, respectively).

- Fiscal expansion.** Fiscal reforms, such as reduction of the share of direct taxes or increase in the share of productive spending, are often followed by a fiscal expansion and an increase in the fiscal deficit and public debt. Given that fiscal expansion by itself can stimulate growth independent from fiscal reforms, the exercise checks whether the association between fiscal reforms and growth accelerations holds in periods when fiscal reforms were not followed by rising fiscal deficits and debt. Restricting the sample to non-expansionary fiscal reform episodes reduces the total number of observations to 934 (no debt expansion) and 3024 (no deficit expansion): it includes 61 (121) growth accelerations, 52 (114) revenue reforms and 88 (150) expenditure reforms in periods of non-expansionary debt (deficit) reforms. The conditional probability of growth acceleration for combined revenue and expenditure reforms remains high (71 and 64 percent, respectively), suggesting that fiscal expansion does not alter significantly the relationship between fiscal reforms and growth acceleration.
- Income inequality.** One of the factors contributing to the success of fiscal reforms is their inclusiveness and consensus-based implementation. To assess the importance of income inequality, the model is estimated for a subsample of periods when fiscal reforms were followed by a reduction in income inequality as measured by the GINI coefficient. The number of total observations declines to 1068, including 67 growth accelerations, 57 revenue and 72 expenditure reforms in periods of reforms leading to improved inequality. The conditional likelihood of growth acceleration remains high (62 percent) in this restricted sample as well, suggesting that inclusiveness of reforms does not undermine their success in terms of growth outcomes.



### Box 1. Growth Accelerations

The approach of Hausmann and others (2005) is employed to identify growth accelerations. Average growth in real GDP per capita at time  $t$  over horizon  $n$  is estimated from the following regression:

$$y_t = \alpha + g_{t,t+n-1} \text{ trend} + \varepsilon_t \quad (1)$$

where:

$y$  is the log of real GDP per capita;

$\text{trend}$  is the time trend;

$\varepsilon$  is the residual;

$g_{t,t+n-1}$  is the average annual growth rate over horizon  $n$  (between periods  $t$  and  $t+n-1$ );

$t=[i, \dots, i+n-1]$  is the regression sample period, where  $i = 1, 2, \dots, T-n+1$  is the starting time period for the regression and  $T$  is the total sample size.

In regressions, 5 year period ( $n=5$ ) is used when calculating average growth rates. The results of regression (1) are then used to estimate changes in 5-year average growth rates:

$$\Delta g_{t,5} = \hat{g}_{t,t+4} - \hat{g}_{t-1,t-5} \quad (2)$$

Growth acceleration in period  $t$  is identified when the following three conditions are met:

$\hat{g}_{t,t+4} > 2 \text{ percent}$  (growth is rapid);

$\Delta g_{t,5} > 1 \text{ percent}$  (growth accelerates); (3)

$y_{t+4} > \max \{y_i\}, i < t$  (post-acceleration output exceeds the pre-episode peak).

This parameterization is less restrictive than that used by Hausmann and others (2005), in which rapid growth threshold is 3.5 percent and growth acceleration threshold is 2 percent.

### Box 2. Fiscal Reforms

In the absence of a cross-country dataset on *de-jure* fiscal reforms, information on government fiscal indicators is used to identify *de-facto* fiscal reforms. Fiscal reforms are defined as protracted growth-friendly improvements by at least 2 percentage points over at least 3 consecutive years in the following fiscal indicators:

- *Revenue indicators*: indirect taxes (share in total government revenue), consumption taxes (share in total government revenue), property taxes (share in total government revenue), corporate income taxes (share in total government revenue, inverse), personal income taxes (share in total government revenue, inverse), social security contributions (share in total government revenue, inverse);
- *Expenditure indicators*: capital spending (share in total government spending), education spending (share in total government spending), health spending (share in total government spending), and transport and communication spending (share in total government spending).

**Box 3. Empirical Methodology: The Indicators Approach**

An indicators approach is a non-parametric method developed by Kaminsky and others (1998) and applied to study determinants of crises by other authors (e.g., Kaminsky and Reinhart, 1999; Berg and Patillo, 1999; Berg and others, 2005) is used to assess the probability of growth accelerations conditional on fiscal reforms. The methodology identifies the conditional relationship without implying any causality. The following classification table is used:

	Growth acceleration does not start between [t+1, t+5]	Growth acceleration starts between [t+1, t+5]
Fiscal reform does not start at t	A	B
Fiscal reform starts at t	C	D

where:

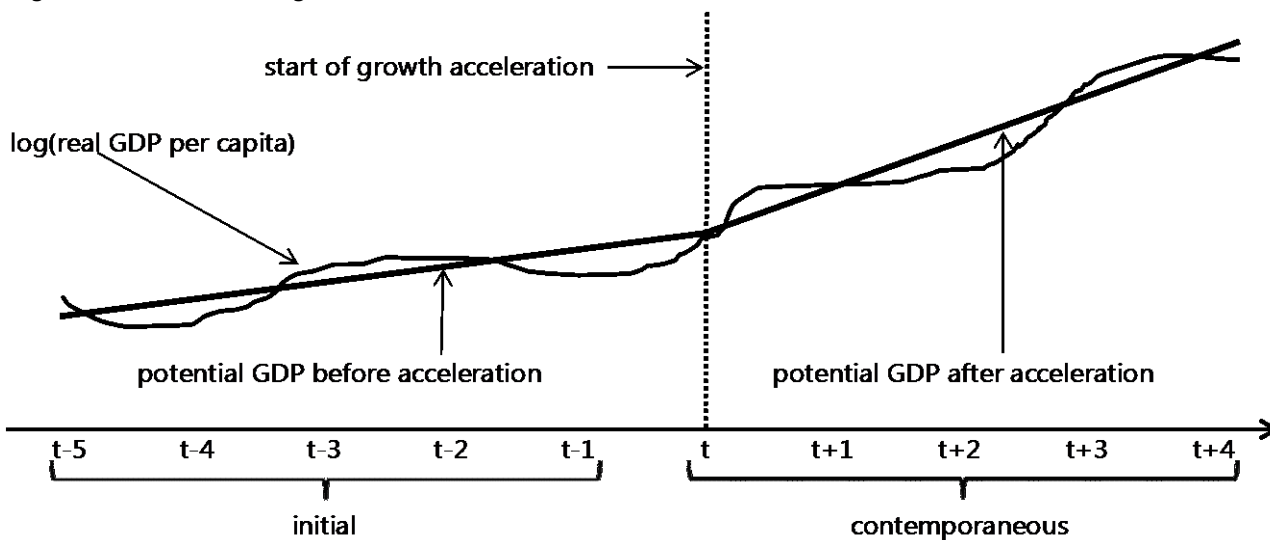
A is the number of country-year observations with no fiscal reforms and no growth acceleration in the subsequent 5-year period;

B is the number of country-year observations with no fiscal reforms and growth acceleration in the subsequent 5-year period;

C is the number of country-year observations with fiscal reforms and no growth acceleration in the subsequent 5-year period;

D is the number of country-year observations with fiscal reforms and a growth acceleration in the subsequent 5-year period.

The probability of growth acceleration starting conditional on a fiscal reform happening in the previous 5-year period is estimated as:  $P(\text{acceleration}|\text{reform}) = D/(D+C)$ . Intuitively, this indicator measures the number of good signals as a share of all signals.



**Table 1. Relationship Between Fiscal Reforms and Growth Accelerations: The Indicators Approach**

<b>Fiscal Reforms</b>	<b>Sample</b>	<b>Total obs.</b>	<b># of growth accelerations</b>	<b># of fiscal reforms</b>	<b>P(accel reform)</b>
<b>Figure 2</b>					
Revenue measures	Total sample	3,419	143	131	26.0
Expenditure measures	Total sample	3,419	143	185	20.5
Revenue and expenditure measures	Total sample	3,419	143	25	60.0
Revenue measures	Advanced economies	894	62	39	30.8
Expenditure measures	Advanced economies	894	62	31	35.5
Revenue and expenditure measures	Advanced economies	894	62	5	80.0
Revenue measures	Emerging economies	922	42	49	34.7
Expenditure measures	Emerging economies	922	42	52	30.8
Revenue and expenditure measures	Emerging economies	922	42	12	66.7
Revenue measures	Low-income countries	1,603	39	43	11.6
Expenditure measures	Low-income countries	1,603	39	102	10.8
Revenue and expenditure measures	Low-income countries	1,603	39	8	37.5
<b>Figure 3</b>					
Indirect taxes	Total sample	3,419	143	35	37.1
Consumption taxes	Total sample	3,419	143	57	28.1
Property taxes	Total sample	3,419	143	6	16.7
Corporate income taxes	Total sample	3,419	143	42	31.0
Personal income taxes	Total sample	3,419	143	35	40.0
Social security contributions	Total sample	3,419	143	25	36.0
Capital spending	Total sample	3,419	143	73	15.1
Education spending	Total sample	3,419	143	61	26.2
Health spending	Total sample	3,419	143	38	39.5
Transport and communication spending	Total sample	3,419	143	40	20.0
<b>Figure 4</b>					
Revenue measures	High level of debt	1,774	55	44	22.7
Expenditure measures	High level of debt	1,774	55	90	13.3
Revenue and expenditure measures	High level of debt	1,774	55	11	27.3
Revenue measures	Debt reduction	934	61	52	34.6
Expenditure measures	Debt reduction	934	61	88	27.3
Revenue and expenditure measures	Debt reduction	934	61	14	71.4
Revenue measures	Deficit reduction	3,024	121	114	27.2
Expenditure measures	Deficit reduction	3,024	121	150	20.7
Revenue and expenditure measures	Deficit reduction	3,024	121	22	63.6
Revenue measures	Inequality reduction	1,068	67	57	33.3
Expenditure measures	Inequality reduction	1,068	67	72	29.2
Revenue and expenditure measures	Inequality reduction	1,068	67	13	61.5

Note: the table summarizes main indicators from the classification tables. The sample includes only the first year of growth acceleration spells. P(accel|reform) is the ratio of fiscal reforms that were followed by a growth acceleration within a 5-year period to the total number of fiscal reforms (in percent).

## Technical Annex II. Fiscal Policy in an Endogenous Growth Model

*This annex describes the theoretical model of endogenous growth. The objective of developing this model based on micro foundations is to study the effects of fiscal policy changes on long-run growth and government debt dynamics. Model simulations suggest that fiscal reforms aimed at reducing the rates of distortionary taxes on capital and labor income lead to significant increases in the long-run growth rate. This remains the case even if the government seeks to offset the associated loss in revenue by raising the rate of less distortionary consumption taxation. On the expenditure side, deficit-neutral reform aimed at increasing productive public investment offset by a reduction in unproductive government expenditure also raises the long-run growth rate.*

### A. The Formulation of the Endogenous Growth Model

1. **The model is in the endogenous growth theory tradition.** It is similar to models presented by King and Rebelo (1990), Rebelo (1991), and Devereux and Love (1994), in which tax reforms can affect long-run growth. The model presented in this Annex also allows for productive public capital and government borrowing.
2. **Endogenous growth models exhibit long run growth in output per worker and the growth rate is endogenously determined.** Long-run growth occurs because of non-decreasing returns to scale to reproducible factors of production (e.g. physical capital, human capital and public capital). In the models presented by King and Rebelo (1990), Rebelo (1991), and Devereux and Love (1994), this is achieved through human capital accumulation, which offsets the otherwise decreasing returns to physical capital accumulation. The long-run growth rate is endogenous in these models and can be influenced by fiscal policy. Tax policy changes can affect post-tax rates of return on physical and human capital investment, and hence saving and investment decisions and ultimately the growth rate.
3. **The model presented in this Annex contains two sectors of production in a closed economy: a final output good sector and a human capital sector.** Each sector has a different production technology. The required inputs for production in both sectors are the stocks of public capital, private capital, and human-capital-adjusted (or skilled) labor supply. The two sector formulation allows the relative importance of production factors to differ across sectors, creating the potential for interesting dynamics. The model is formulated in discrete time.
4. **There are four agents in the model (Box 1):**
  - **Representative consumer.** The consumer chooses to consume  $c_t$  or save in up to three assets: (i) private capital<sup>1</sup>  $K_t$ , (ii) human capital  $H_t$ , and (iii) government bonds  $B_t$ . The

<sup>1</sup> The total private capital stock  $K_t$  comprises capital used by firms  $K_t^1$  and for human capital production  $K_t^2$ , so that  $K_t = (K_t^1 + K_t^2)$ .



representative consumer supplies labor<sup>2</sup> ( $n_t, m_t$ ) and capital  $K_t$  for the production of both final output and human capital. The representative consumer makes these choices to maximize the discounted present value of utility over an infinite horizon, subject to satisfying its long-run budget constraint. The representative consumer earns income from labor supply, from return on assets, and from government transfers.<sup>3</sup>

- **Representative firm.** The representative firm produces final output  $Y_t^F$  and acquires production inputs by renting private capital  $K_t^1$  and skilled labor<sup>4</sup>  $n_t H_t$  from consumers each time period to maximize profit. The firm also benefits from access to the stock of public capital  $G_t$  or infrastructure, which the firm takes as given each period. In this setup, firms do not make forward looking investment decisions. This is only done by the representative consumer. This assumption is mathematically convenient and should not affect the path of variables, such as final output, since the representative consumer is the owner of the firm and behaves rationally.
- **Human capital.** Private capital  $K_t^2$  and skilled labor  $m_t H_t$  are needed to produce human capital  $Y_t^H$ . Public capital is also an input, so that the government has an indirect role in financing human capital by providing access to the public capital stock  $G_t$ , which could include educational facilities and transport. Consumers purchase human capital.
- **Government.** The government engages in various types of spending, raises revenue and borrows by selling bonds to consumers. The government spends in the following forms: (i) investment in public capital stock  $G_t$ , (ii) transfers to consumers  $T_t$ , and (iii) unproductive spending  $g_t$ . In the long run, it is assumed that the government sets spending by following a rules-based approach. A fixed share of revenue every period is spent on each item, with shares differing across spending items. Revenue is raised by levying distortionary taxes ( $\tau_t^K, \tau_t^L, \tau_t^C$ ) on the representative consumer's (i) private capital income  $r_t K_t$ , (ii) labor income  $w_t(n_t + m_t)H_t$ , and (iii) consumption  $c_t$ . The government borrows by issuing bonds  $B_t$  to the representative consumer.

5. **Long-run economic growth is possible in the model.** This is because decreasing returns to physical capital accumulation can be offset by the accumulation of human capital and productive public capital.

<sup>2</sup> It is assumed that the representative consumer has an endowment of time equal to one. The model abstracts from population growth.

<sup>3</sup> It is assumed that there are no nominal rigidities in price and wage setting and also no financial intermediation frictions. Given these assumptions, the model excludes money and a system of financial intermediation of saving into investment, since these features would have only minor real effects.

<sup>4</sup> Human capital acquired by the representative consumer is embodied in the consumer's labor supply, becoming skilled labor supply ( $n_t H_t$ ). Human capital is only productive if it is attached to an individual's labour supply in this way.

6. **Fiscal policy can affect long-run growth through a number of channels.** First, changes in the capital income tax rate  $\tau_t^K$  affect the post-tax rate of return on private capital  $(1 - \tau_t^K)r_t K_t$  and influence the incentives to invest. Second, changes to the post-tax wage also change the return to skilled labor and influence the decisions of consumers to acquire human capital. Analysis in Rebelo (1991) and Devereux and Love (1994) implies that changes to the post-tax rates of return on investment in physical and human capital impact the growth rate by affecting the decision of consumers to save and invest. Changes in the tax rates on labor income  $\tau_t^L$  and consumption  $\tau_t^C$  also affect labor supply to firms and for the production of human capital. Higher labor supply can boost growth by raising the marginal productivity of physical and human capital. Finally, changes in the share of revenue devoted to public investment affect the level of public capital or infrastructure  $G_t$  available to firms and for human capital production. This can also affect total factor productivity and ultimately the growth rate.

## B. The Solution

7. **The model admits a long-run steady state (or balanced growth path (BGP)) for particular combinations of tax rates and rules for government spending.** On a BGP, non-stationary endogenous variables (e.g. consumption  $c_t$ , final output  $Y_t^F$ , and the stocks of physical capital  $K_t = (K_t^1 + K_t^2)$ , human capital  $H_t$  and public capital  $G_t$ ) all grow at a constant rate. This constant rate equals the overall growth rate of the economy. A constant rate of growth is possible because the production function for final output  $A[\psi G_t/K_t]^\gamma (K_t^1)^\alpha (n_t H_t)^{1-\alpha}$  exhibits constant returns to scale to re-producible factors on a BGP<sup>5</sup>. At the firm level, the ratio of total public to private capital in the economy  $G_t/K_t$  is taken as given, so firms face constant returns to scale in private capital input  $K_t^1$  and skilled labor input  $n_t H_t$ . This ratio is kept constant on a BGP, since public investment is set to be proportional to revenue, which should grow in proportion to output and the private capital stock. At the social level, there are constant returns to scale to public capital ( $G_t$ ), the total private capital ( $K_t$ ) stock and skilled labor ( $n_t H_t$ ). This can be seen by noting that private capital input into final output production ( $K_t^1$ ) will be a constant fraction of the total capital stock ( $K_t$ ) on a BGP, so that the production function at the social level can be re-written as  $A G_t^\gamma (K_t)^{\alpha-\gamma} (n_t H_t)^{1-\alpha}$  where A is a constant. The exponents sum to one, implying constant returns to scale.

8. **The BGP growth rate is identified by finding an approximate solution to the simultaneous system of nonlinear equations that characterizes the BGP.** The BGP growth rate can differ for different sets of tax rates and rules for government spending. The nonlinear equations characterizing the BGP include the first order conditions of the consumer's and firm's optimization problems, as well as budget constraints of all agents.

9. **A benchmark BGP is solved for using tax rates, government spending rules, and other key parameters that approximately characterize fiscal policy in an advanced economy.** The

<sup>5</sup> This is also true of the production function for human capital.

distortionary tax rates on private capital income  $\tau_t^K$  and labor income  $\tau_t^L$  are both set to 25 per cent. The rate of consumption taxation  $\tau_t^C$  is set to 7 per cent. This is closer to some rates of sales tax in the United States, although below rates of value added tax in certain European economies. Public investment is set so that it is approximately 4 per cent of final output on the benchmark BGP, similar to its level in the United States. The complete calibration of fiscal policy settings and parameters is presented in Table 1.

10. **On any BGP, the government's long-run budget constraint must be satisfied. Government borrowing must grow at a slower rate than the real rate of interest on government bonds.** This requires the government to run a primary surplus on any BGP. Given the endogenous interest rate on government bonds and the primary surplus (as a ratio of final output), the government's budget constraint then reveals the maximum level of government debt (as a ratio of final output) that is sustainable in the long-run on a BGP.

### C. Long-Run Growth Effects of Fiscal Policy Reforms

11. **Reductions in distortionary capital and labor income tax rates raise the long-run growth rate (Table 2):**

- **Capital income tax rate.** A reduction in the capital income tax rate  $\tau_t^K$  results in a higher post-tax rate of return on private capital  $(1 - \tau_t^K)r_t$  compared with the benchmark BGP, encouraging a faster pace of private capital investment. This boosts output, which ultimately allows for faster accumulation of other factors and faster long-run growth.
- **Labor income tax rate.** Reduction in the labor income tax rate  $\tau_t^L$  leads to a higher post-tax wage rate  $(1 - \tau_t^L)w_t$  compared with the benchmark BGP, inducing higher skilled labor supply. There are greater returns to acquiring human capital and skills, so that there is also faster human capital accumulation. Ultimately, this boosts output and the accumulation of other factors, so that long run growth is faster.

12. **Lower capital and labor tax rates still imply faster long-run growth, even if the consumption tax rate is increased so that the primary fiscal balance (as a share of final output) is unchanged relative to the benchmark BGP.** Overall, these deficit-neutral reforms still raise the long-run growth rate because consumption taxation is less distortionary than capital or labor income taxation in this model. Specifically, consumption taxation does not distort intertemporal savings decisions. As a result, changes in consumption taxes have a smaller growth effect in the model than changes in other taxes.<sup>6</sup>

<sup>6</sup> Milesi-Ferretti and Roubini (1998) discuss model specifications under which consumption tax changes can have larger effects on growth. For example, if revenue from a consumption tax rise is rebated to consumers in the form of higher lump-sum transfers, then this can mute the income effect of the tax change, leaving only the substitution effect on the labor supply / leisure choice. The result can be a larger effect on labor supply and growth. Abstracting from this issue, Table 2 presents the growth effects of tax reform packages (changing more than one tax rate) that

(continued)

13. **Changing the composition of public spending in favor of higher public investment leads to higher long-run growth.** The increase in public capital spending is offset by cutting unproductive government spending  $g_t$ , so that the primary balance (as a share of final output) is unchanged compared with the benchmark BGP. Higher public investment raises the ratio of the public to private capital stocks  $G_t/K_t$ . This raises the productivity of inputs used in production of final output and human capital, allowing for faster long-run growth.

14. **Implementing capital and labor income tax cuts or public investment increases without compensating measures has similar long-run growth effects.** This is because the consumption tax  $\tau_t^c$  (previously increased to offset the revenue loss from other tax cuts) has a relatively small distortionary effect in this model.<sup>7</sup> Changing the rate of consumption taxation will have “level effects” (e.g. on the level of consumption as a share of long-run final output), but should leave the economy’s long-run growth rate relatively unchanged. Changes to unproductive spending  $g_t$  (used to offset higher public investment) appear to have relatively small growth effects, so the impact on the growth rate of higher public investment is similar (although not identical), whether offset by lower unproductive spending or not.

15. **Fiscal reforms that produce a lower long-run primary balance (relative to the benchmark BGP) imply that only a lower long-run level of government debt is sustainable.** The government must engineer a reduction in the level of debt (as a ratio of final output) as the economy transitions from the benchmark BGP to the post reform BGP.

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leave government revenue and all types of government expenditure unchanged (as shares of final output) compared with the benchmark BGP.

<sup>7</sup> The assumption of constant expenditures as a share of revenue on a BGP implies that in the absence of compensating measures to accompany a tax cut, there will be lower total government spending (as a share of final output) because revenue is lower.

### Box 1. Mathematical Description of the Model

**Representative Consumer.** The representative consumer chooses consumption  $c_t$ , labor supply ( $n_t + m_t$ ) and saving (in private capital  $K_t = (K_t^1 + K_t^2)$ , human capital  $H_t$  and government bonds  $B_t$ ) to maximize the discounted present value of utility over an infinite horizon:

$$\max_{\{c_t, n_t, m_t, K_{t+1}, H_{t+1}, B_{t+1}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \frac{\beta^t (c_t^\theta (1 - n_t - m_t)^\eta)^{1-\sigma} - 1}{(1 - \sigma)}$$

subject each period to the budget constraint:

$$(1 + \tau_t^c)c_t + q_t \left[ \frac{H_{t+1} - (1 - \delta_H)H_t}{\text{human capital inv.}} \right] + \left[ \frac{K_{t+1} - (1 - \delta_K)K_t}{\text{physical capital inv.}} \right] + \left[ \frac{B_{t+1}}{\text{govt. bond purch.}} \right] \\ \leq (1 - \tau_t^l)w_t(n_t + m_t)H_t + (1 - \tau_t^K)r_t K_t + T_t + (1 + r_t^b)B_t$$

with initial conditions  $H_0, K_0, B_0$  and taking fiscal policy, the interest rate on government bonds  $r_t^b$ , wages  $w_t$  and the rental rate of return  $r_t$  on private capital as given. The price of human capital is  $q_t$ , also taken as given by consumers.

**Representative Firm.** The representative firm chooses a production level  $Y_t^F$  and rents from consumers inputs of skilled labor  $n_t H_t$  and private capital  $K_t^1$  each period, to maximize profit:

$$\max_{\{n_t, H_t, K_t^1\}} \{Y_t^F - w_t n_t H_t - r_t K_t^1\}$$

where final output is given by technology  $Y_t^F \leq A \left[ \frac{G_t}{K_t} \psi \right]^Y (K_t^1)^\alpha (n_t H_t)^{1-\alpha}$ , taking wages  $w_t$ , the rental rate  $r_t$  on private capital and the ratio of the total public to private capital stocks  $G_t/K_t$  as given.

**Human Capital.** Skilled labor  $m_t H_t$  and private capital  $K_t^2$  are rented each period to produce human capital  $Y_t^H$ , in a profit maximizing way:

$$\max_{\{m_t, H_t, K_t^2\}} \{q_t Y_t^H - w_t m_t H_t - r_t K_t^2\}$$

subject to the production technology:  $Y_t^H \leq C \left[ \frac{G_t}{K_t} (1 - \psi) \right]^\epsilon (K_t^2)^\phi (m_t H_t)^{1-\phi}$  taking wages  $w_t$ , the rental rate  $r_t$  on private capital and the ratio of the total public to private capital stocks  $G_t/K_t$  as given.

**Government.** The budget constraint of the government that must be satisfied each period is:

$$\underbrace{G_{t+1} - (1 - \delta_G)G_t}_{\text{public investment}} + g_t + T_t + (1 + r_t^b)B_t = \begin{cases} \tau_t^c c_t + \tau_t^l w_t (n_t + m_t) H_t \\ + \tau_t^K r_t (K_t^1 + K_t^2) + B_{t+1} \end{cases}$$

Fraction  $v$  of revenue is spent on public investment each period:

$$\underbrace{G_{t+1} - (1 - \delta_G)G_t}_{\text{public investment}} = v \{ \tau_t^c c_t + \tau_t^l w_t (n_t + m_t) H_t + \tau_t^K r_t (K_t^1 + K_t^2) \}$$

There are similar rules for unproductive spending  $g_t$  and transfers  $T_t$ .

**Table 1. Calibration of Model Parameters**

Parameter	Value	Description	Parameter	Value	Description
$\beta$	0.98	Discount factor	$\delta_H$	0.04	Depreciation rate: human capital
$\eta$	0.65	Labor supply parameter	$\delta_K$	0.04	Depreciation rate: private physical capital
$\theta$	0.35	Utility function parameter	$\delta_G$	0.04	Depreciation rate: public capital
$\sigma$	2	Parameter related to the elasticity of intertemporal substitution	$\epsilon$	0.09	Elasticity of human capital production to public capital
$\gamma$	0.09	Elasticity of final output to public capital	$s$	0.30	Share of revenue spent on transfers
$\alpha$	0.36	Capital share in final output	$v$	0.11	Public investment share of revenue
$\phi$	0.85	Capital share in human capital production	$z$	0.51	Unproductive government spending share of revenue
$\psi$	0.5	Share of public capital in final output	$\tau_L$	0.25	Labor income tax rate
<b>A</b>	0.43	Scale factor	$\tau_k$	0.25	Capital tax rate
<b>C</b>	0.43	Scale factor	$\tau_c$	0.07	Consumption tax rate

**Table 2. Impact of Revenue-Neutral Fiscal Reforms 1/**

Fiscal reform /2	Increases in long-run growth relative to the benchmark /3	Change in long-run level of sustainable government debt /4
$\Delta$ capital tax -5%	0.2 percentage points	$\approx 0$
$\Delta$ labor tax -5%	0.2-0.3 percentage points	$\approx 0$
$\Delta$ capital tax -5%, $\Delta$ labor tax -5%	0.4-0.5 percentage points	$\approx 0$
$\Delta$ public investment +1% of GDP, $\Delta$ unproductive spending -1% of GDP	0.15-0.2 percentage points	$\approx 0$

1/ Consumption tax rate is raised permanently to ensure that the primary balance and the government debt levels (as a share of final output) are approximately unchanged on the new BGP following a taxation reform, compared with the benchmark.

2/ Change in fiscal policy settings compared with the benchmark BGP.

3/ The balanced growth paths achieved following all reforms imply higher consumer welfare than the benchmark balanced growth path.

4/ Following these fiscal reforms, there can be small reductions in the level of government debt sustainable on the new BGP, because the interest rate – growth differential may be higher than on the benchmark BGP.

<b>Table 3. Fiscal Policy Experiments in the Endogenous Growth Literature 1/</b>		
<b>Author</b>	<b>Type of Model</b>	<b>Policy Experiments: Effect on Long-Run Growth</b>
Lucas (1990)	Two-sector endogenous growth model, where only human capital and time are used in the production of new human capital. Results are computed both under exogenous and fixed labor supply, as well as elastic labor supply.	Growth rate is invariant to changes in capital tax rates when labor supply is fixed. Small growth effects are found under elastic labor supply. Eliminating a 36 percent capital tax (while raising labor tax by 6 percentage points) raises growth by 0.03 percentage points.
Chen and Lu (2013)	Two sector endogenous growth model, where only human capital embodied in labor supply is used in the production of new human capital. Labor supply is endogenous.	1 percentage point increase in the capital income tax rate lowers growth by 0.02 percentage points.  1 percentage point increase in the labor income tax rate lowers growth by 0.22 percentage points.
King and Rebelo (1990)	Two sector endogenous growth model, where both physical capital and human capital are used in the production of new human capital, as well as in final output. Labor supply is exogenous.	10 percentage point increase in the tax rates of both labor and capital income (derived from final output) reduces the growth rate by 0.5 percentage points. A similar increase in tax rates applied to income from both final output and human capital sectors reduces the growth rate by 1.5 percentage points.
Jones Manuelli and Rossi (1993)	Two-sector endogenous growth model where the production of new human capital requires both physical capital and skilled labor supply. The model is calibrated to have a capital tax rate of 21 percent and a labor tax rate of 37 percent.	The elimination of all tax rates can raise growth by up to 8 percentage points, depending on the assumed elasticity of labor supply.
Turnovsky (2000)	An AK model with productive government expenditure and elastic labor supply. The model is calibrated to the US economy.	An increase in capital income tax rate of 12 percentage points reduces growth by around 0.5 percentage points.  A reduction of capital and labor tax rates each by 8 percentage

<b>Table 3. Fiscal Policy Experiments in the Endogenous Growth Literature 1/</b>		
<b>Author</b>	<b>Type of Model</b>	<b>Policy Experiments: Effect on Long-Run Growth</b>
		<p>points raises long run growth by 0.4 percentage points.</p> <p>A reduction in the capital and labor income tax rates of 8 percentage points and an increase in the consumption tax rate of 13 percentage points raises long run growth by 0.36 percentage points.</p> <p>A 50 percent cut in productive government expenditure (as a percentage of national production) lowers growth by 0.2 percentage points.</p>
Pecorino (1993)	A three-sector endogenous growth model. Physical and human capital are inputs into the production of new human capital. Labor supply is endogenous. The model is calibrated so that the tax rates on capital and labor income are 42 percent and 20 percent respectively.	Capital and labor income taxes replaced with a consumption tax (presumably sufficient to leave revenue unchanged). This raises the growth rate by 1.23 percentage points when labor supply is endogenous (or around 1 percentage point when labor supply is exogenous).
Kim (1998)	A one-sector endogenous growth model, with human capital in the production function. Labor supply is exogenous. The model has a rich financial and fiscal sector. There are taxes imposed on labor income, interest income, dividend income and capital gains. There is also a corporate income tax rate, a value-added tax rate as well as certain other taxes on firms. The model is calibrated to the US economy.	The elimination of all taxation raises the growth rate by 0.85 of a percentage point.
Devereux and Love (1994)	A two-sector endogenous growth model similar to that of King and Rebelo (1990), but allowing for endogenous labor supply. The benchmark calibration involves 20 percent tax rates on capital and labor income, but zero consumption tax.	<p>Eliminating all taxation raises growth by around 1 percentage point.</p> <p>Eliminating only capital taxation</p>



<b>Table 3. Fiscal Policy Experiments in the Endogenous Growth Literature 1/</b>		
<b>Author</b>	<b>Type of Model</b>	<b>Policy Experiments: Effect on Long-Run Growth</b>
		raises growth by around 0.3 percentage points.  Eliminating only wage taxation raises growth by around 0.7 percentage points.
Turnovsky (2004)	A one-sector model with growing population but constant growth rate (i.e. without scale effects). Public capital is productive and labor supply endogenous. There is no human capital.	The long-run growth rate is invariant to tax rates.
Baier and Glomm (2001)	A one-sector model with productive public capital, private capital and human capital in production. Government spending can take the form of investment in public capital, spending on useful goods (that enhance utility) and transfers to consumers.	For given tax rates on company profits and consumer labor income, increases in the share of government spending directed to public investment raise the long run growth rate. The increase in public investment is financed by reducing lump sum transfers to consumers.

1/ This table contains a summary of papers that describe fiscal policy experiments in endogenous growth models. The list of papers included is not exhaustive.



## FISCAL POLICY AND LONG-TERM GROWTH - CASE STUDIES

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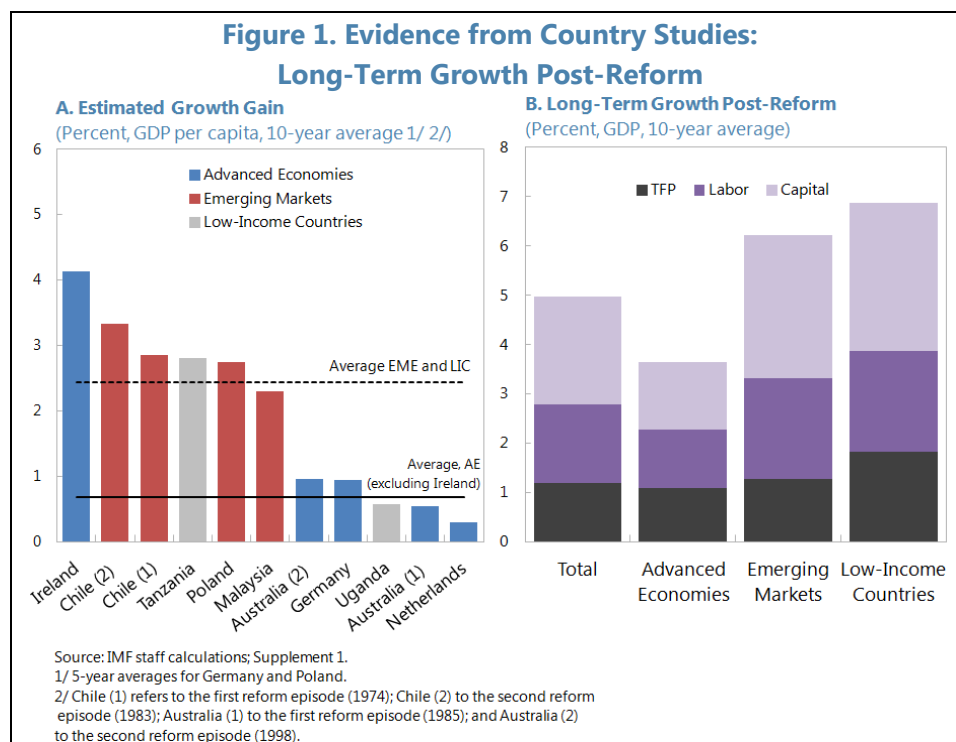
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## INTRODUCTION

1. **This supplement presents the case studies on the impact of fiscal reforms on long-term growth.** The sample of countries comprises Australia, Chile, Germany, Ireland, Malaysia, Netherlands, Poland, Tanzania and Uganda. Annex I outlines how both quantitative and qualitative indicators were used to select countries on the basis of the number of reform episodes, income groups and geographical diversity. The studies cover a wide variety of fiscal reforms, including macroeconomic stabilization, tax policy, expenditure policy and institutional reforms. With regard to transmission channels to growth, they consider three channels: human capital-adjusted labor supply, physical capital, and total factor productivity. The lessons from the case studies are integrated into the main Board paper discussion.
2. **The studies apply the Synthetic Control Method (SCM) to assess the effect of fiscal policy reforms on GDP growth.** The SCM is a data-driven technique to quantify the impact of an event (fiscal reforms in this case) on an outcome variable of interest (long-term growth in this case). With the SCM, a counterfactual, or “synthetic” country, is constructed as a weighted average of a large number of countries that have similar characteristics to the country of interest, but are unaffected by the fiscal policy reform. Once the counterfactual is created, the post-reform growth performance in the country of interest is compared to the growth performance in the counterfactual and the estimated impact of the fiscal reform is then the difference between the two series.
3. **The limitations of the SCM method suggest interpreting the results with caution.** It is difficult to disentangle the growth impact of reforms from that of various other factors affecting growth. Although econometric tests are used to check the robustness of the results (Annex II), the difference between post-reform growth in the country of interest and its synthetic counterpart could be due to factors other than fiscal policy. Results could also be potentially biased if the comparator groups include countries that also underwent growth-enhancing reforms. In this case, any potential bias introduced by including countries that also undertook reforms should reduce the impact of the fiscal reform on growth meaning, in this regard, the estimates are conservative.

### **Limitations of the SCM notwithstanding, country studies suggest that fiscal reforms can affect long term growth.**

- **Impact.** In advanced economies (excluding Ireland), long-term per-capita growth is about  $\frac{3}{4}$  percentage points higher than the counterfactual. In emerging markets and low-income countries long-term growth is  $2\frac{3}{4}$  and  $1\frac{3}{4}$  percentage points higher, respectively (Figure 1a).
- **Transmission channels:** The relative contribution of each growth channel varies by income group. For emerging market and low income countries capital accumulation was the most significant driver while the advanced economies studied had relatively balanced contributions from each channel (Figure 1b).



**Lessons:**

- **Design matters for the successful implementation of reforms.** In all countries studied the design of fiscal measures reinforced each other. For example, in the Netherlands, Ireland, and Germany, work incentives were enhanced by reducing benefits and income taxes. Fiscal reforms were also commonly implemented together with broader structural reforms to maximize their growth impact.
- **Social dialogue enhances the likelihood of reforms being implemented and sustained.** Various strategies were used to foster public support including effective communication with stakeholders (Germany) and compensatory measures for those expected to lose from reforms (Ireland, Netherlands). Common policy anchors, such as the prospect of EU accession in Poland, helped forge consensus.

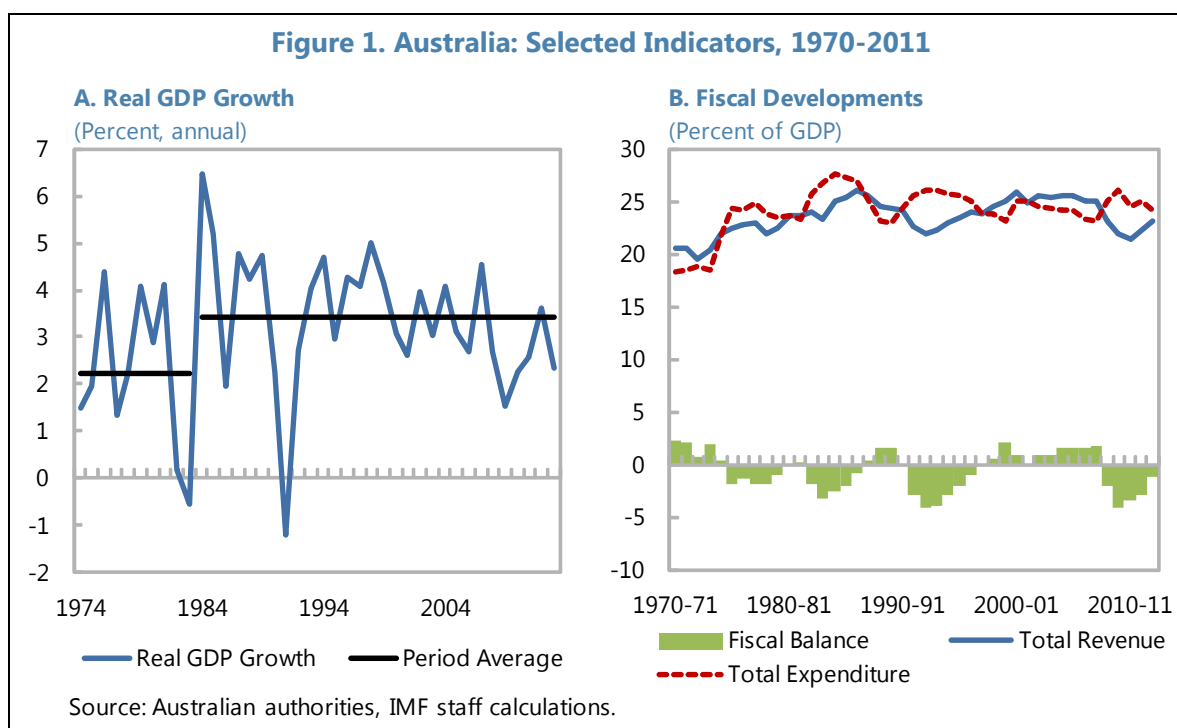
# AUSTRALIA: FISCAL POLICY AND LONG-TERM GROWTH

## A. Background

1. **Australia established a strong track record of steady economic reforms over several decades.** This process of continuous economic reform began in the mid-1980s, following a decade of comparatively poor growth; high unemployment; persistent inflation; deteriorating competitiveness and rising external and fiscal imbalances. Early efforts aimed at opening up the economy through tariff reform; and exchange rate and financial sector liberalization (DeBelle and Plumb, 2006). However, these reforms were insufficient to establish a sustained improvement in growth. These initiatives were followed by a successful fiscal consolidation, which began in 1985, and which was built upon comprehensive tax reform and credible fiscal rules. In the 1990s, the economic strategy turned to the real sector. The government strengthened product market competition and liberalized wage bargaining arrangements. In 2000, the focus of reform efforts returned to fiscal policy. A new consumption tax, the Goods and Services Tax (GST), was introduced, allowing limited reductions in personal income tax rates. The reform also permitted the abolition of the inefficient wholesale sales tax and provided a more reliable fiscal equalization arrangement for Australian States.
2. **In many areas, such as tax policy, pensions, and fiscal transparency, Australia was an “early adopter” at the forefront of designing and implementing innovative reforms.** Wide-ranging fiscal reforms were conducted in tandem with major product and labor market reforms. In the mid-1980s it adopted an ambitious tax reform that reduced personal income tax rates. In 1992, it overhauled its pension system when a fully funded three pillar superannuation scheme replaced the old “pay-as-you-go-system.” In 1998, a Budget Honesty Act was passed, introducing transparent budget reporting, intergenerational accounting, and medium-term fiscal planning. These fiscal reforms took place within the context of a wider reform effort that also included substantial improvements of wage bargaining arrangements, strengthening product market competition and enhancing intra-governmental fiscal relations.
3. **Australia’s federal structure, comprising of the national government, six states and two territories, also strongly influenced the design of economic reforms.** Ensuring the successful implementation of reforms required a high degree of consensus-building and strong intra-governmental cooperation. In tandem with economic reforms, the country developed institutions that provide opportunities for discussing policy challenges and coordinating the national reform agenda across different levels of government.
4. **Australia’s economic reforms took place against a backdrop of a strongly improving external environment.** The rapid increase in foreign demand for Australian commodities, along with falling import prices, led to a substantial improvement in the terms of trade. The commodities

boom, particularly over the last decade, fueled a rapid increase in mining-related investment, which bolstered economic growth.

5. **Nevertheless, growth decelerated somewhat over the last decade relative to 1990s; renewing the focus on economic reform** (Figure 1). This deceleration provoked a reappraisal of the policy framework and a search for new measures that will reinvigorate growth. The future of fiscal policy figured prominently in this reappraisal. In 2010, the Australian Government commissioned a thorough review of tax policy, as well as an examination of federal fiscal relations. One major early result of this review has been a fundamental rethinking of the role of natural resource taxation.



## FISCAL POLICY INNOVATION AND COMMITMENT TO REFORM

### A. Overview

6. **In the 1970s and early 1980s, Australia suffered from severe macroeconomic imbalances.** Growth was low and volatile relative to other advanced economies, due to the economies' dependence on commodity exports. Double-digit inflation was a persistent problem, while unemployment increased from less than 2 percent in 1971 to almost 10 percent in 1983.

7. **These poor economic outcomes led to widespread dissatisfaction with the development model** (Fenna, 2013). Australia was a comparatively closed economy, with a smaller share of its GDP being traded than would be normal for an economy of its size (Anderson, 2009). The terms of trade deteriorated throughout the 1970s as the prices of commodity exports declined, adding downward pressure on the growth rate. Many sectors of the economy, particularly manufacturing and agriculture, were heavily regulated or benefited from protectionist policies. By the end of the decade, a combination of global shocks, a deep recession, and growing fiscal and external sector imbalances emphasized the need for fundamental structural adjustment. As such, early fiscal reform efforts focused on tariff reforms in order to strengthen external competitiveness.

8. **The new government elected in 1983 launched a comprehensive economic strategy that aimed to reestablish macroeconomic stability and reinvigorate economic growth.** This strategy had three broad objectives:

- **Improving the tools of macroeconomic management.** The Australian dollar was allowed to float; capital controls were removed; and interest rates were liberalized.
- **Restoring macroeconomic stability.** Continued large fiscal deficits prompted renewed efforts at fiscal consolidation in 1985. To add credibility to their deficit reduction efforts, the Hawke-Keating government adopted a 'trilogy' of fiscal rules which became operational in the 1986 budget. The government made a commitment to not increase either taxes or expenditures as a ratio of GDP, and to reduce the budget deficit both in absolute terms and as a ratio of GDP.
- **Strengthening the supply side of the economy.** A four-year tax reform package was also introduced that established new taxes on capital gains and fringe benefits. The wholesale sales tax was streamlined while tax expenditures on sectors such as agriculture, forestry and film were reduced. The corporate tax rate was lowered progressively from the late 1980s onwards (Figure 6). To encourage greater labor force participation, income tax rates were reduced. Between 1987 and 1992, the tax burden on individuals fell from 13.5 percent of GDP to 11.4 percent (Table 3). To reorient the economy to external markets tariff reform was accelerated.

9. **Australia was one of the first advanced economies to tackle demographic change with fundamental pension reform.** In 1992, the Keating Labor government introduced a three pillar pension reform called "Superannuation Guarantee". The reform included a means-tested "safety net" pension, the establishment of a compulsory employer-based contribution that funded private pension schemes for all employees, and a voluntary pension pillar. Since the pension system was introduced, Australia's pension investment funds have grown dramatically. In 1992 assets totaled AUS\$150 billion. By June 2014, total superannuation assets amounted to \$1.85 trillion (ASFA, 2014). The reform is associated with a substantial increase in private sector investment to GDP ratio.

10. **This first phase of fiscal reforms ended with a severe recession in 1991, leading to another period of deteriorating fiscal deficits** (Table 2). This recession coincided with a global downturn, but it was exacerbated by a collapse in Australian asset prices, including housing, leading to large losses in the banking sector (Gizycki and Lowe, 2000). A further round of fiscal consolidation

resulted in a return to budget balance by the mid-1990s. Efforts were made to contain public indebtedness, which was in part financed through privatization (Gruen and Sayegh, 2005). Thereafter, the government recorded surpluses for the following eight years.

11. **The 1991 recession prompted another round of economic reforms that focused on the real economy** (Table 1). Inflation targeting was introduced in 1993. In 1995, there was an overhaul of the legislation governing product market competition. A coordinated National Competition Policy was agreed by all governments in Australia's federal system, extending anti-competitive conduct laws to cover previously exempt government and unincorporated enterprises. Barriers to entry in highly regulated sectors like telecommunications were reduced while the regulatory framework governing monopolies was radically changed (Kerf and Geradin, 2005).

12. **The 1990s also witnessed a gradual but comprehensive restructuring of the wage bargaining system** (Wright and Lansbury, 2014). The Workplace Relations Act 1996 reduced the role of the Industrial Relations Commission in setting wages and conditions—primarily by restricting its role to adjudicating on “safety net” wage adjustments. Labor market policies also encouraged the decentralized wage bargaining (Dawkins, 2000). In 1990, only a third of Australian workers had wages set through enterprise-based or individual contracts. By 2002, this ratio had increased to almost 80 percent (Productivity Commission, 2005). These labor market reforms paid a crucial role in curtailing real wage growth, thus re-establishing external sector competitiveness.

**Table 1. Australia: Major Fiscal Reforms**

Reform Areas	Year	Reform Steps
Tariff Reform	1973 to mid-1980s	Unilateral and gradual reduction of trade tariffs and protectionism. Reduced international tax revenues.
Fiscal Consolidation, Tax Reform, and the "Trilogy of Fiscal Rules"	1985-86	Ceilings on revenues and expenditures as ratio of GDP; education on overall balance in both nominal terms and as a ratio of GDP. Fiscal consolidation efforts that resulted in budget balance by 1990. New taxes on capital gains; reductions in tax expenditures and income tax cuts.
Pension Reform	1992-	Introduction of a three-tier fully funded pension system.
Intra-Governmental Cooperation	1992-	Creation of the Council of Australian Governments.
Product and Labor Market Reforms	1995-	New competition policy and a move to decentralized wage bargaining.
Budget Honesty Act	1998-	Establishment of a fiscal transparency framework.
Introduction of GST	2000-	Introduction of a consumption based tax, new funding mechanism for states and territories, and the removal of a large number of state taxes and fees.
Henry Review	2008-12	Establishment of Minerals Resource Rent Tax.

Source: IMF staff reports.

13. **The late 1990s saw a second round of fiscal policy innovations, which focused on fiscal transparency and tax reform.** The Charter of Budget Honesty, launched in 1998, established a new framework for the conduct of fiscal policy (Miyazaki, 2014). The Charter also improved transparency by facilitating public scrutiny of fiscal outcomes. Governments were obliged to provide regular updates of fiscal out-turns, including a mid-year Economic and Fiscal Outlook. A final budget report had to be published within three months after the end of the financial year. As soon as an election was called, the Charter required the Departments of Treasury and Finance to prepare an

independent report—the Pre-Election Economic and Fiscal Outlook. Governments were also obliged to specify their long-term fiscal objectives within which short-term fiscal policy would have to operate. To facilitate a broader understanding of demographic related fiscal challenges, the act obliged the government to publish an Intergenerational Report (IGR) at least once every five years.

14. **In July 2000 a broadly-based consumption tax, known as the Goods and Services Tax, was introduced.** It replaced the previous Federal wholesale sales tax system as well as a large number of heavily distortionary State and Territory Government taxes, duties and levies such as banking taxes and some stamp duties. The higher tax revenues allocated to the States also allowed the federal government to remove government financial assistance grants allocated to the states.<sup>1</sup> The additional revenues from the GST also facilitated a shift of the tax burden away from direct taxation, both for personal and business taxpayers. Average tax rates were reduced for all income levels in 2001 (McDonald and Kippen, 2005).

15. **More recently, tax reform has again emerged as an important issue on the policy agenda.** In 2008, the government initiated a wide-ranging review of the tax system in order to identify a reform agenda for the next twenty years. This review led to the proposal to introduce an ambitious Resources Super Profit Tax. Subsequently, a controversial Minerals Resource Rent Tax was established but was repealed in 2014.

## B. Notable Design Features

16. **Policies promoting social cohesiveness played a decisive role in the success of Australia’s reform strategy.** The highly decentralized political structure means that sub-national entities are important actors in the policy dialogue. This necessitated the development of a “Collaborative Federalism” model, where formal institutions have been created to enhance cooperation between different levels of government.

17. **A key step in this process was the creation of the Council of Australian Governments (COAG) in 1992.** This body replaced the Premiers Conferences where State Prime Ministers met regularly to discuss matters of common interest. Since its creation, the Council has taken a leading role in developing a national reform agenda over wide areas of common interests. For example, in 2009, the COAG played a leading role in developing a new Federal Financial Relations Framework.

18. **The introduction of the consumption tax in 2000 provided a good example of successful intra-governmental cooperation.** The new tax was accompanied by a parallel reform of the State Government financing model, providing the necessary income that permitted the abolition of a large number of highly distortionary state-based fees and taxes. This allowed the development of a powerful coalition of interests across different levels of government in support of an important policy reform.

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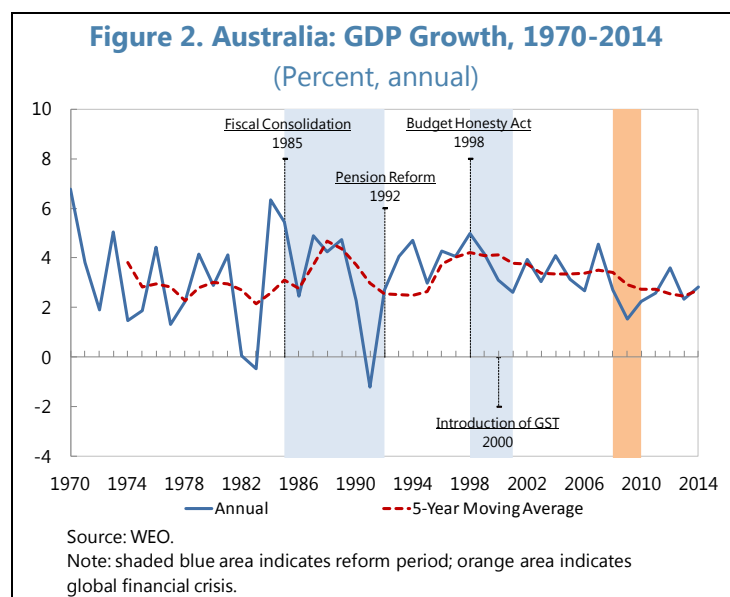
<sup>1</sup> Australia’s structure of fiscal federalism is characterized by concurring federal and state taxing powers. This significantly helped with the introduction of the GST.



19. **Australia also benefited from strong civil and public institutions that have fostered an environment where policy options can be developed.** Think-tanks, trade unions, the financial press, universities, as well as institutions such as the National Productivity Commission have all actively contributed to the dialogue over the challenges facing Australia, facilitating a high degree of policy innovation. In this regard, measures to enhance fiscal transparency have helped ensure that the political debate over policy options is more informed.

## IMPACT ON LONG-TERM GROWTH

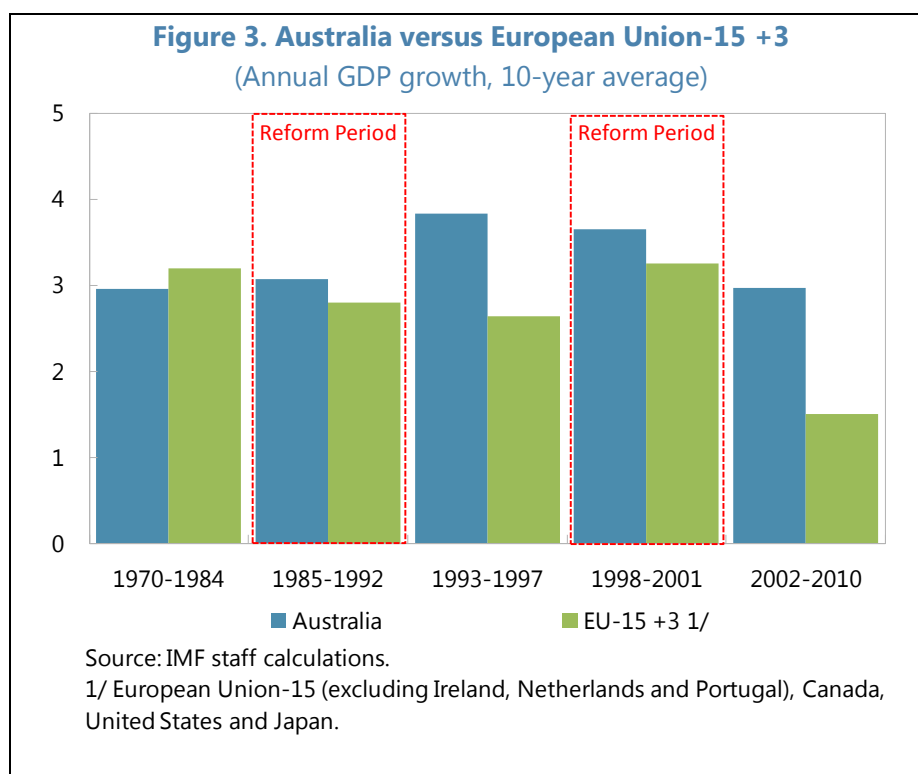
20. **Australia has enjoyed several decades of strong growth; monetary stability; low inflation; and prudent macroeconomic management** (Figure 2). It has one of the highest per-capita GDP levels in the world. Since 1980, real GDP growth averaged 3.2 percent per year, while unemployment was consistently below the OECD average. Moreover, Australia's fiscal outcomes compare favorably to other advanced countries. Since the early 1970s, Australia consistently maintained a general government gross debt below 35 percent of GDP.



21. **In order to assess the impact of fiscal policy on economic development, it is useful to consider five periods between 1970 and 2007:**

- **The pre-reform period 1970–84.** The economy was comparatively inward looking, with a high degree of protection to manufacturing and agricultural sectors. During this period there were very limited fiscal reforms, primarily focused on tariff reduction.
- **The first wave of fiscal reforms 1985–92.** The period started with a major consolidation effort, tax cuts, and fiscal rules and concluded with the creation of a fully funded pension system.

- **Real sector structural adjustment 1993-1997.** The reform effort was directed towards labor and product markets.
- **The second wave of fiscal reforms 1998-2001.** The adoption of greater fiscal transparency and the introduction of the GST, a new funding arrangement for States, and lower personal income tax rates.
- **The post-fiscal reform period 2002-07.** This period marks an interregnum between the reforms of the early 2000s, and the last major review of the tax system<sup>2</sup> as well as the introduction of a new framework for natural resource taxation.



22. **Figure 3 offers a simple comparison between Australia’s per capita growth with a peer group comprising of the EU15 plus major commodity producers—Canada and South Africa—as well as United States.**<sup>3</sup> During the pre-reform period, a small negative growth differential vis-à-vis the peer group had emerged on average, while Australia suffered greater volatility in growth and rising imbalances, highlighting the motivation behind the structural adjustment that began from 1985 onwards. Economic performance improved in tandem with the first wave of major fiscal and structural reforms. The third period marks an interregnum in fiscal reform efforts. The reform

<sup>2</sup> The review began in 2008, and was reported in December 2009.

<sup>3</sup> Ireland was excluded from the sample since it was conducting reforms somewhat similar to those in Australia.

priorities shifted towards the real sector. Growth performance improved during this period, opening up a substantial positive differential with the peer group.

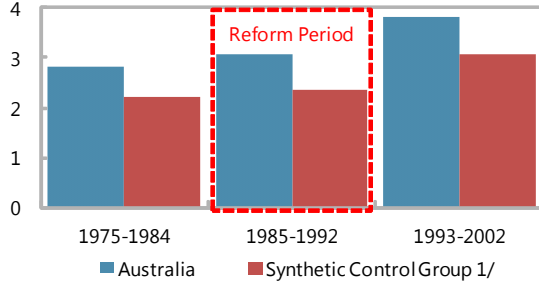
23. **Between 1998 and 2001, Australia launched a second wave of reforms, centered on improving fiscal transparency and tax reform.** During this period, we see the beginning of a deceleration of growth. The Australian economy slowed compared to the period 1993–97, while its peer group enjoyed a period of accelerating growth. Once this second fiscal reform effort is concluded, the Australian economy continues decelerate. Nevertheless growth performance compares favorably in relative terms to the peer group with a positive growth differential increasing.

24. **A counterfactual growth series was generated for a hypothetical Australia** (Figure 4 and Table 2). It was constructed using a synthetic control group—comprising of advanced economies that did not experience substantial fiscal reforms in periods similar to Australia’s— and a set of common growth predictors. Given the multifaceted nature of the growth process, the results of the synthetic control method need to be interpreted with care. Nevertheless, the approach offers some interesting insights into the Australian growth experience. The counterfactual confirmed that a growth differential opened up after 1985, when the first fiscal reform wave started. In the mid-1990s the growth differential between Australia and the counterfactual series narrows, and briefly reversed as Australian growth decelerates during the second fiscal reform wave, while the counterfactual growth rate picks up. This second wave of reforms did not establish a higher growth rate relative to the pre-reform period; Australian growth continued to decelerate. However, the reforms did re-establish a small, but positive differential vis-à-vis the peer group during 2002–07.

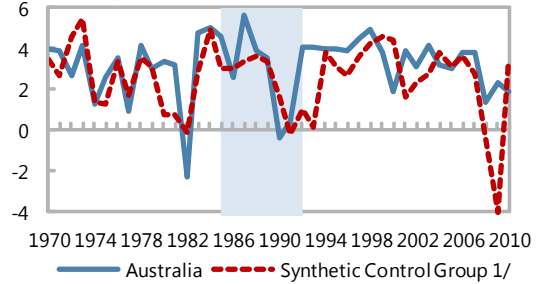
25. **The results of the synthetic control method were tested with three robustness checks.** The first test, the placebo test, applies the synthetic control method to every country in the comparator group (Figure A1). Post-reform growth in Australia was higher relative to the growth distribution of non-reformers (countries in the comparator group), indicating that the fiscal reform likely has made a positive difference in the growth performance in Australia. The second test examined the implications for the results by sequentially excluding countries used to estimate the synthetic growth series (Figures A2). This test indicates that the results are robust—post-reform Australian growth was higher than the synthetic growth series in each of the cases where a country is excluded. The third test examined how changes in the pre-reform sample size affected the results (Figures A3, A4, A5, and A6). The baseline assumption is that 1985 marked the beginning of the substantive fiscal reforms in Australia, when the Hawke-Keating fiscal consolidation began with the establishment of the “trilogy of fiscal rules.” However, substantive fiscal reforms also took place in subsequent years, suggesting that an alternative identification of reform periods might be appropriate. This check suggests that the results are robust to alternative starting and ending dates of the pre-reform period. In all cases, the Australian growth out-turn is higher than that suggested by the alternative synthetic control series.

**Figure 4. Synthetic Control Method: Australia**

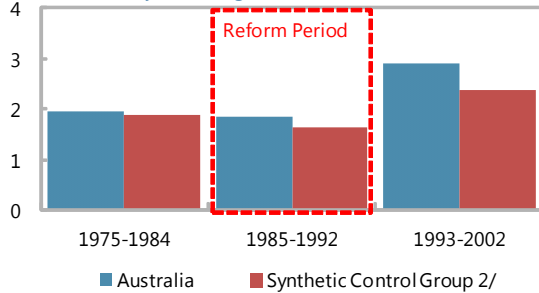
**A. Annual GDP Growth, 1985-1992**  
(Percent, 10-year average)



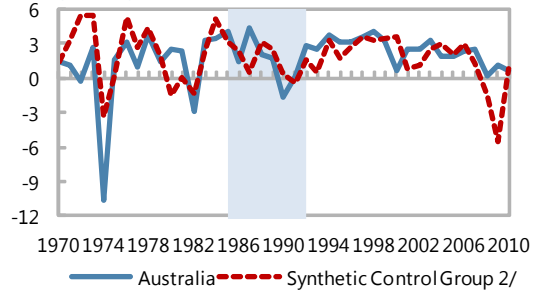
**B. GDP Growth, 1985-1992**  
(Percent)



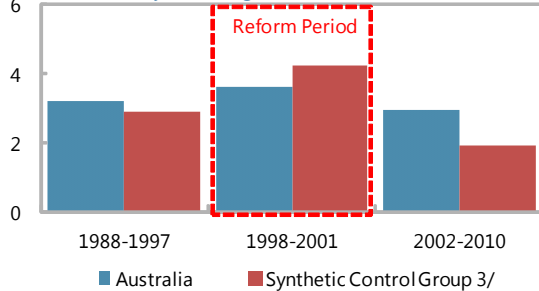
**C. Annual GDP Growth Per Capita, 1985-1992**  
(Percent, 10-year average)



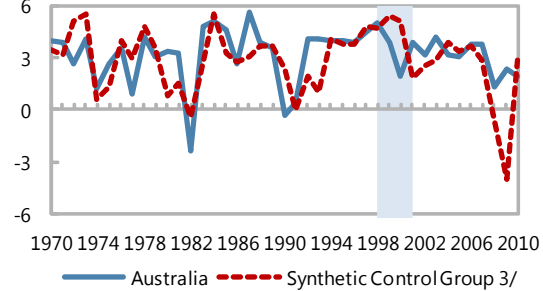
**D. GDP Growth Per Capita, 1985-1992**  
(Percent)



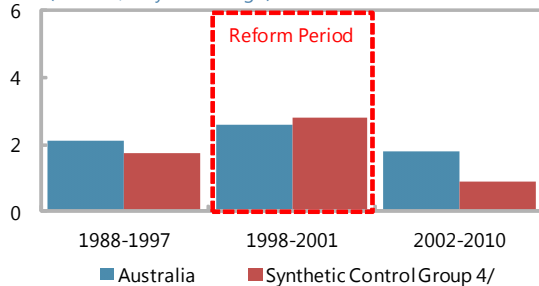
**E. Annual GDP Growth, 1998-2001**  
(Percent, 10-year average)



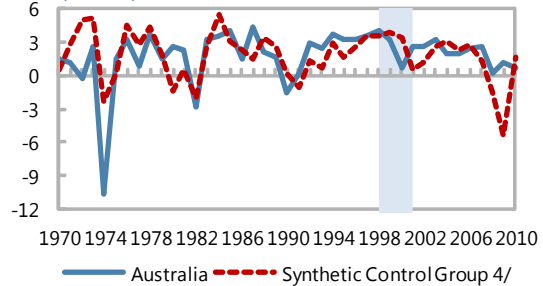
**F. GDP Growth, 1998-2001**  
(Percent)



**G. Annual GDP Growth Per Capita, 1998-2001**  
(Percent, 10-year average)



**H. GDP Growth Per Capita, 1998-2001**  
(Percent)



Source: IMF staff calculations.

Note: Shaded blue areas indicate reform periods.

1/ United States, Spain, Greece and United Kingdom.

2/ Sweden, United States, Spain, Greece and United Kingdom.

3/ United States, Sweden, Ireland, Greece and Japan.

4/ United States, Sweden and Greece.

**Table 2. Australia : Economic Growth Predictor Means before Fiscal Reform**

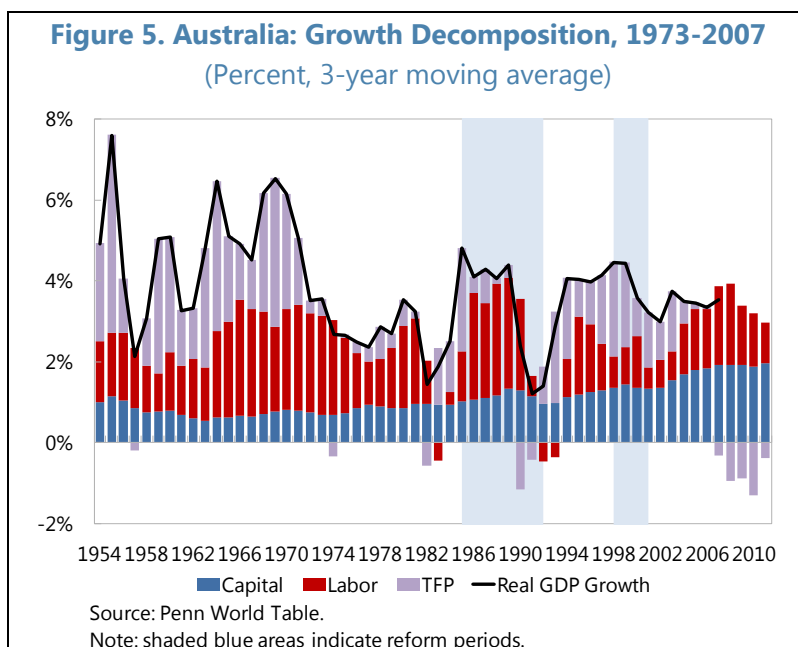
Variable	Reform Period 1985		Reform Period 1998	
	Real	Synthetic	Real	Synthetic
<b>GDP Growth</b>				
GDP Growth (Percent)	3.3	3.4	4.4	3.6
GDP Per Capita (2005 I\$/Person)	21144.6	21093.7	23958.0	23952.9
Trade Openness (Percent)	20.8	25.8	24.6	31.5
Terms of Trade (Percent)	94.1	95.1	94.1	94.1
Inflation Rate (Percent)	9.5	9.4	7.3	6.9
Human Capital Index	3.1	2.8	3.2	3.1
<b>GDP Growth Per Capita</b>				
GDP Growth Per Capita (Percent)	2.0	3.1	2.0	2.8
GDP Per Capita (2005 I\$/Person)	21144.6	21234.5	23958.0	25066.2
Trade Openness (Percent)	20.8	18.6	24.6	20.1
Terms of Trade (Percent)	94.1	81.7	94.1	80.9
Inflation Rate (Percent)	9.5	9.5	7.3	7.3
Human Capital Index	3.1	3.0	3.2	3.2

Source: IMF Staff calculations.

1/ All variables except GDP growth and GDP growth per capita are averaged for the 1970-1984 period. The average for GDP growth and GDP growth per capita is calculated using the years 1970, 1977 and 1984.

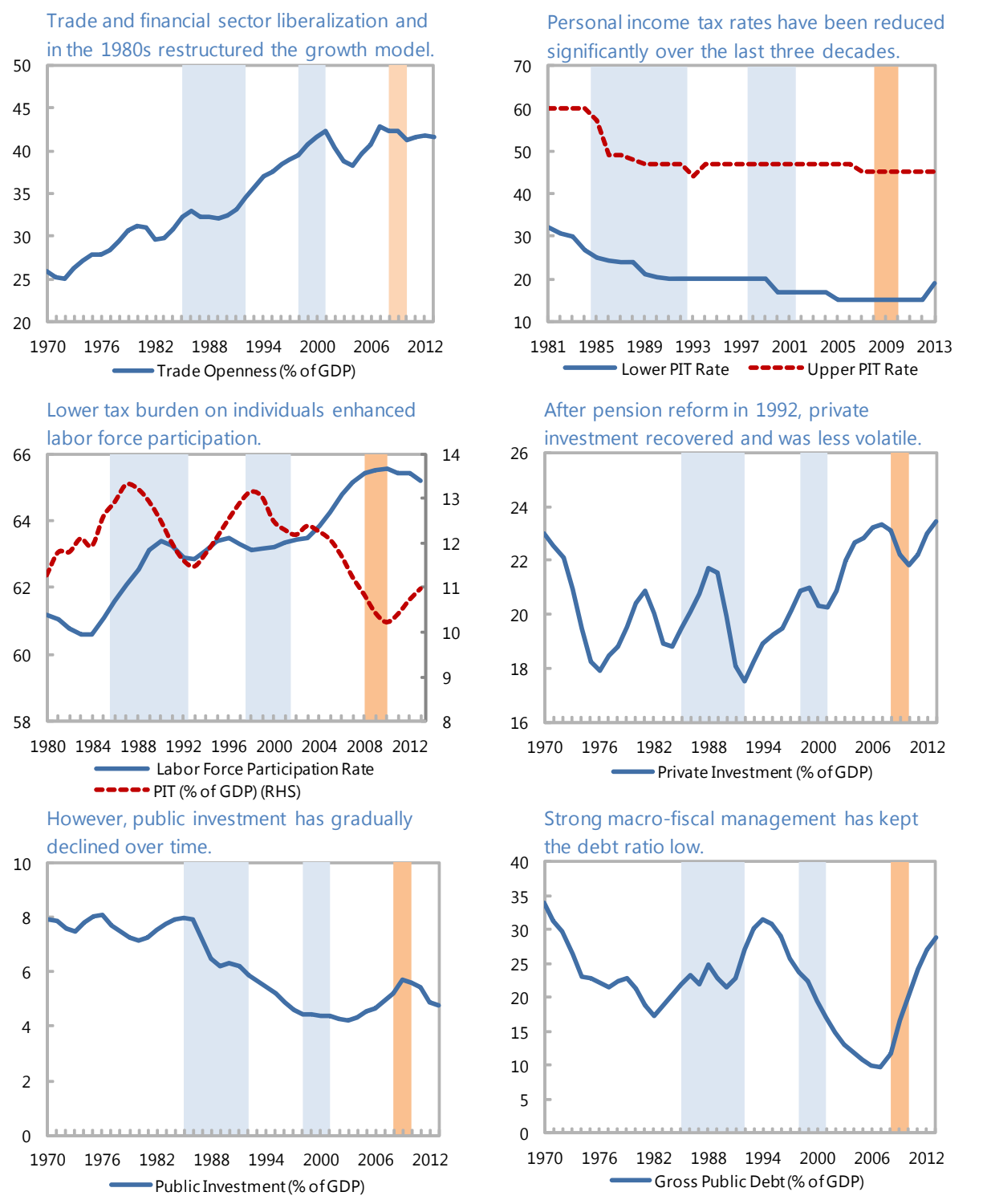
2/ All variables except GDP growth and GDP growth per capita are averaged for the 1970-1997 period. The average for GDP growth and GDP growth per capita is calculated using the years 1970, 1983, 1997.

26. **A decomposition of growth in terms of capital, labor and total factor productivity (TFP) provides further insights how fiscal policies were transmitted into higher economic growth** (Figure 5). The most striking feature of this decomposition is the gradually increasing contribution of capital to economic growth, emphasizing how macroeconomic and fiscal stability improved the investment climate. In particular, pension reform provided a significant increased private sector savings, thus contributing to capital accumulation. In the decade just prior to the first wave of fiscal reforms; capital accumulation contributed on average 30 percent towards GDP growth. During the first decade of this century, this contribution had increased to almost 50 percent. This rising contribution of capital is particularly noticeable after 1992. This was in part due to the strong improvement in terms of trade, as commodity prices increased, prompting a large increase in mining-related investment.



27. **The decomposition also suggests that the second wave of fiscal reforms had a somewhat lower impact on economic growth.** Between 1987 and 1992, the contribution of labor was the primary growth driver; highlighting the importance of tax changes aimed at reducing economic distortions such as lower personal income tax rates. During this period, labor force participation increased in response to these tax cuts. A more muted, but nonetheless important increase also occurs in the mid-1990s, which was associated with important policy changes that enhanced labor market flexibility. However, these policies did not generate the same impressive improvement in labor force participation experienced in the 1980s. Likewise, we do not see an increase in the labor contribution to growth after the second wave of fiscal reforms from 2000 onwards.

**Figure 6. Australia, Fiscal Policy and Growth, 1970-2012**



Source: Australian authorities, Historical Debt Database, and IMF staff calculations.  
 Note: Shaded blue areas indicate reform periods; orange areas indicate global financial crisis.

## LESSONS: FISCAL REFORM AS A CATALYST FOR ACCELERATING GROWTH

28. **Fundamental structural changes, including those in the fiscal area, have ensured that the Australian economy has a greater degree of flexibility than was the case in the 1970s and early 1980s.** This has made it more resilient to external shocks such as the recent global financial crisis. Nevertheless, we have also seen a gradual growth deceleration following the first wave of fiscal reforms. This prompted a renewed discussion within Australia regarding the relationship between fiscal policy and growth. Australia recently conducted a thorough review of the tax system, and while many of the measures have not yet been implemented, tax reform continues to be an important policy issue.

29. **Fiscal reforms have leveraged all four channels, whereby fiscal policies can influence long run growth:**

- **Macroeconomic stability:** Two successful fiscal consolidation efforts, coupled with the adoption of fiscal rules have ensured that debt and deficit levels have been contained.
- **Social cohesion:** Building political consensus - particularly across different levels of government and civil society - is an essential element explaining the success of many economic policies.
- **Expenditure reforms:** The establishment of a fully funded pensions system increased private sector savings and contributed to a sustained recovery in private investment.
- **Tax reform:** Lower personal income tax rates helped increase labor force participation rates, positively contributing to growth rates.

30. **Developing a fiscal reform agenda in the context of a highly diverse society with decentralized political structure poses particular challenges.** Australia created the necessary cooperative institutions—both formal and informal—to ensure a high degree of social cohesiveness and consensus across all levels of government as well as civil society. It established an environment where policy options can be carefully considered, which in turn has allowed Australia to be an innovator in fiscal reform. Moreover, this social discourse has at crucial moments offered a frank and honest assessment of difficulties and challenges facing the economy and; therefore, provided a basis for developing the political consensus around difficult and painful policy measures.



**Table 3. Australia: Selected Indicators**  
(Period Averages)

	<b>Reform Episode 1</b>		<b>Reform Episode 2</b>		2002-07	2008-2011	
	1975-79	1980-84	1985-92	1993-97			
<b>Real Economy</b>	(Percentage change, unless otherwise indicated)						
Real GDP	2.8	2.6	3.2	4.0	3.7	3.6	2.3
Contributions to Growth (Percent) 1/							
Capital	0.9	1.0	1.1	1.2	1.3	1.8	1.9
Labor	1.3	0.9	1.4	1.4	0.7	1.6	1.3
Total Factor Productivity	0.7	0.9	0.5	1.5	1.6	0.1	-1.0
CPI Inflation (Average)	11.6	9.0	6.3	2.2	2.8	2.8	3.1
<b>General Government</b>	(Percent of GDP, unless otherwise indicated)						
Total Revenue	22.5	23.9	24.4	23.3	25.1	25.4	22.2
Total Expenditure	24.1	25.4	25.2	25.3	24.3	23.9	25.2
Fiscal Balance	-1.6	-1.5	-0.8	-2.0	0.8	1.4	-3.0
Gross Debt	22.4	19.4	23.3	29.5	20.7	11.8	18.4
Long Term Bond Yield (Percent)	9.8	13.8	12.2	7.7	5.9	5.6	4.7
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)						
Labor Force Participation Rate	...	60.8	62.5	63.2	63.2	64.2	65.5
Employment Rate	94.4	92.4	91.9	90.8	93.1	94.7	95.0
Unemployment Rate	5.6	7.6	8.1	9.2	6.9	5.3	5.0
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)						
Lower PIT tax rate (Percent)	...	29.8	22.4	20.0	18.5	16.0	15.0
Upper PIT tax rate (Percent)	...	60.0	48.9	46.4	47.0	46.7	45.0
Private Investment	18.6	19.8	19.9	19.2	20.6	22.5	22.3
Public Investment	7.7	7.5	6.8	5.2	4.4	4.5	5.5
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)						
Market Gini Coefficient 2/	35.6	40.5	43.7	47.6	48.9	46.7	49.3
Net Gini Coefficient	26.0	28.1	29.4	30.8	30.9	30.4	33.0

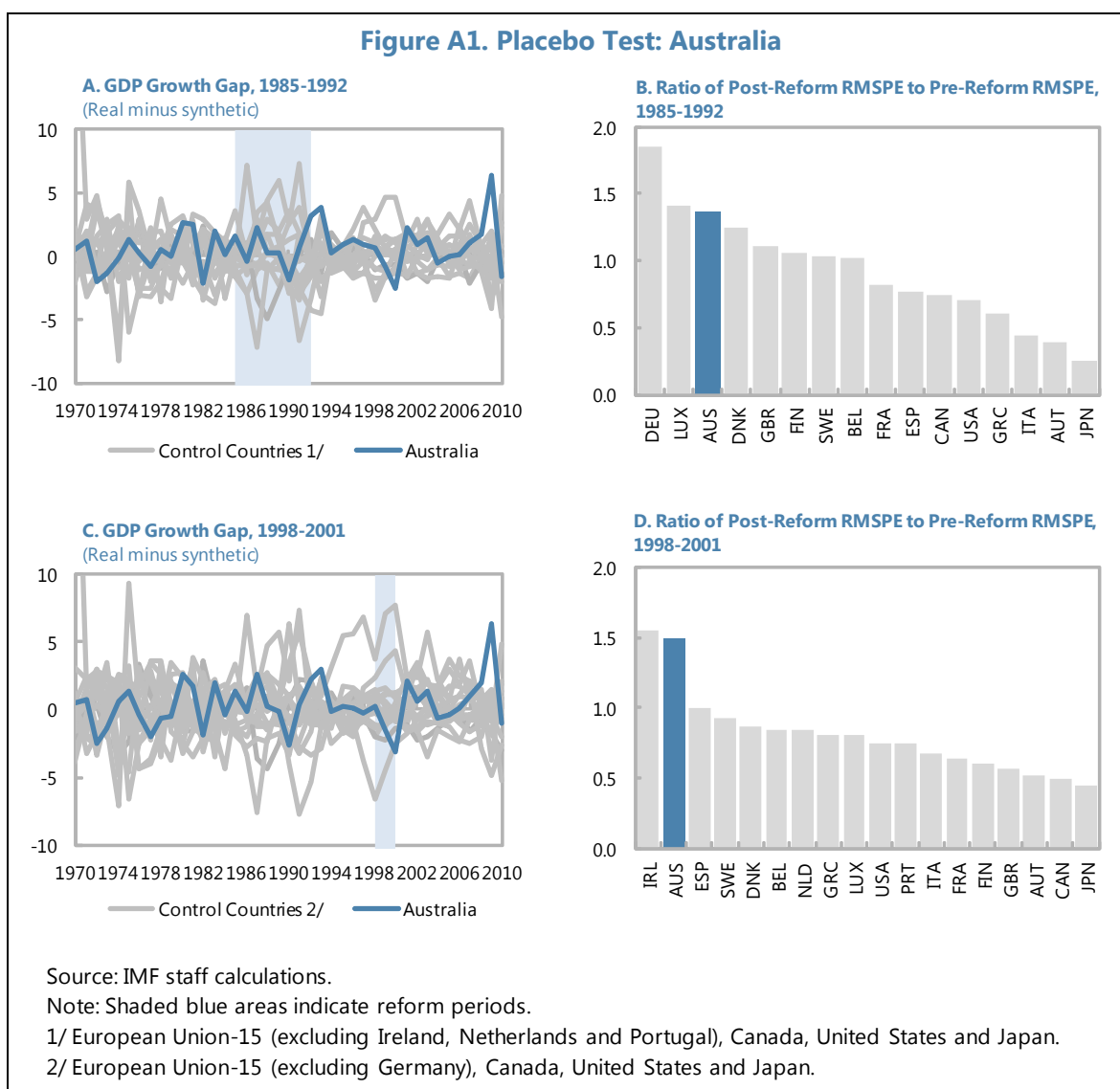
Source: Australian authorities, Historical Public Debt Database, Penn World Table, SWIID 5.0, WEO.

1/ Growth accounting estimates are calculated using Penn World Table 8.0.

2/ "Market" Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

## Appendix. Robustness Tests for Australia

### A. Placebo Tests

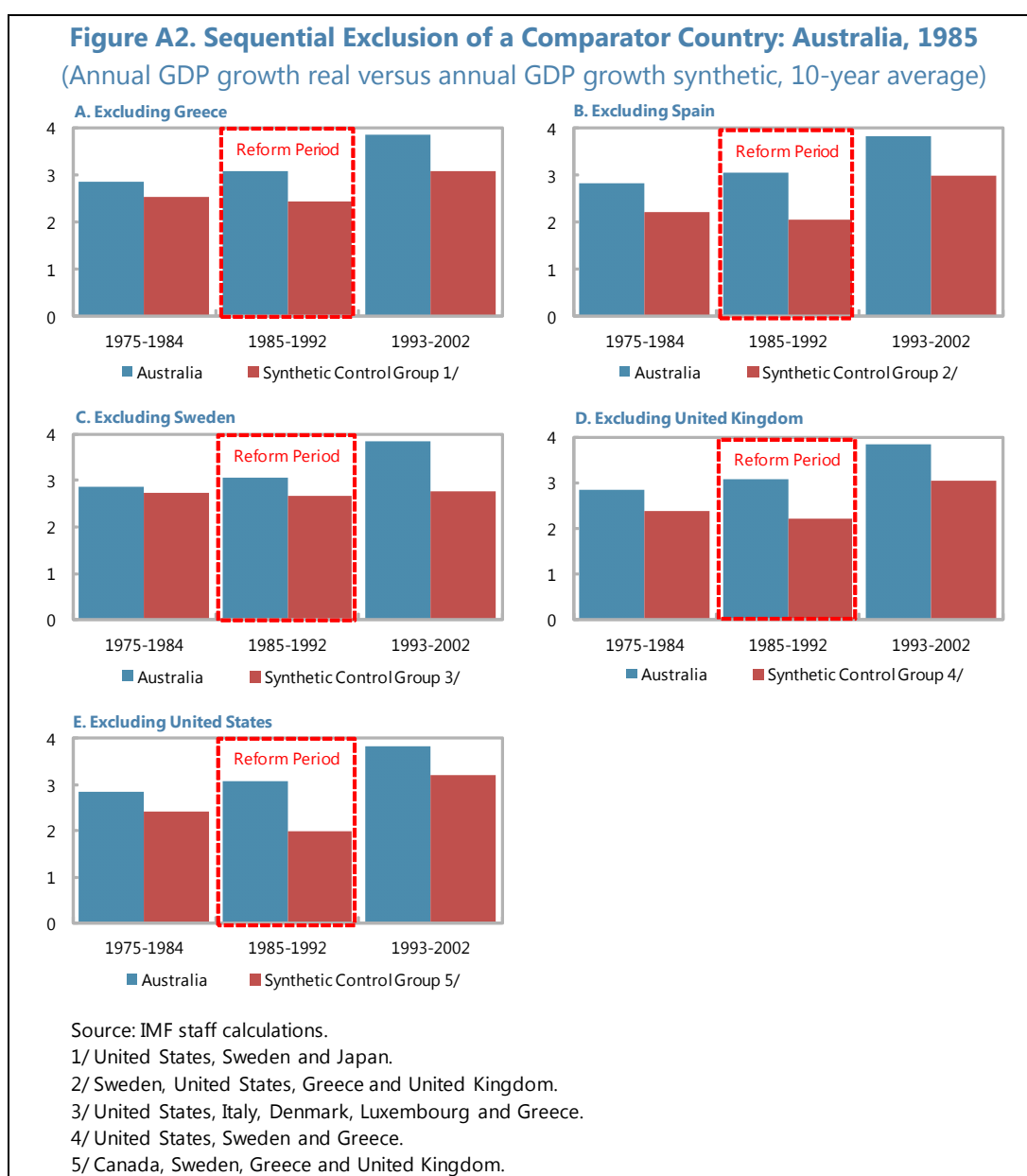


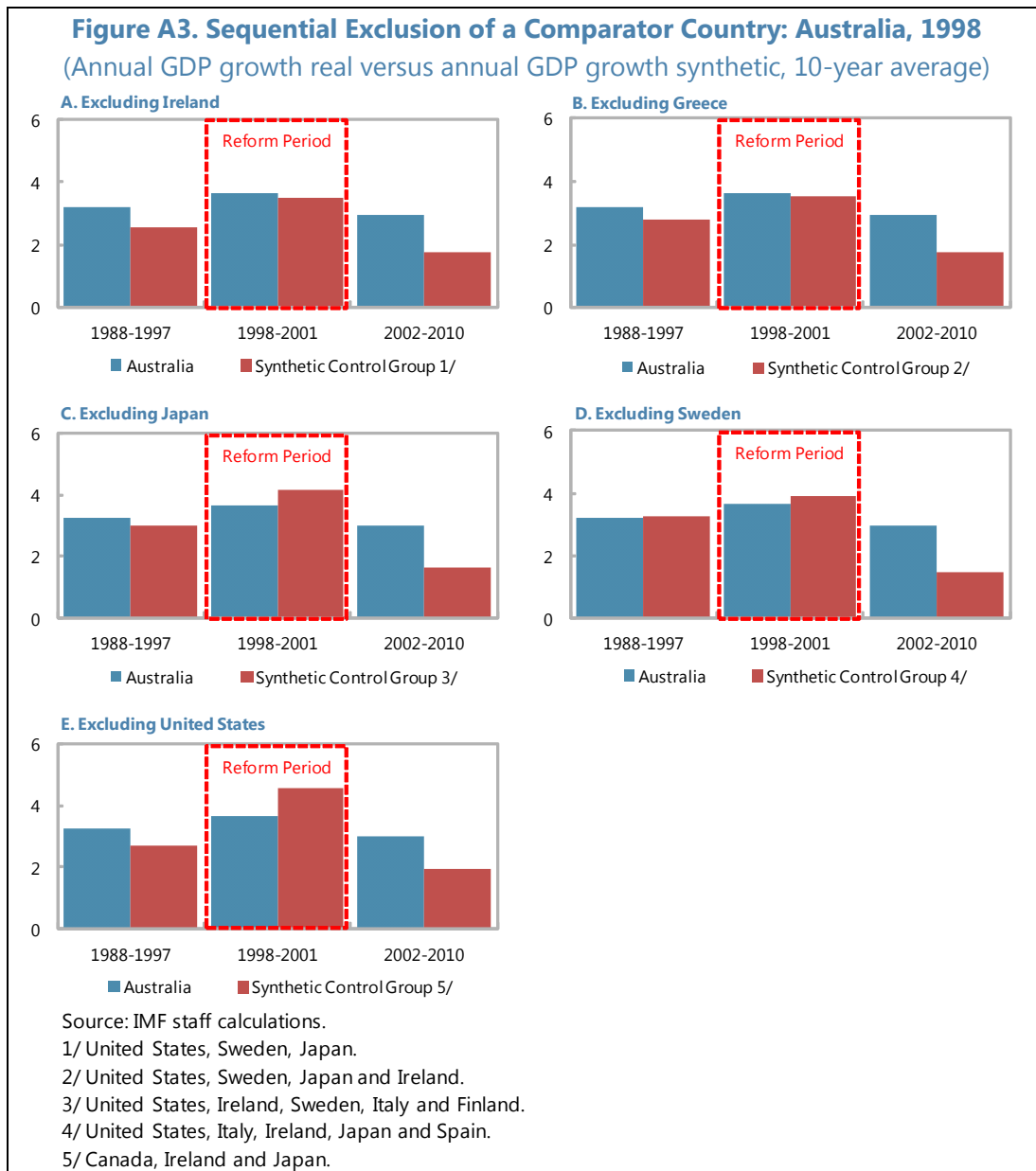
1. **Every country in the comparator group was alternatively chosen as the tested country when in fact no fiscal reform took place in that country** (Figure A1). If the estimated effect for Australia is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in Australia was higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of both the size of growth gaps and ratios of post-reform and pre-

reform root mean square prediction errors (RMSPEs). This indicates that the fiscal reform likely has made a positive difference in the growth performance in Australia.

## B. Sequential Exclusion of a Comparator Country

2. **The sensitivity of the baseline results was tested by sequentially excluding each of the countries in the comparator group that received a positive weight and re-estimating the model** (Figure A2 and A3). Post-reform GDP growth gaps are larger than pre-reform GDP growth gaps for almost all cases for both 1985 and 1998 reforms, confirming the robustness of the baseline results.

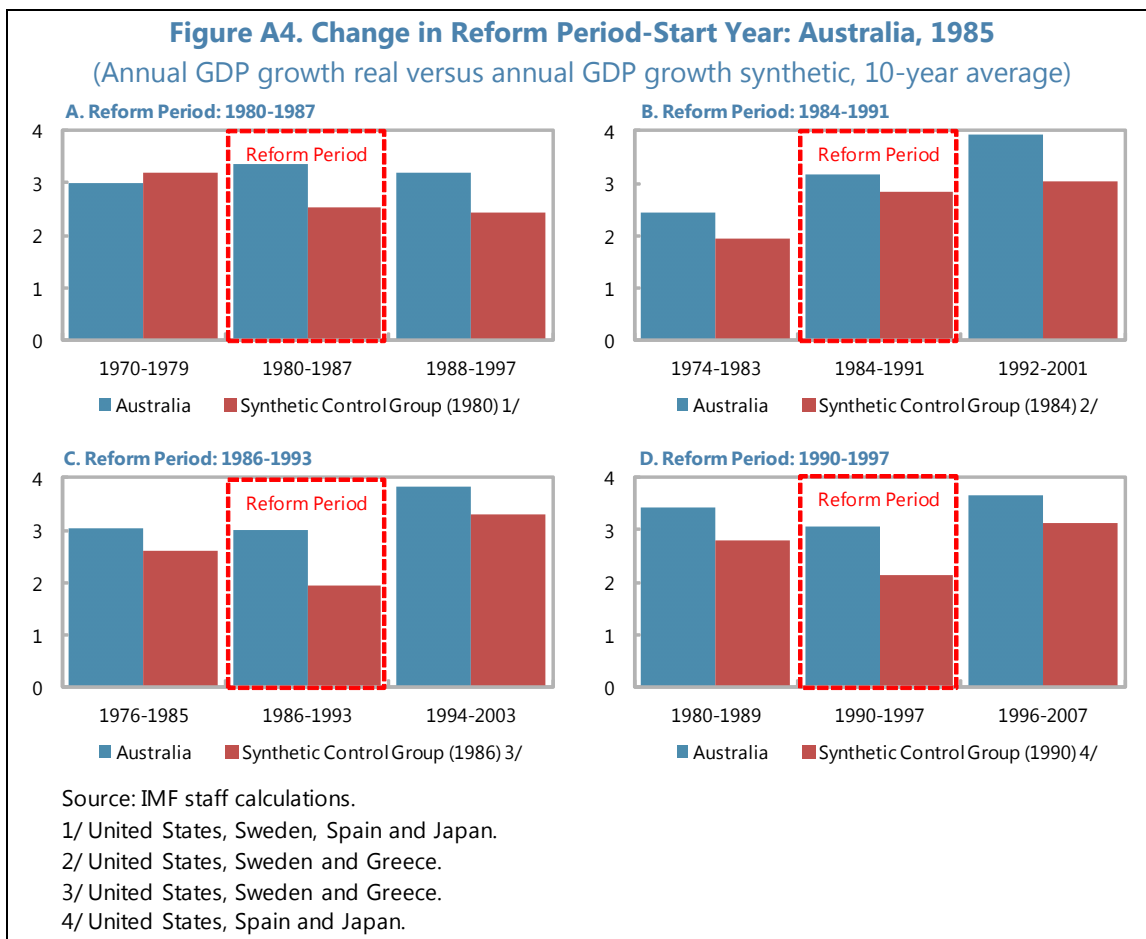


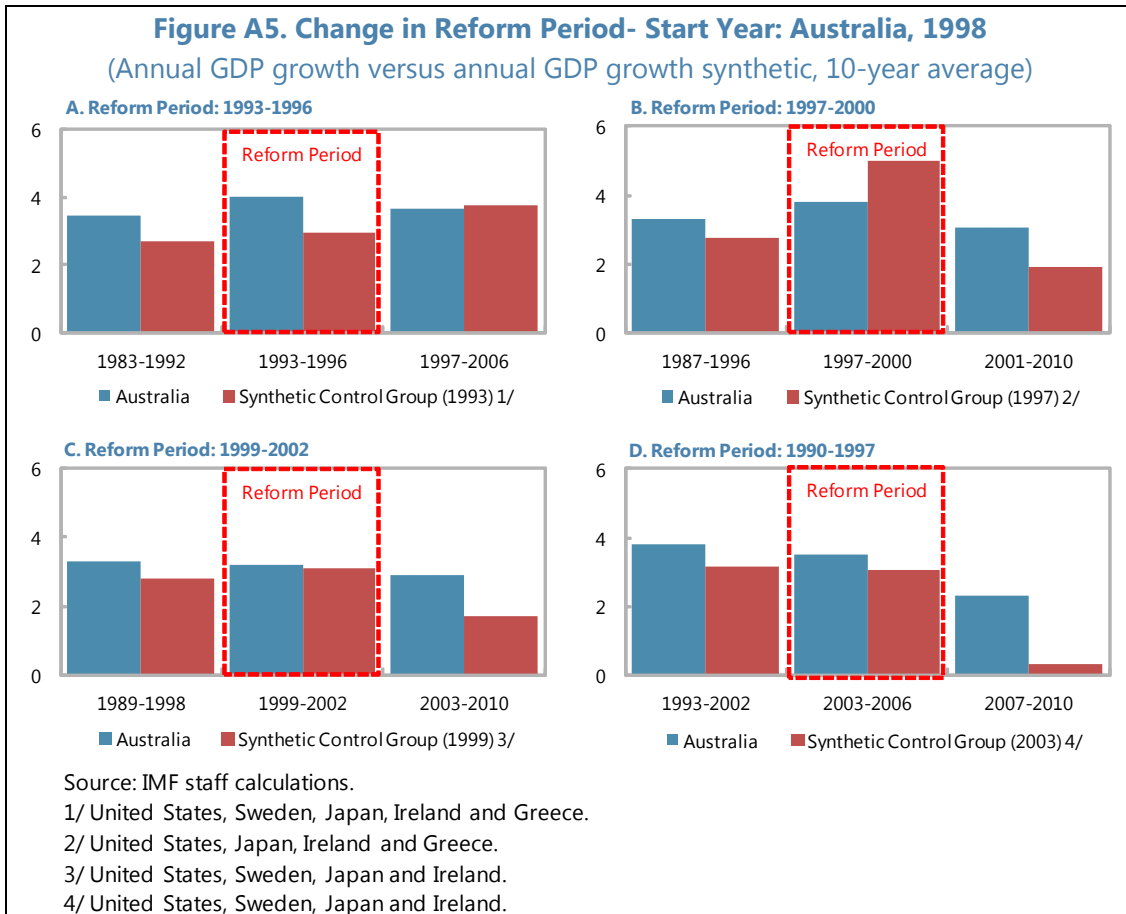


### C. Changes in the Reform Periods

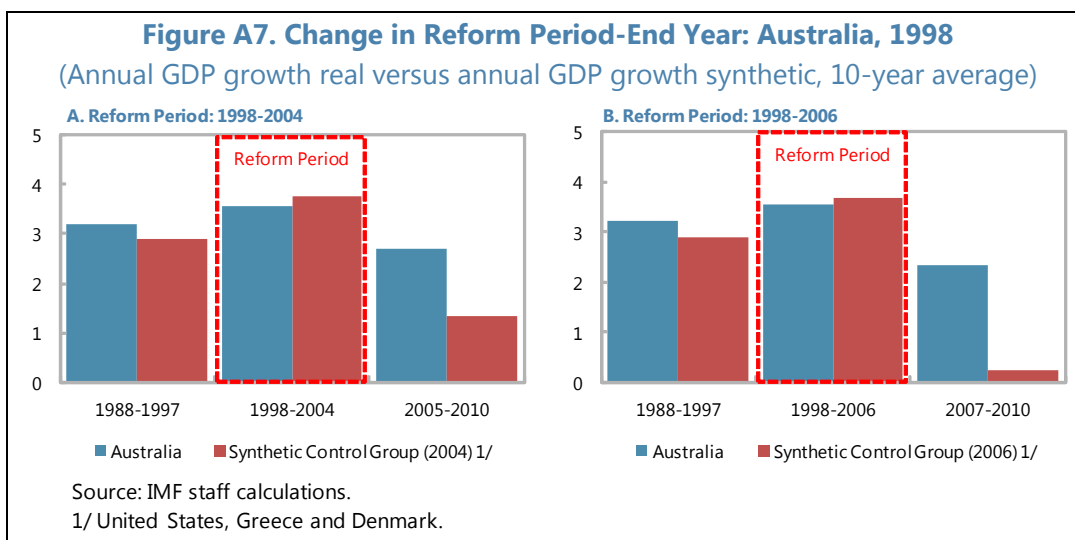
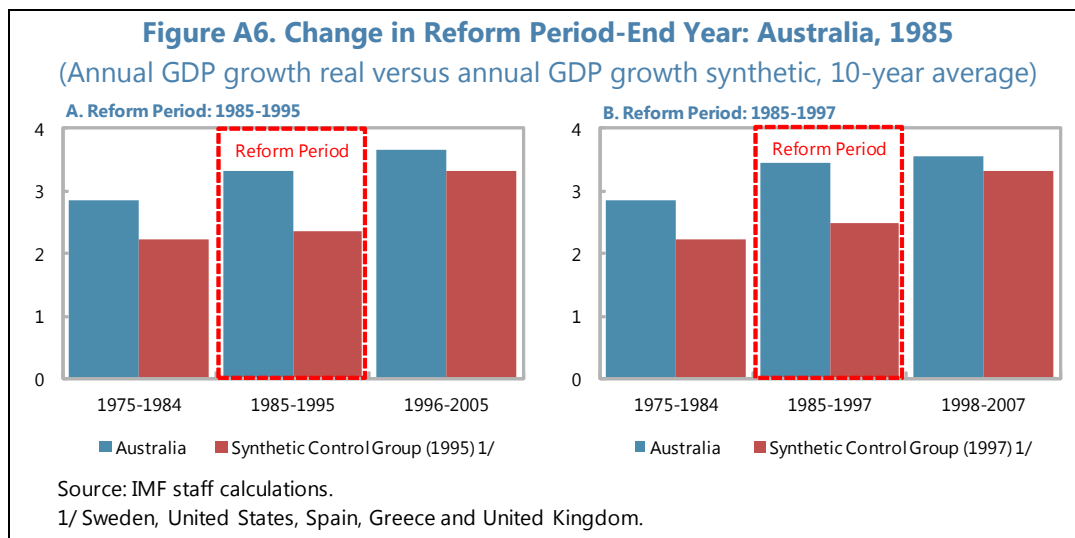
3. **Synthetic series were re-estimated for years 1980, 1984, 1986, and 1990 (first wave) and 1993, 1997, 1999, and 2003 (second wave)** (Figure A4 and A5). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. For the 1985

reform, starting periods are varied from 1980 to 1990, while for the 1998 reform, starting periods are varied from 1993 to 2003. Results show that the conclusion for the baseline is not sensitive to small changes in starting periods, but large changes sometimes result in disappearance of growth effects. These results are consistent with the conjecture in the baseline that the fiscal reform is the likely reason for the positive growth effect.





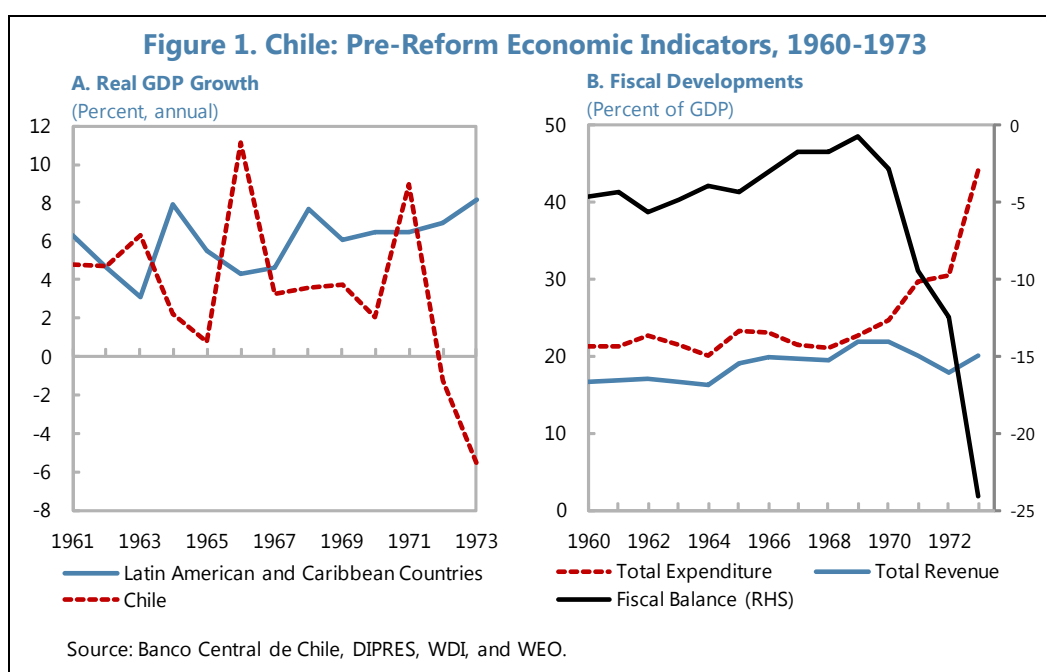
4. **The difference in average growth rates was recalculated by setting the end of the fiscal reform period to different years** (Figure A6 and A7). The purpose of this exercise is to examine whether our conclusion in the baseline is sensitive to the timing of the end of the reform, given its uncertainty. Results confirm that the conclusion holds for the 1998 reform when the end of the fiscal reform period changes but not for the 1985 reform.



# CHILE: FISCAL POLICY AND LONG-TERM GROWTH

## A. Background

1. **The Chilean economy expanded at moderate rates between 1964 and 1970, suffering from stubbornly high inflation and the legacy of protectionism** (Figure 1). Real GDP and per-capita GDP grew on average at about 4 and 2 percent, respectively, as several decades of protectionist trade and industrial policies practically isolated the Chilean economy from the world economy. Inflation—a chronic problem of the country—fluctuated around 28 percent per year, on average, reflecting wage increases in excess of productivity gains (Table 1).



2. **During this period, fiscal imbalances were contained thanks to buoyant copper revenues that offset the detrimental impact of interventionist policies.** After posting average deficits of about 5 percent per year in the early 1960s, the fiscal balance of the general government improved gradually, benefiting from historically high prices of copper. By 1969, the deficit had shrunk to 0.8 percent of GDP. On the structural front, Chile continued to follow policies centered on import substitution and an active role of the state in the economy. As a result, no significant structural reforms were implemented until 1970.

3. **In late 1970, the Allende government adopted aggressive fiscal measures to stimulate demand and redistribute income, but after a rebound the country fell into deep crisis.** Fiscal measures included a widespread program of nationalization and a sharp increase in public transfers, wages, and social spending on housing, health, and education. As a result, the deficit of the general government jumped from about 3 percent of GDP in 1970 to 24 percent in 1973. Increasingly, large



fiscal deficits were financed with money creation, which translated into galloping inflation despite generalized price controls. By the end of 1973, the country was in a deep economic crisis, with GDP contracting by about 6 percent and end-year inflation exceeding 550 percent.

**Table 1. Chile: Selected Indicators, 1964-1973**  
(Percent change unless otherwise indicated, annual)

Indicator	1964-1970	1971	1972	1973
GDP Growth (Constant Prices)	3.8	9.0	-1.2	-5.6
Per-Capita GDP Growth (Constant Prices)	1.6	7.1	-2.9	-7.1
Inflation (End of Period)	28.0	19.4	149.2	558.6
Fiscal Balance (Percent of GDP) 1/	-2.6	-9.5	-12.5	-24.0
Trade Openess (Percent of GDP) 2/	27.8	23.1	23.1	29.1
Copper Price Inflation	14.3	-23.5	-0.9	65.9

Source: IMF staff calculations, WEO.

1/ General government.

2/ Exports of goods and services plus imports of goods and services divided by GDP.

## FISCAL POLICY REFORMS: FISCAL CONSOLIDATION AND COMPREHENSIVE PUBLIC SECTOR REFORM

### A. Overview<sup>1,2</sup>

4. **In late 1973, the military took over and adopted an adjustment program aimed at drastically reducing the state's role in the economy** (Reform episode I: 1974–79). The new leadership enacted a radical overhaul of economic institutions and policies, with the objective of shifting from a highly-regulated and closed economy dominated by state property and government control, to a deregulated and open market economy based on private ownership. Cornerstones of the 1974–79 program were a sharp tightening of fiscal policy by cutting primary spending (particularly on wages, transfers, and investment) and adopting radical structural reforms, including

<sup>1</sup> The relevant reform periods for Chile reflect the application of the selection criteria discussed in the methodological annex. Importantly, the identified reform periods do not include all significant fiscal reforms undertaken by Chile over the sample period. For example, the analysis excludes the pension reform of 1981 which was unique to Chile, stimulated the development of capital markets, and contributed to a reduction of labor costs (Mackenzie and others, 1997a; Mackenzie and others, 1997b). Similarly, it does not include more recent improvements to the fiscal framework such as the adoption of a fiscal rule in early 2000, which introduced a target for the government's structural balance and adjustments for copper price variations (Kalter and others, 2004).

<sup>2</sup> For more information on Chile's economic performance and policy implementation during the decades from 1970 to 2000 see, for example, Corbo (1985), Larrain and Meller (1991), Corbo and Fischer (1993), Laban and Larrain (1995), Ffrench-Davis (2002), and Caputo, R., D. Saravia (2014).

the introduction of a value added tax (VAT) and privatization of a large number of state-owned enterprises (SOEs). These measures were part of a package of broader reforms which included most notably the removal of price controls, trade liberalization, and financial markets' deregulation (Table 2).

5. **This program suffered from some policy inconsistencies, however, that contributed to the build-up of large imbalances and prompted further reforms in 1983 (Reform episode II, 1983-89).** In the late 1970s, Chile adopted an exchange rate-based program to reduce stubbornly high inflation, while maintaining full indexation of most contracts (including wages) to past inflation. This generated a sharp real appreciation of the peso and a drastic reduction in the cost of foreign borrowing, which resulted in large capital inflows and unsustainable trade deficits. In 1982, the sudden stop in external financing sparked by the international debt crisis and growing doubts about the fixed exchange rate policy triggered a severe recession and a banking crisis.<sup>3</sup> To restore macroeconomic stability, the government adopted a new stabilization program in 1983. This second reform program focused on fiscal retrenchment supported by a wide range of structural measures, such as: further privatizations and a reform of the social security system; labor market flexibility; financial system reform; adoption of a flexible exchange rate regime; and enhanced central bank independence. The reform effort was supported by financial arrangements with the IMF, the World Bank, and the Inter-American Development Bank (IDB).<sup>4</sup>

6. **Both reform programs featured large fiscal adjustments mainly focused on primary spending cuts** (Table 2). During the first reform episode (1974–79), the general government's primary fiscal balance posted an unprecedented correction, reflecting a dramatic compression of primary spending and comprehensive measures to broaden the tax base. Such an unprecedented adjustment was in part motivated by the severity of the economic recession in 1975. During the second reform episode (1983–89), fiscal adjustment was less pronounced as fiscal space created by further primary spending cuts was used to finance a reduction in the tax burden—particularly on business income—and an increase in public investment.

7. **Initial spending reforms aimed at achieving immediate and permanent savings, leaving limited room for pro-growth measures.** Between 1974 and 1979, capital expenditure was severely reduced—particularly for public housing programs. The wage bill was cut through wage restraint and reductions in employment. Consumer subsidies and public transfers also decreased significantly as thousands of prices were liberalized and more than ⅔ of SOEs were privatized by end-1979. At the same time, health and education expenditures were protected to the extent possible after initial severe cuts (Figure 7), allowing Chile to maintain relatively high health and

<sup>3</sup> At the beginning of the 1980s, international interest rates increased dramatically, driven by the restrictive monetary policy of the United States. Together with the significant build up of foreign debt during the 1970s, this was a major determinant of the Latin American debt crisis of the early 1980s. By end-1982, real GDP growth fell by about 14 percent and the unemployment rate jumped to about 20 percent in Chile (10 percent in 1981).

<sup>4</sup> During 1983-1990, Chile had three financial arrangements with the Fund: two Stand-by Arrangements (1983-85 and 1989-90) and one Extended Fund Facility (1985-89).

education standards compared to peers (Mackenzie and others, 1997a; Meller, 1992). During the second reform episode, further reductions in public transfers and subsidies helped create space for a recovery in public investment to alleviate increasing bottlenecks in basic infrastructure, such as roads.

**Table 2. Chile: Major Fiscal Reforms**

	Reform areas	Year(s)	Reform Steps
Reform I (1974-79)	1. Fiscal Consolidation	1974-79	Expenditure-based fiscal consolidation brought the primary fiscal deficit from 23 percent of GDP in 1973 to a 5 percent surplus in 1979.
	2. Tax Reform		
	PIT	1974-79	Temporary one-year increase followed by a reduction of the top rate from 60 to 58 percent; replacement of proportional tax on labor income by progressive tax.
	VAT	1975	Introduction of a broadly based VAT with general rate of 20 percent and initial exemptions for certain basic goods.
	Custom Duties	1974-79	Revision to tariff structure to achieve by 1979 a uniform import tariff of 10 percent with some exceptions; quantitative restrictions eliminated.
	3. Spending Reform		
	Civil Service	1974-79	Wage restraint and reduction of public employees.
	Subsidies	1974-79	Reduction facilitated by privatization of SOEs and reversal of previous expropriation of enterprises.
	Public Investment	1974-79	Reduction from 8 percent of GDP in 1973 to 3 percent in 1979; efforts to protect the most productive investment projects.
	Education and Health	1974-79	Increase in spending on primary and secondary education, and primary care expenditure.
	4. PFM and Revenue Administration		
	Budget Process	1975	Adoption of single treasury account; strong coordination of macro framework and the budget.
	Revenue Administration	1974-79	Improvement of enforcement and tax collection including by streamlining filing and payment procedures.
5. Labor Market	1979	New labor plan for collective bargaining.	
6. Privatizations	1974-79	Sale of more than 500 SOEs.	
Reform II (1983-89)	1. Fiscal Consolidation	1983-89	Expenditure-based fiscal consolidation brought the primary fiscal balance from a negligible deficit in 1982 to a 9 percent surplus in 1989.
	2. Tax Reform		
	CIT	1983-89	Major revisions to rate structure; top rate reduced from 50 percent in 1983 to 35 percent in 1989; near elimination of the tax on retained profits.
	PIT	1983-89	Top rate reduce from 58 percent to 50 percent.
	VAT	1983-89	Reduction of general rate to 18 percent.
	3. Spending Reform		
	Primary Current Expenditure	1983-89	Reduction in primary current spending from 25 percent of GDP in 1982 to 17 percent in 1989.
	Public Investment	1983-89	Increase from about 2 percent of GDP in 1982 to about 3 percent in 1989.
	4. PFM		
	Copper Stabilization Fund	1985	Adoption of the fund to shield the budget from copper prices' volatility.
	5. Labor Market	End 1982	Removal of full wage indexation.
6. Privatizations	1983-89	Sale of about 80 SOEs.	

Source: Corbo (1985), IMF, and Mackenzie and others (1997a).

8. **Tax policy reforms led to a radical overhaul of the tax system, including the early introduction of a VAT.** In 1975, the cascading sales tax was replaced with a broad-based VAT, featuring a general rate of 20 percent and limited exemptions for specific goods. This helped reduce the distortive effects of sales taxes and excises on relative prices of consumer goods, and yielded substantial revenue thanks to its simple design. After initial increases, income taxes were adjusted to reduce the dispersion of effective tax rates (e.g., the top PIT rate was reduced by two percentage

points by 1979); and trade liberalization implied the introduction of a uniform import tariff of 10 percent and the elimination of quantitative restrictions (Mackenzie and others, 1997a). During the second reform period, spending reforms created space to reduce further corporate taxes and lower the standard VAT rate.<sup>5</sup>

9. **Continued improvement in revenue administration and public financial management (PFM) systems helped enact fiscal reforms swiftly.** Chile entered the first reform episode with reasonably well-functioning revenue administration and PFM systems, which permitted to enhance tax collection, and to exert greater control on budget preparation and execution (Mackenzie and others, 1997a). During 1974–79, main improvements in tax administration included greater taxpayer education, simplification of taxpayer forms, and streamlined filing and payment procedures. In the PFM area, notable advances comprised tighter control over the budget preparation process; enhanced cash management system; and the adoption of a medium-term macroeconomic and planning framework for investment projects (Mackenzie and others, 1997a; Kalter and others, 2004).<sup>6</sup> During the second reform period (1983–89), the government established a copper stabilization fund (CSF) to shield the conduct of fiscal policy from the volatility of copper’s international prices.

## B. Notable Design Features

10. **Initial reforms were part of a comprehensive, crisis-driven policy package that included some internal inconsistencies.** During the first reform episode, the policy package ranged from dramatic fiscal stabilization measures to radical structural reforms—including an overhaul of the tax system, large-scale privatizations, market and price liberalizations, and trade and financial reforms. The breath of these policies was dictated primarily by the gravity of the crisis rather than by considerations on their conduciveness to growth or their impact on the income distribution. As a result, the policy mix included some internal inconsistencies, such as the coexistence of full wage indexation with a preannounced nominal exchange rate (Corbo and Fischer, 1993). During the second reform episode, consistency and synergies among policies were enhanced.

11. **Military government and strong institutions facilitated a swift implementation of comprehensive fiscal reforms.** While military leadership facilitated the swift identification, adoption and implementation of the far-reaching reforms (Schmidt-Hebbel, 2008), Chile’s relatively good tax and PFM systems were instrumental in carrying out complex reforms in a timely fashion (Mackenzie and others, 1997a). Notable examples are the successful introduction of a VAT in 1975 and the effective reduction of unproductive spending during both reforms episodes, including by rationalizing and better selecting investment programs.

<sup>5</sup> The corporate income tax was significantly reduced with the top rate declining from 49 percent in 1982 to 33 percent in 1989. During the 1990s, the corporate income tax was raised to 35 percent until 1994 and then lowered to 15 percent.

<sup>6</sup> For example, from 1975 the Ministry of Finance set ceilings prior to preparation of ministry spending envelopes; and the authorities adopted a single treasury account in 1975.

12. **Reform packages, while aiming primarily at attaining macroeconomic stabilization, included some measures to mitigate the impact of adjustment on the very poor.** For example, at the outset of the first reform period, the government implemented a temporary public works program to alleviate the impact of the steep increase in high unemployment (Edwards and Edwards, 2000); and increased food provisions for participants in the public works programs (Mackenzie and others, 1997a). Also, it introduced other poverty alleviation schemes that targeted mothers, pregnant women, and school children (Meller, 1992).

### C. Outcomes

13. **While volatile in both reform periods, growth picked up markedly in the late 1980s and remained sustained during the 1990s** (Table 4). During 1974–75, GDP fell cumulatively by about 12 percent due to significant terms-of-trade shocks and policy-related factors, such as a sharp fiscal contraction and measures to contain inflation after price liberalization.<sup>7</sup> Similarly, economic activity contracted by about 16 percent in 1982–83 as a result of a further worsening in the terms of trade and expenditure-based fiscal retrenchment in the midst of the international debt crisis (Ffrench-Davis, 2002). Growth started to rebound in the mid-1980s peaking at 11 percent in 1989 and hover at around 6 percent in the following decade as improved policy coordination and business-friendly policies supported strong private investment and export performance (Goldsbrough and others, 1996). While such a rebound may partially reflect a cyclical recovery from the 1982–83 crisis, improvements persisted for long enough to suggest that other influences—including fiscal and market-oriented structural reforms—played a significant role (Mackenzie and others, 1997a).

14. **Sharp expenditure-based fiscal adjustment helped put public finances on a sustainable footing, while making room for some pro-growth fiscal measures down the road.** During the first reform episode, the primary fiscal balance of the general government moved from a deficit of about 23 percent of GDP in 1973 to a surplus of about 5 percent in 1979. Two-thirds of the adjustment came from a dramatic reduction in primary spending, with primary current expenditures and public investment falling by 20 and 4 percentage points of GDP, respectively. At the same time, revenues increased by 4 percentage points of GDP following the introduction of a VAT. During the second reform period (1983–89), the improvement in the primary balance was somewhat smaller, about 9 percentage points of GDP, with current primary spending falling by about 8.5 percentage points of GDP. However, capital spending was increased marginally and the tax ratio was lowered by about 3 percentage points—including by reducing CIT and VAT rates.<sup>8</sup>

<sup>7</sup> The price of copper fell by about 45 percent in 1975, and international oil prices increased by about 150 percent in real terms between December 1973 and December 1975.

<sup>8</sup> For example, the suspension of wage indexation at the end of 1982 and fiscal retrenchment between 1983 and 1989 were instrumental in translating nominal exchange rate depreciations into a real depreciation, which boosted non-copper exports and sustained rapid growth.

15. **Fiscal and structural reforms succeeded in paving the way for private-sector-led growth, which in turn helped sustain the fiscal consolidation.** Initial efforts to reduce primary public expenditure were further supported by a massive program of privatizations, which brought the number of state-owned enterprises to 38 in 2000, from 595 in 1973 (Serra and others, 2001).<sup>9</sup> At the same time, the 1981 pension reform—which included a shift to privatized savings plans and an increase in the retirement age—helped boost private savings and deepen capital markets, which along with significant reductions in CIT rates promoted a sharp increase in private investment throughout the 1990s. These measures ultimately improved allocative efficiency and expanded the economy’s productive capacity, with ensuing medium-term benefits for the budget (in the form of lower subsidies and higher revenue collection). Importantly, the full benefits of such reforms were grasped only after the removal of wage indexation at the end of 1982.

16. **Despite some efforts to protect the poor, income inequality increased sharply during the reform periods and remained above the 1973 level throughout the 1990s** (Figure 7). Amidst strong growth and the authorities’ efforts to protect the poor, the poverty rate fell to about 12 percent in 1992 from about 21 percent in 1970 (Camhi and Castro, 2003). However, income inequality, as measured by the GINI coefficient, increased from about 0.45 in 1973 to about 0.56 in 1987, mainly reflecting negative labor market developments and depressed real wages (Laban and Larrain, 1995).<sup>10</sup> Inequality improved somewhat during the 1990s, but it continued to be on average 20 percent higher than in 1970 (Contreras and Ffrench-Davis, 2012).

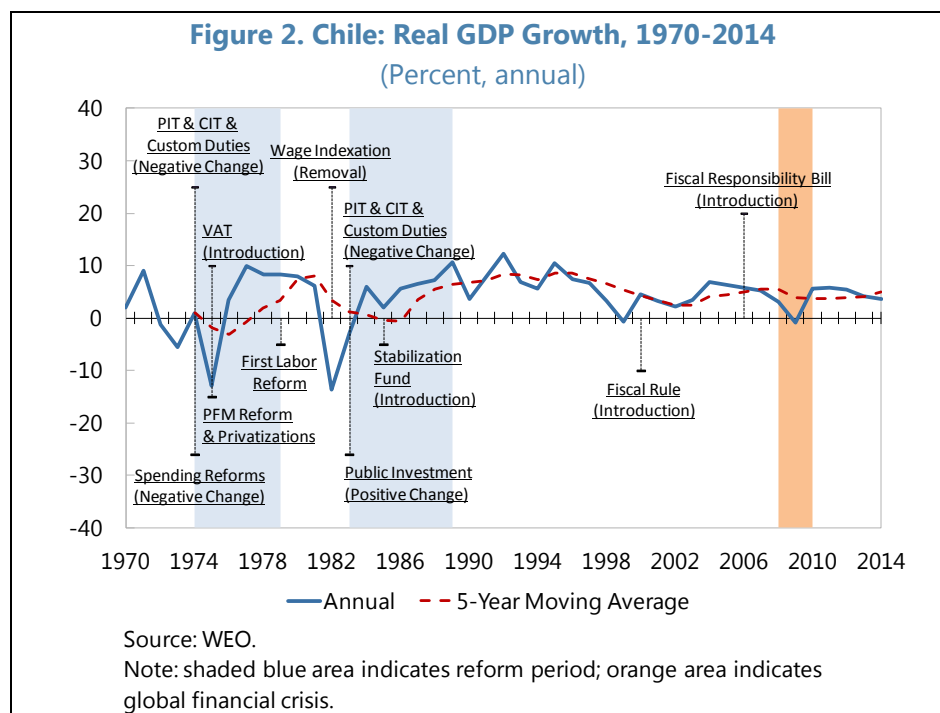
## IMPACT ON LONG-TERM GROWTH

### A. Long-Term Growth Dissected

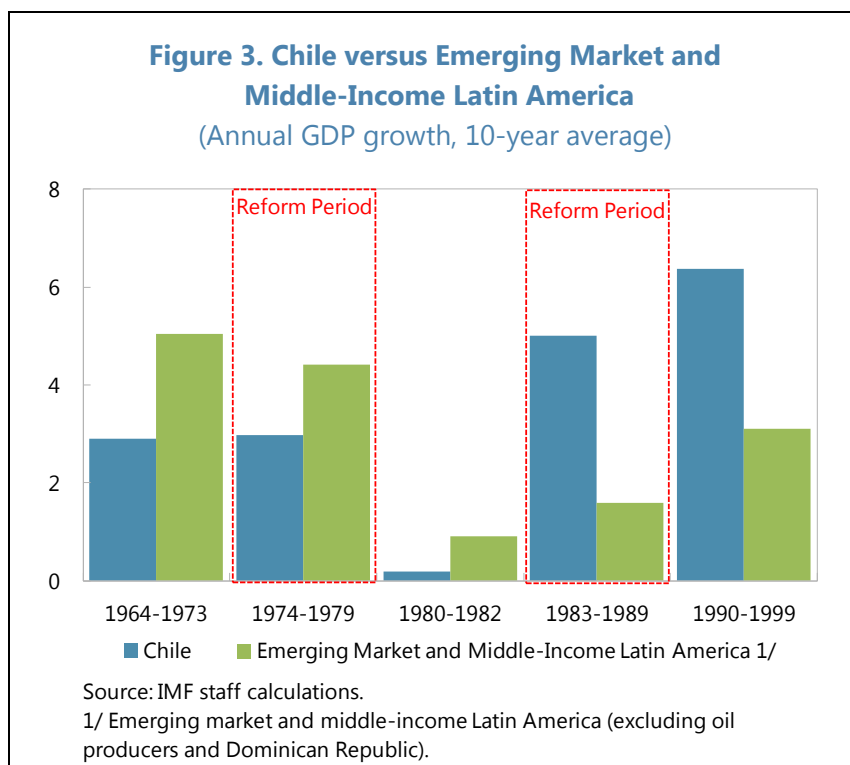
17. **Long-term growth picked up significantly in the mid 1980s and was sustained throughout the 1990s** (Figure 2). Average annual GDP growth, which hovered around 1.6 percent during the five years preceding the first reform episode, increased to 3 percent during the first reform episode and ultimately to 5 percent during the second reform episode. In the first half of the 1990s, trend growth even accelerated to 7 percent, on average, on the back of buoyant private investment and a rapid expansion of exports, before slowing down in the wake of the Asian crisis (1997–98).

<sup>9</sup> Primary spending fell from 43 percent of GDP in 1973 to 23 percent in 1999.

<sup>10</sup> The unemployment rate reached 20 percent in 1982 (4 percent in 1973) and remained in double digits until 1987. At the same time, real wages remained significantly below the level attained in 1970.



18. **Simple comparisons suggest that Chile's growth performance was stronger than that of its peers following its fiscal reforms** (Figure 3). During 1980-89, Chile exceeded the average growth rate of emerging Latin American economies by about 1.7 percentage points. This difference seems to have increased in the decade following the second reform period spanning from 1990 to 1999, with Chile outperforming its peers by about 3 percentage points. More evidence of the 1990s as Chile's "golden period" in terms of economic growth is presented in several empirical studies, for instance De Gregorio (2004a), and Gallego and Loayza (2002).



19. **Similar results are obtained if Chile's growth experience is compared to a hypothetical growth performance based on the synthetic control method**<sup>11</sup>(Figure 4 and Table 3). While the results of this methodology need to be interpreted with caution, some general trends seem to emerge. Average GDP growth in the ten years following the first reform episode was about 2.6 percentage points higher than that generated by the synthetic control group based on standard growth predictors.<sup>12</sup> Moreover, Chile's advantage appears to have increased further in the decade following the second reform episode (1990-99). Similar results are reached with the same exercise using GDP per capita growth.<sup>13</sup>

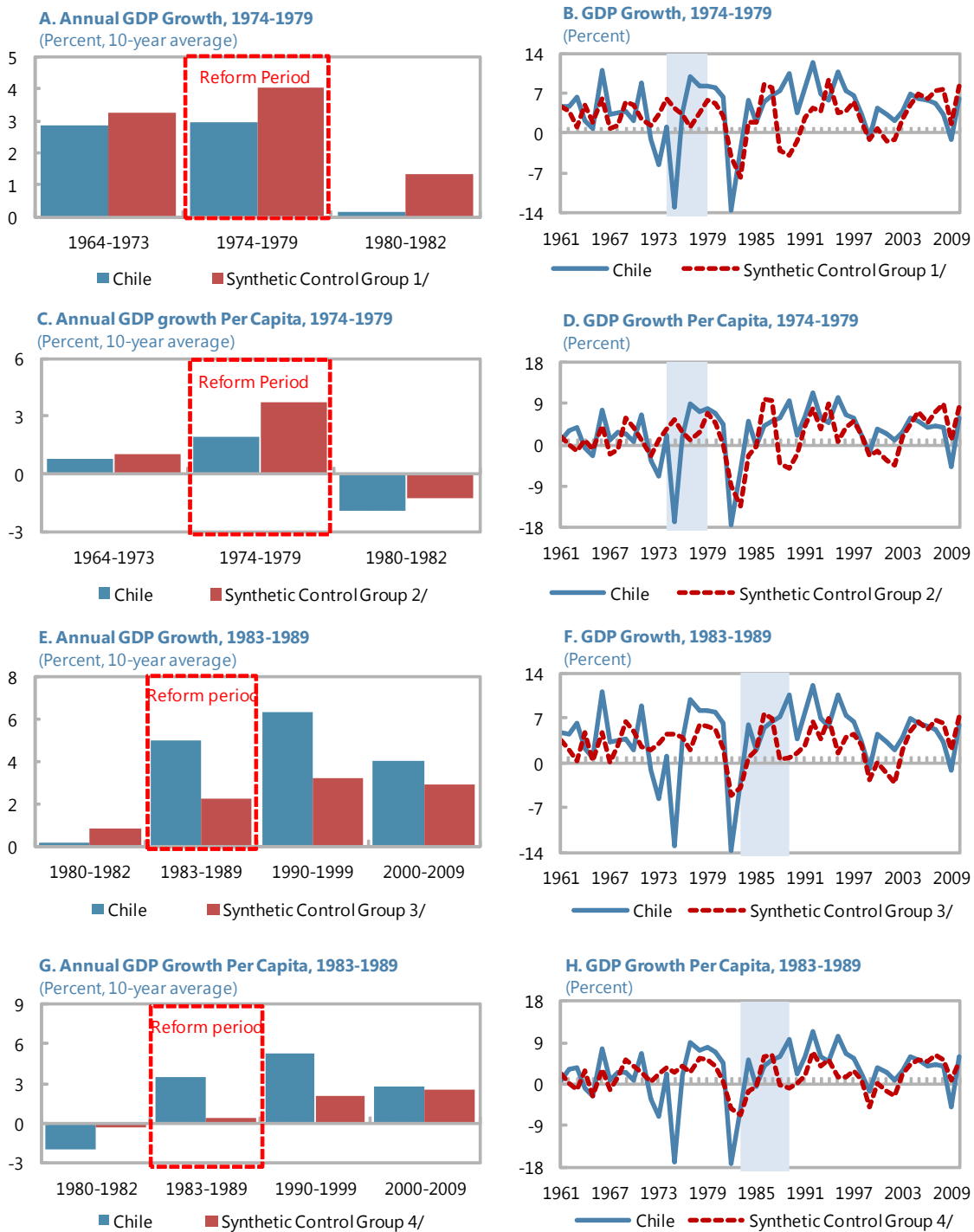
<sup>11</sup> See the methodological annex for more information on the synthetic approach. Chile's synthetic control group was identified among emerging market and middle-income Latin America.

<sup>12</sup> Such predictors include per-capita GDP, inflation, trade openness, terms of trade for goods and services, real effective exchange rate, and education levels.

<sup>13</sup> Detailed robustness checks are presented in Appendix I. Results of robustness checks broadly confirm the analysis presented in this study.



Figure 4. Synthetic Control Method: Chile



Source: IMF staff calculations.  
 Note: Shaded blue areas indicate reform periods.  
 1/ Uruguay, Peru and Colombia.  
 2/ Uruguay, Peru and Colombia.  
 3/ Uruguay and Colombia.  
 4/ Colombia, Uruguay and Peru.

**Table 3. Chile: Economic Growth Predictor Means before Fiscal Reform**

Variable	Reform period 1974		Reform period 1983	
	Real	Synthetic	Real	Synthetic
<b>GDP Growth</b>				
GDP Growth (Percent)	0.8	2.9	0.1	0.3
GDP Per Capita (2005 I\$/Person)	4179.6	4531.1	4241.2	4820.9
Trade Openness (Percent)	25.9	25.9	30.0	21.2
Terms of Trade (Percent)	104.8	92.0	97.6	93.9
Inflation Rate (Percent)	55.5	33.9	92.9	42.3
Human Capital Index	2.1	1.8	2.1	1.9
Real Effective Exchange Rate Index	443.8	74.5	331.0	103.2
<b>GDP Growth Per Capita</b>				
GDP Growth Per Capita (Percent)	-1.7	0.3	-3.2	-0.3
GDP Per Capita (2005 I\$/Person)	4179.6	4736.3	4241.2	4573.2
Trade Openness (Percent)	25.9	23.9	30.0	20.1
Terms of Trade (Percent)	104.8	97.0	97.6	95.6
Inflation Rate (Percent)	55.5	47.0	92.9	35.7
Human Capital Index	2.1	1.9	2.1	1.9
Real Effective Exchange Rate Index	443.8	75.5	331.0	112.4

Source: IMF Staff calculations.

1/ All variables except GDP growth and GDP growth per capita are averaged for the 1961-1973 period. The average for GDP growth and GDP growth per capita is calculated using the years 1961, 1967 and 1973.

2/ All variables except GDP growth and GDP growth per capita are averaged for the 1961-1982 period. The average for GDP growth and GDP growth per capita is calculated using the years 1961, 1971, 1982.

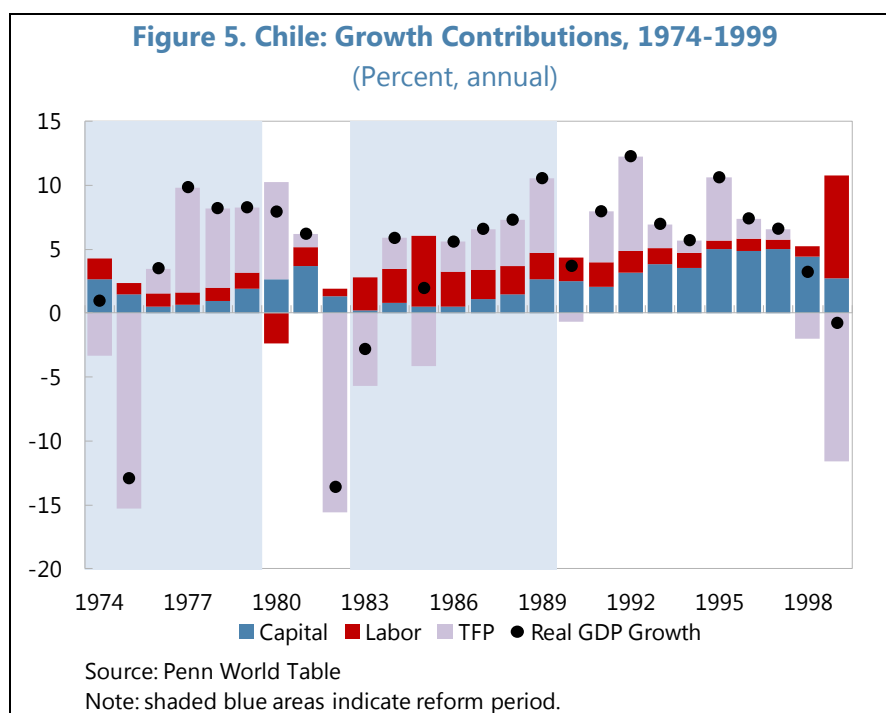
## B. Fiscal Reform: A Game Changer?<sup>14</sup>

20. **Growth accounting suggests that capital and labor were the main drivers of growth after 1974, but there are significant differences across sub-periods** (Figure 5). Over the entire sample period, capital and labor recorded an average contribution to growth of 2.3 and 1.8 percent, respectively, while total factor productivity (TFP) only contributed 0.4 percent.<sup>15</sup> However, period averages hide significant differences in the relative importance of sources of growth over time. For example, capital accumulation explains half of average growth during the first reform episode, yet TFP was the main contributor to economic development in the years immediately following the 1975

<sup>14</sup> The effects of fiscal policies on growth are intrinsically difficult to disentangle from those related to changes in the external environment (e.g., terms of trade shocks) and in other domestic policies (i.e., financial liberalization). Indeed, the response of growth to specific policy measures depends on a complex set of interactions, including the mix of policy measures, structural characteristics of the economy, the conditions prevailing at the eve of adjustment, and the impact of exogenous shocks. Consequently, it is very difficult to draw clear conclusions on the policy-growth nexus and any result from this analysis should to be interpreted with caution.

<sup>15</sup> This result seems to be broadly in line with earlier analysis on sources of growth in Chile, see for example Jadresic and Zahler (2000), Gallego and Loayza (2002), and De Gregorio (2004a and 2004b).

recession. Between 1980 and 1982, capital accumulation was the only source of growth as the contribution of TFP turned negative. In contrast, labor emerged as the main driver of growth during the second reform period, accounting for almost two-thirds of growth.<sup>16</sup> Finally, between 1990 and 1999, more than half of average GDP growth was explained by capital accumulation, driven by record high private investment rates.



21. **Capital accumulation may have benefited from fiscal measures aimed at restoring macroeconomic stability and promoting private sector development.** Fiscal retrenchment and privatizations led to an environment more conducive to private investment by reducing the state's role in the economy, improving borrowing conditions, and anchoring markets' expectations on future policies (Corbo, 1985; Corbo and Fischer, 1993; Ffrench-Davis, 2002). In the 1990s, additional factors may have contributed to the significant increase in capital accumulation, such as a drastic reduction in corporate income tax rates (Vergara, 2004) and increased public spending on infrastructure, with potential crowding in effects for private investment (Ffrench-Davis, 2002). In addition, more effective PFM systems may have helped select and implement investment in projects with a higher growth dividend.

22. **Improved TFP likely benefited from measures to reduce the state's role in the economy and to strengthen fiscal institutions.** During 1976-79, TFP gains may have reflected the efficiency improvements of economic deregulation, including price liberalization and privatization

<sup>16</sup> While largely negative in the early 1980s, the contribution of TFP to average growth rose sharply between 1986 and 1989, accounting for nearly half of total growth.

(Coeymans, 1999). The significant reduction in inflation also seems to have played an important role in enhancing resource allocation (Jadresic and Zahler, 2000). In the late 1980s, aggregate productivity gains may have been related to the adoption of comprehensive labor and pension reforms, which further helped to direct resources to the most productive activities (Edwards and Edwards, 2000). Also, well-functioning tax and PFM systems might have helped to raise the productivity of public investment and to crowd in foreign direct investments, with associated knowledge transfers (Bergoeing and others, 2010).

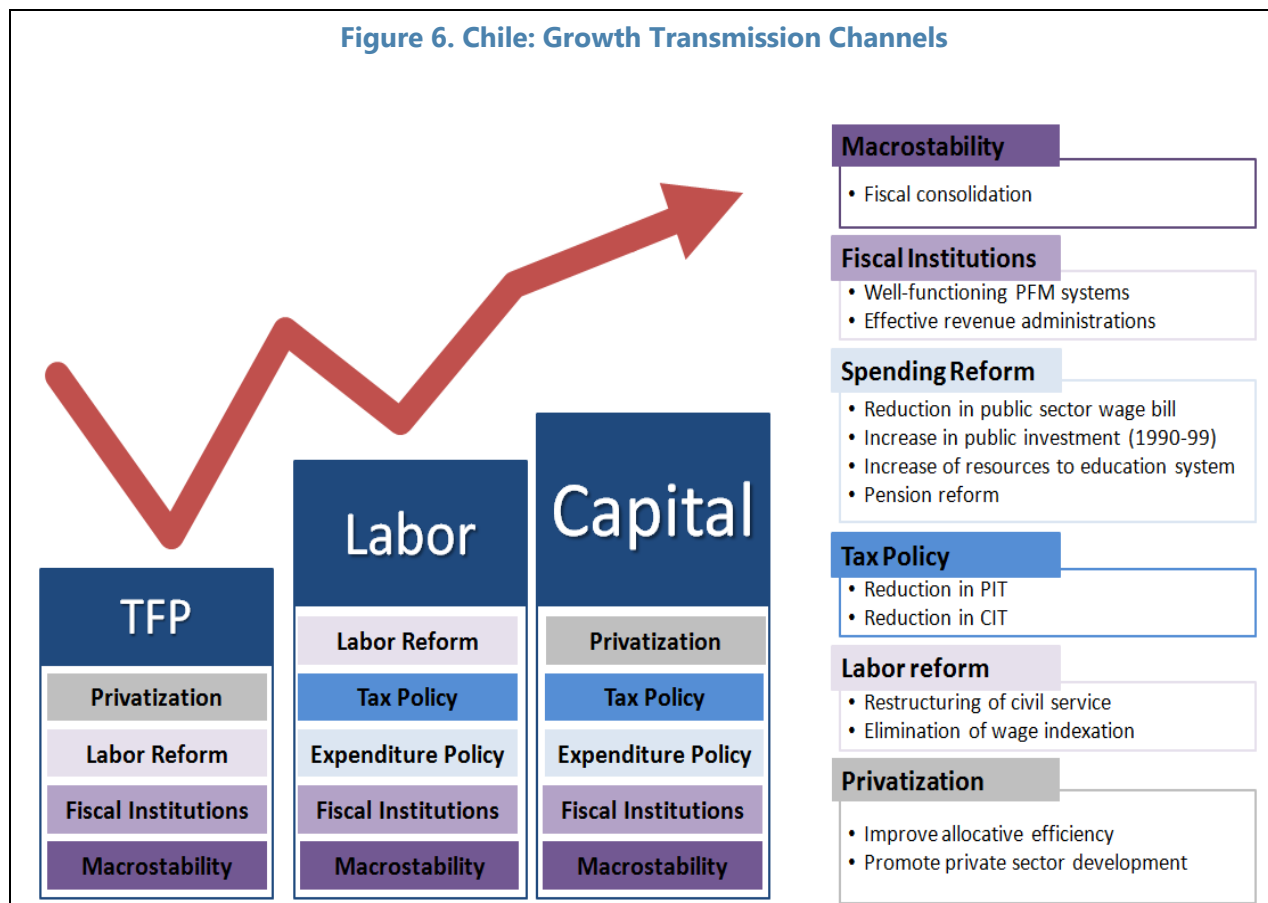
23. **Also, the sharp increase in the contribution of labor in the late 1980s may have been underpinned by macro stability, pro-growth tax and spending policies, and labor reforms.** Specifically, fiscal retrenchment promoted private sector activity by reducing uncertainty associated with fiscal imbalances and improving financing conditions (Mackenzie and others, 1997a), which eventually supported job creation. In addition, labor demand and supply benefited from the reduction in income tax rates (particularly on business income) and social security contributions in the context of the 1981 pension reform (Edwards and Edwards, 2000). Additional stimulating factors could have been the substantial restructuring of the civil service and removal of full wage indexation in 1982, which increased real wage flexibility in the face of record high unemployment (Corbo, 1985; Corbo and Fischer, 1993). Also, the allocation of more budgetary funds to the education system could have reduced labor mismatches by increasing workers' skills. Importantly, the implementation of the above measures appears to have been facilitated by well-functioning PFM systems (Mackenzie and others, 1997a).<sup>17</sup>

24. **In sum, fiscal policy appears to have played an important role in boosting Chile's growth performance after 1973 by promoting productive factor accumulation and some gains in TFP** (Figure 6). Fiscal consolidation contributed to restoring macroeconomic stability and creating the conditions for durable private sector development—including by implementing difficult tax and expenditure reforms with the support of well-functioning fiscal institutions. Also, ambitious labor and pension reforms as well as large-scale privatizations were important in reducing the state's role in the economy, improving resource allocation, and promoting private investment. However, fiscal policies were not the only source of change, of course, and other external and internal factors also played a key role.

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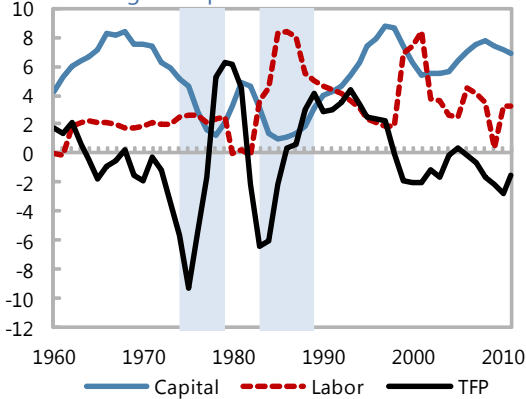
<sup>17</sup> Other macroeconomic reforms are likely to have supported employment growth during 1983-89, including the adoption of a flexible exchange rate regime and liberalizations in the trade and financial sectors.

Figure 6. Chile: Growth Transmission Channels

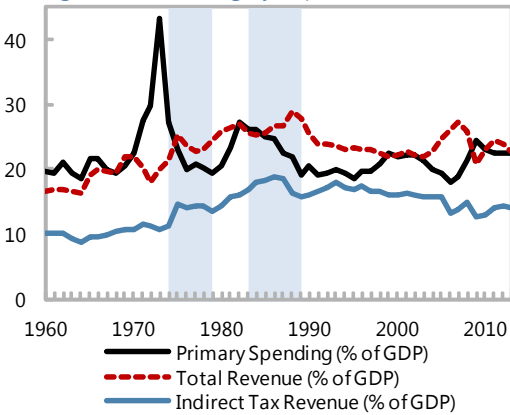


**Figure 7. Chile: Fiscal Policy and Growth, 1960-2013**

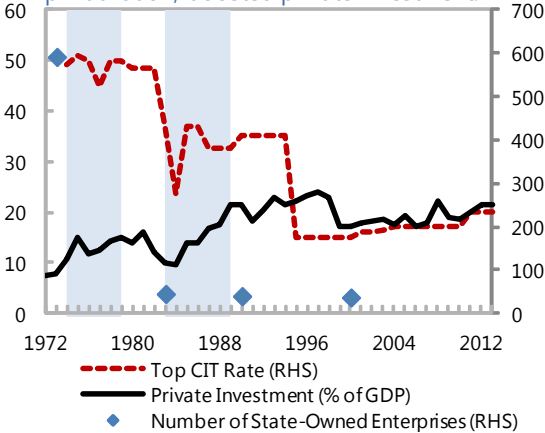
Growth following and reforms came mainly from higher capital and labor accumulation.



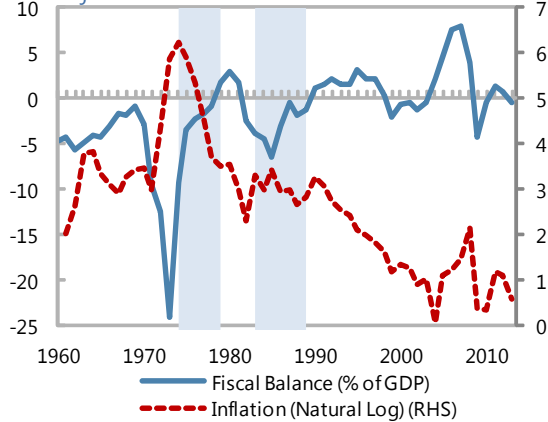
(All series shown as 3-year moving average growth rates)  
Fiscal consolidation in both reform periods was significant and largely expenditure-based.



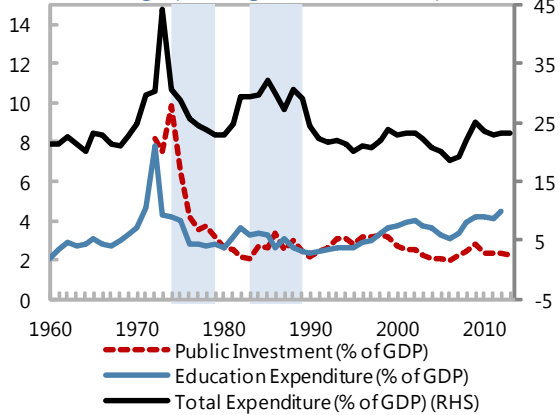
This created room for tax cuts that, along with privatization, boosted private investment.



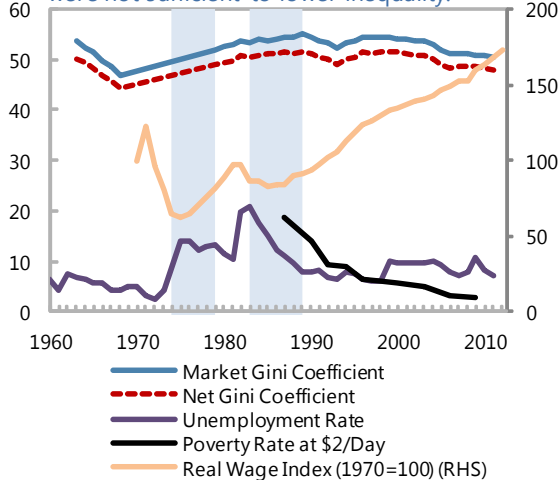
Reform measures primarily aimed at fiscal adjustment and macroeconomic stabilization.



Some efforts were made to protect growth-enhancing spending after initial steep cuts.



However, strong growth and poverty reduction were not sufficient to lower inequality.



Source: CEPAL, IMF staff calculations, OECD, Penn World Table, SWIID 5.0, and WEO.

Note: Shaded blue areas indicate reform periods.

**Table 4. Chile: Selected Indicators**  
(Period averages)

	Reform Episode 1		Reform Episode 2				
	1964-68	1969-73	1974-79	1980-82	1983-89	1990-94	1995-99
<b>Real Economy</b>	(Percent change, unless otherwise indicated)						
Real GDP	4.2	1.6	3.0	0.2	5.0	7.3	5.4
Contributions to Growth (Percent) 1/							
Capital	4.5	3.7	1.4	2.6	1.1	3.0	4.4
Labor	0.8	0.9	1.1	-0.1	2.9	1.6	2.2
Total Factor Productivity	-1.1	-3.0	0.5	-2.3	1.1	2.7	-1.2
CPI Inflation (End of Period)	26.2	158.4	170.6	21.0	20.8	16.1	5.6
<b>General Government</b>	(Percent of GDP, unless otherwise indicated)						
Total Revenue 2/	18.8	20.4	23.4	26.4	26.7	23.9	22.7
Of which Tax Revenue	14.5	15.9	19.4	21.7	21.3	19.3	18.4
Of which Direct Taxes 3/	4.8	4.9	5.7	6.4	3.9	2.3	1.7
Of which Indirect Taxes	9.6	11.0	13.7	15.4	17.5	17.0	16.6
Total Expenditure	21.8	30.3	26.0	25.6	29.7	22.4	21.6
Current Expenditure 4/	...	...	21.4	23.5	26.6	19.3	18.0
Capital Expenditure	...	...	4.6	2.1	3.2	3.0	3.6
Fiscal Balance	-3.0	-9.9	-2.6	0.8	-3.1	1.6	1.1
Primary Balance	-1.4	-8.3	1.6	2.8	3.0	4.3	2.5
Gross Debt 5/	13.5	17.8	22.1	17.2	67.8	38.5	15.4
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)						
Real Wage Index (1970=100) 6/	...	99.8	70.4	94.4	86.7	102.4	126.0
Employment Ratio 7/	30.2	29.2	29.2	27.0	30.7	34.5	35.1
Unemployment Rate	5.3	4.0	12.6	13.9	13.5	7.4	7.2
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)						
Corporate Income Tax Top Rate (Percent)	...	...	49.2	50.0	20.0	15.0	15.0
Private Investment	...	...	...	...	16.5	21.6	22.3
Foreign Direct Investment	...	...	0.6	1.2	2.4	2.7	6.9
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)						
Market Gini Coefficient 8/ 9/	49.6	...	...	52.8	54.1	53.3	54.3
Net Gini Coefficient	46.8	...	...	49.9	51.1	50.2	51.2
Poverty Rate (Percent) 10/	...	...	...	...	18.8	10.7	6.3

Source: Banco Central de Chile, DIPRES, GFS, Haver Analytics, IFS, Penn World Table, SWIID 5.0, WEO, and WDI.

1/ Growth accounting estimates are calculated using Penn World Table 8.0.

2/ From 1960-1990, figures are from *Indicadores Económicos y Sociales de Chile*. From 1991-2013, figures are from DIPRES. This is true for all revenue, expenditure, and resulting balance figures.

3/ DIPRES data from 1991-present does not break out tax revenue into direct and indirect taxes. For these years, figures are estimated by applying the growth rate in indirect tax revenue (data from Central Bank authorities) to the split between direct and indirect tax revenue in 1990.

4/ Estimates of current and capital expenditure are calculated using shares obtained from GFS.

5/ Gross central government debt.

6/ From 1970-1979, figures are from Edwards and Lustig (1997). From 1980-2012, figures are from CEPAL.

7/ Percent of the entire population that is employed.

8/ "Market" Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

8/ SWIID reports data in centered five year moving averages. For intervals above that are not five years long, an average of the two middle values is reported.

10/ Percent of the population living on less than \$2 (PPP) per day.

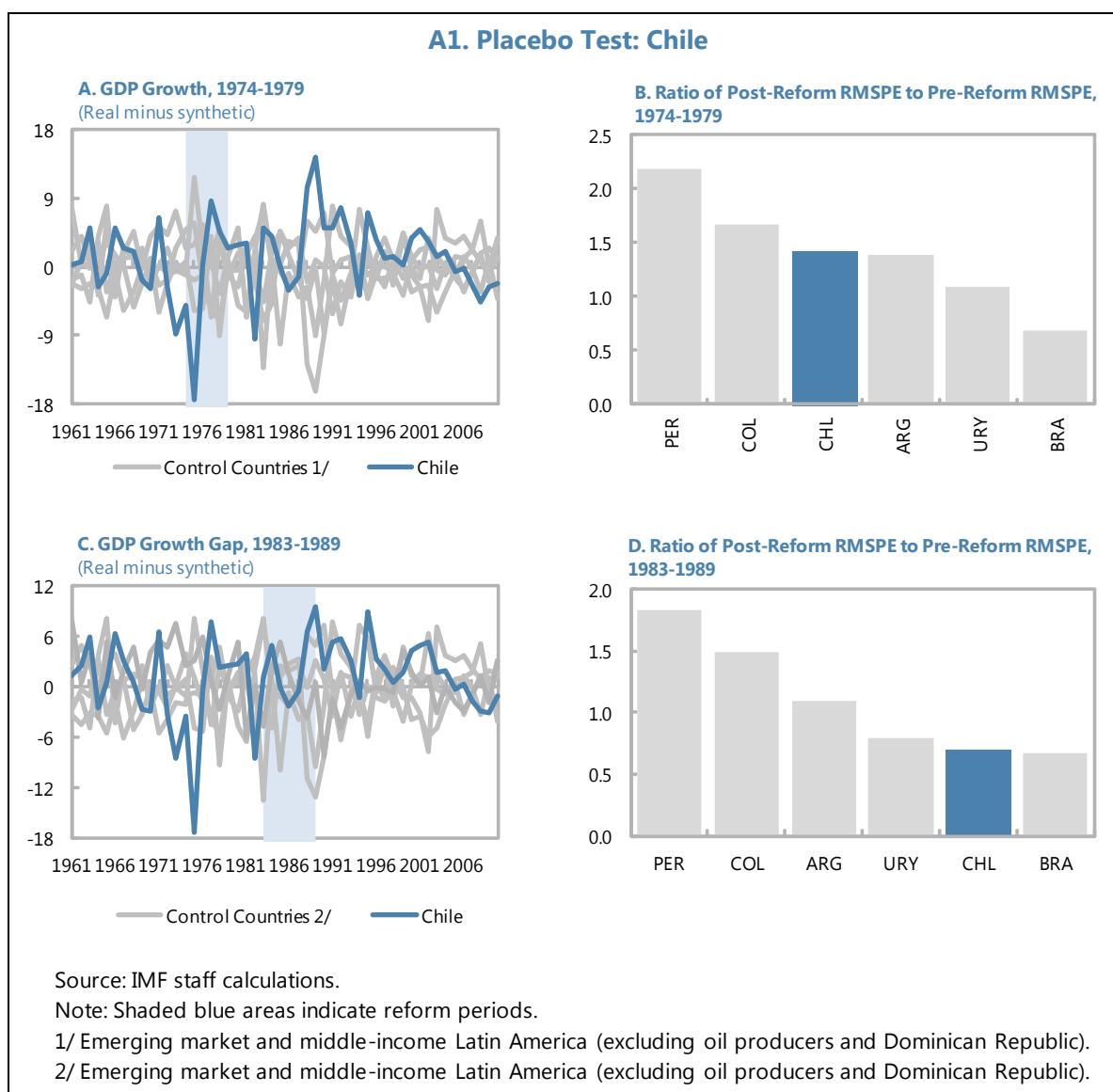
## LESSONS

25. **Large fiscal retrenchment for stabilization purposes may impose short-term pain, but is not at odds with achieving higher long-term growth.** As shown in Chile's case, comprehensive and growth-friendly tax and spending reforms can ultimately contain the pain associated with fiscal retrenchment by making the tax structure more growth friendly (e.g., by moving from direct to indirect taxation) and improving the quality of spending (e.g., by reducing unproductive expenditures). Chile's experience also confirms that those reforms that take time to produce net fiscal savings (e.g., tax reform, civil service reform) should start early on in the adjustment process; and that initial spending cuts can be restored at least partially once stabilization takes hold and revenue-raising measures start bearing fruit.
26. **However, inconsistencies with other macroeconomic policies, if unaddressed, can jeopardize the potential benefits of growth-oriented fiscal adjustment.** Chile's performance in 1978-82, when exchange rate stabilization programs coexisted with full wage indexation, is emblematic in this regard.
27. **Strong and effective fiscal institutions are critical to bring about profound change and maximize the benefits of fiscal reforms.** Well-functioning PFM and revenue administration systems permitted the enforcement of substantial changes in the composition of spending and revenues in a timely manner; while, higher revenue collection helped create fiscal space for growth-enhancing policies.
28. **Fiscal adjustment strategies mainly aimed at boosting growth can face major challenges with respect to income inequality.** Chile's experience confirms that adjustment strategies that successfully boost growth and reduce poverty do not necessarily lead to durable improvements in income inequality—and may even have a detrimental impact on the income distribution. This underscores the importance of specific and well-targeted measures that not only protect the most vulnerable groups, but also ensure that all citizens share equally in the benefits of higher growth.



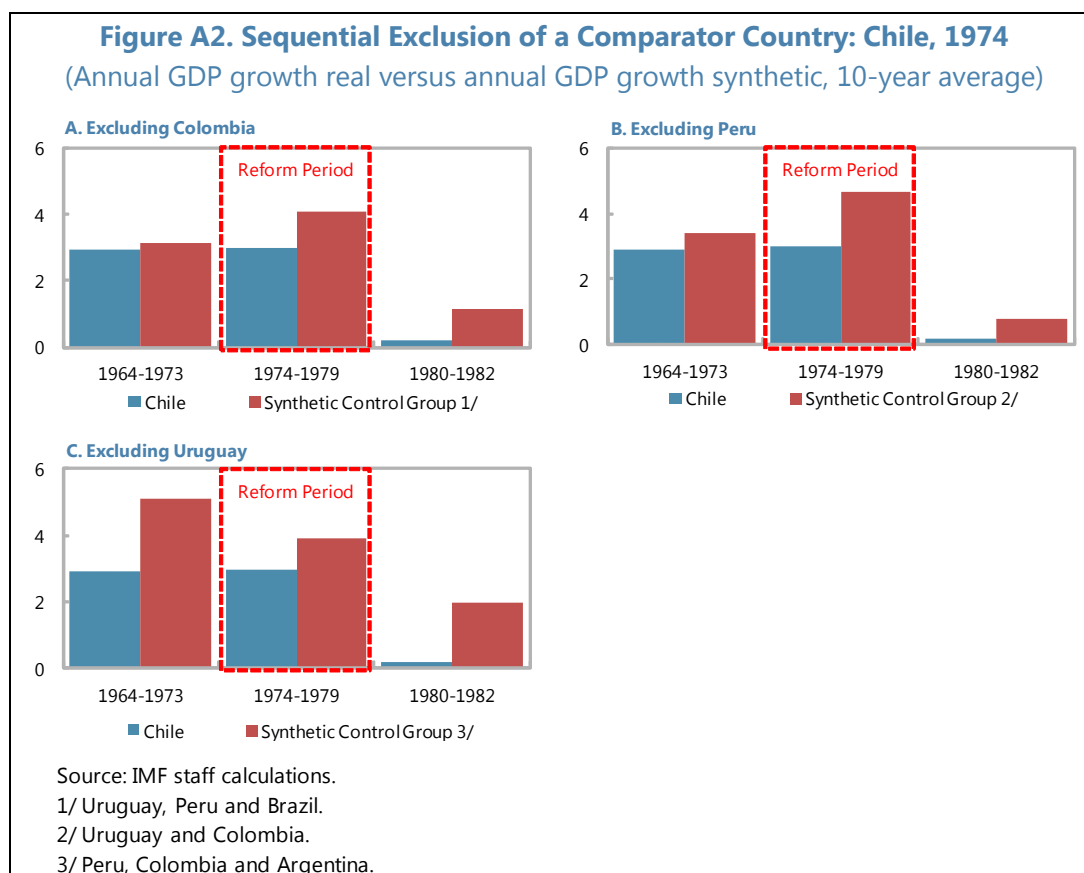
## Appendix. Robustness Tests for Chile

### A. Placebo Tests

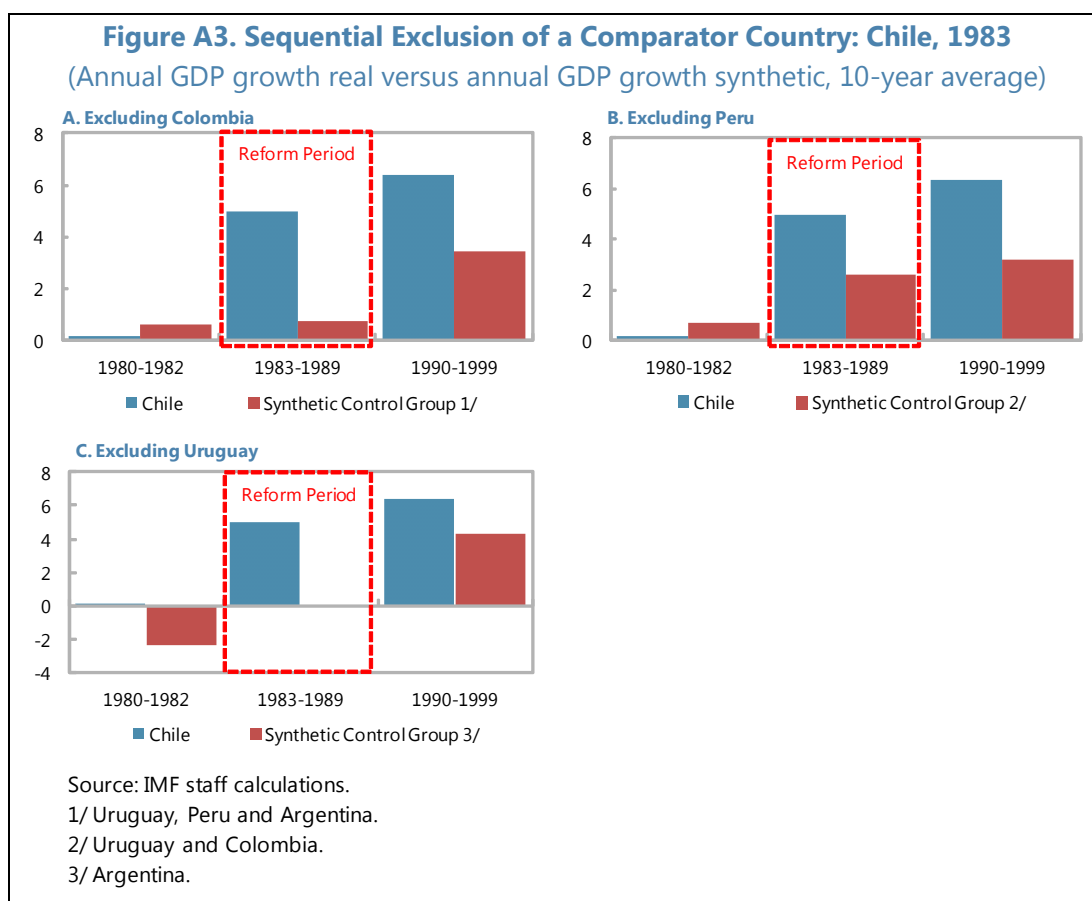


1. **Each country in the group of the input group used was alternatively chosen as the tested country when in fact no fiscal reform took place in that country** (Figure A1). If the estimated effect for Chile is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in Chile was higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of the size of growth gaps. However, the ratios of post-reform and pre-reform RMSPEs are not high, as the synthetic series for Chile were not able to reproduce the pre-intervention outcome variable very well. This indicates that the positive growth gap in the post-reform needs to be cautiously interpreted.

## B. Sequential Exclusion of a Comparator Country



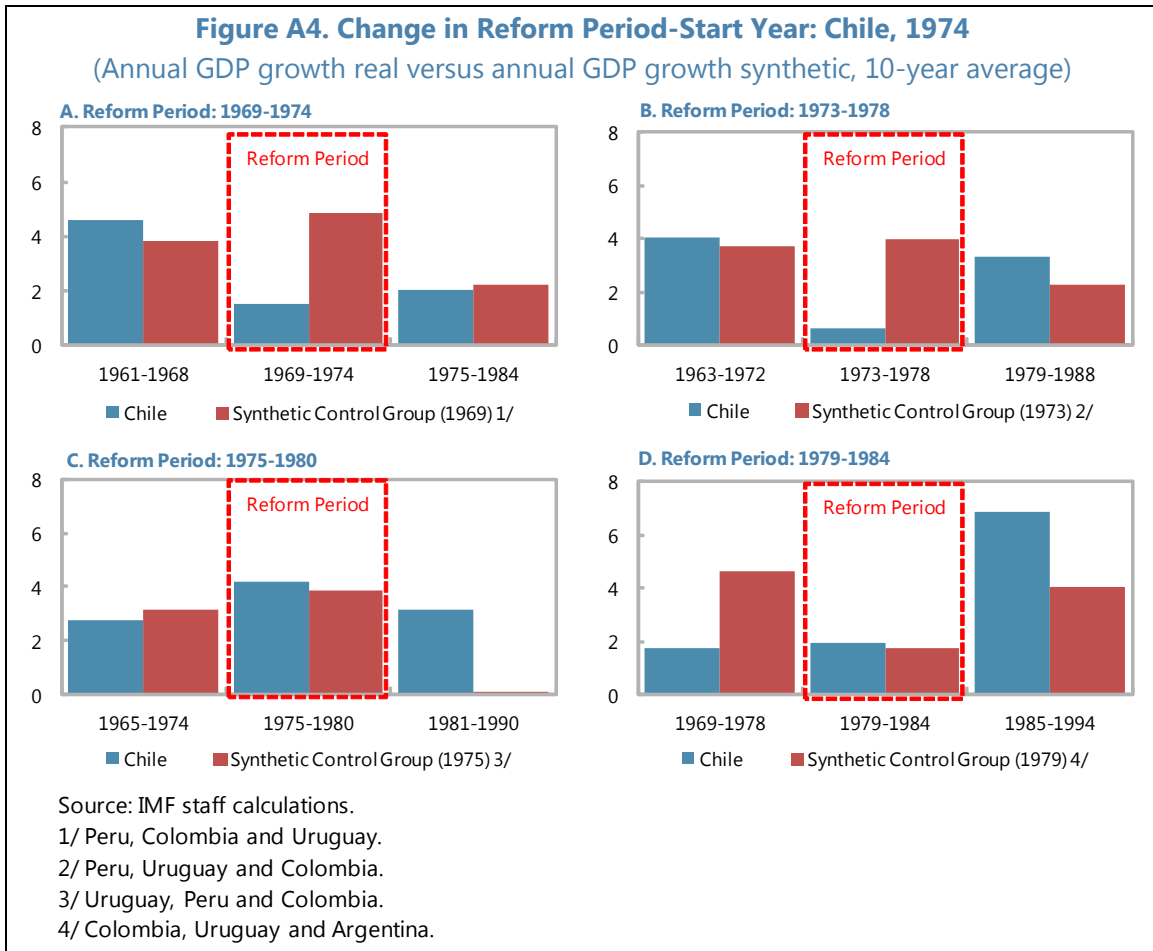
2. **The sensitivity of the baseline results was tested by sequentially excluding each of the countries in the comparator group that received a positive weight and re-estimating the model** (Figures A2 and A3). This implied the sequential exclusion of the following countries for both reform periods: Colombia, Peru and Uruguay. The post-reform growth gap is higher than the pre-reform growth gap in all cases, confirming the baseline.

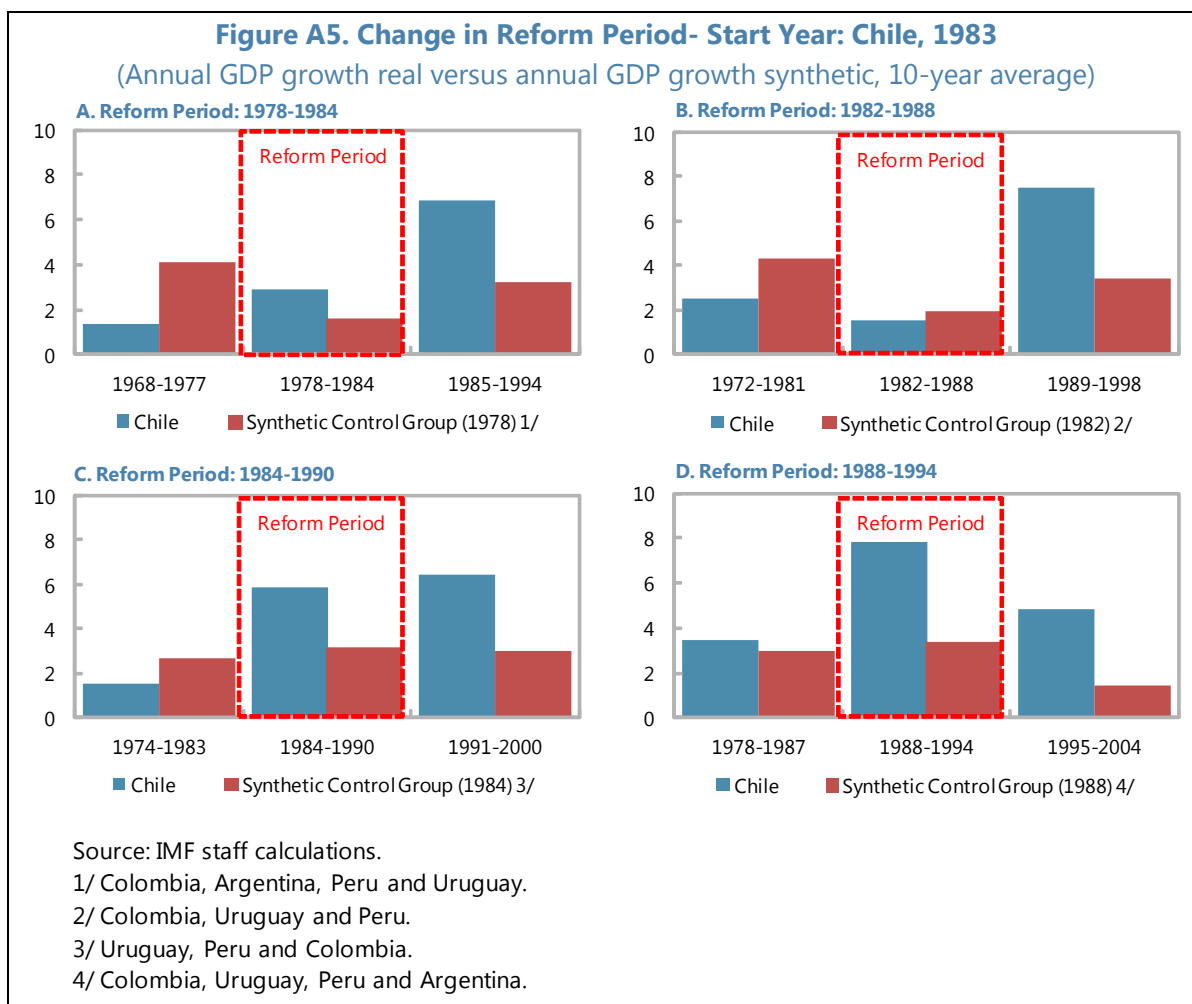


## C. Changes in the Reform Timing

### Changes in the start year of reform

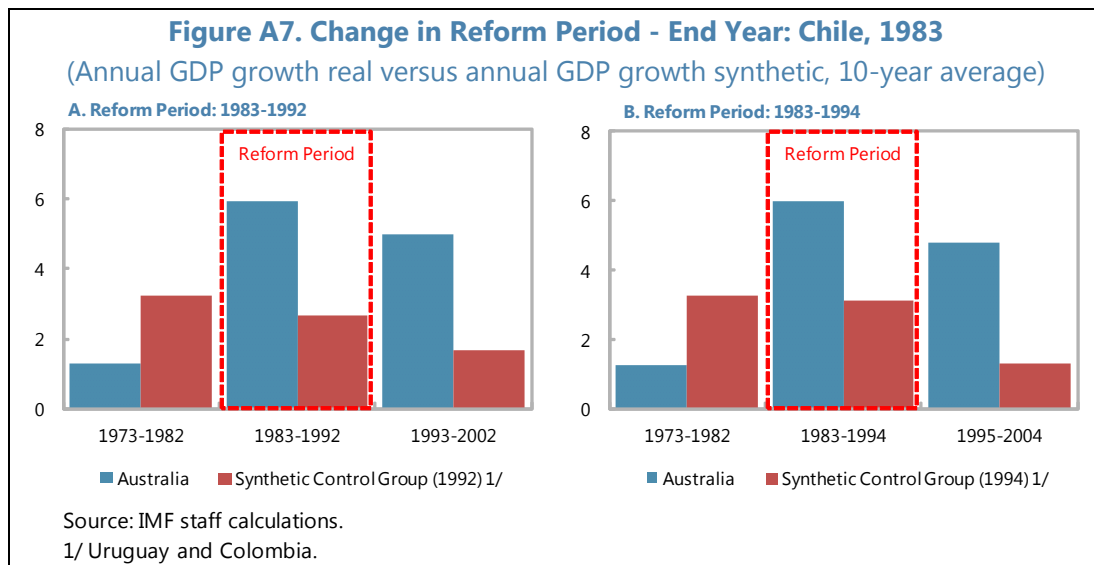
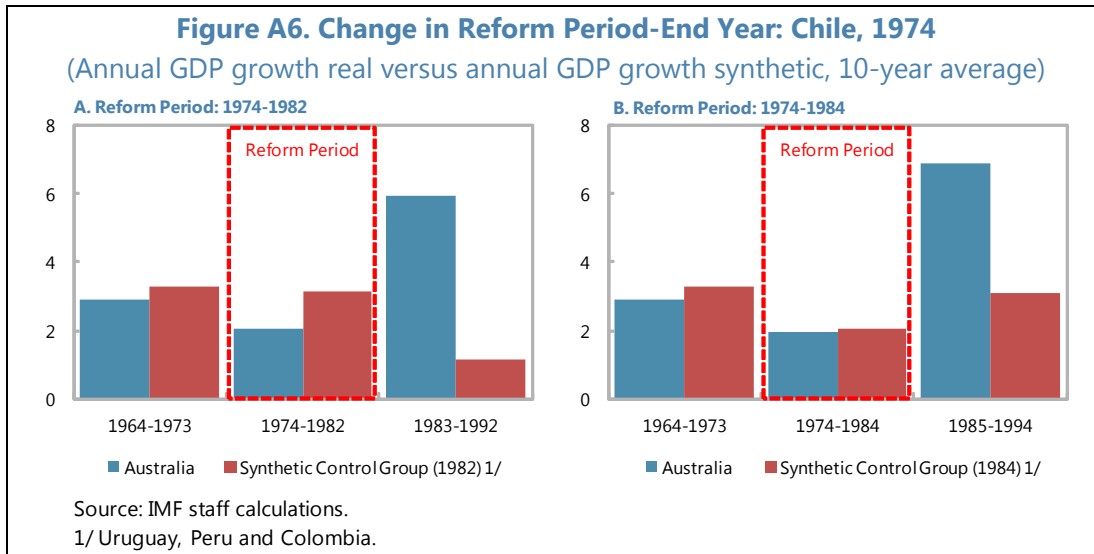
3. **Synthetic series were re-estimated for the years 1969, 1973, 1975 and 1979 (first period) and 1978, 1982, 1984 and 1988 (second period)** (Figure A4 and A5). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (1973 and 1975 for the first period and 1982 and 1984 for the second period), but setting the start of reform in 1969 results in disappearance of the growth effects. These results are consistent with the conjecture in the baseline that the fiscal reform is the likely reason for the positive growth effect in the baseline. On the other hand, the exercise showed positive growth effect that 1978 and 1979, 1988 also showed a positive growth gap.





### Changes in end year of reform

4. **The difference in average growth rates was recalculated by setting the end of the fiscal reform period to 1982 and 1984 (first period); and to 1992 and 1994 (second period), respectively** (Figure A6 and A7). The purpose of this exercise is to examine whether our conclusion is sensitive to the timing of the end of the reform, given its uncertainty. The difference in average growth rates was recalculated by setting the end of the fiscal reform period to different years. The purpose of this exercise is to examine whether our conclusion in the baseline is sensitive to the timing of the end of the reform, given its uncertainty. Results confirm that the conclusion holds for both 1974 and 1983 reforms when the end of the fiscal reform period changes.

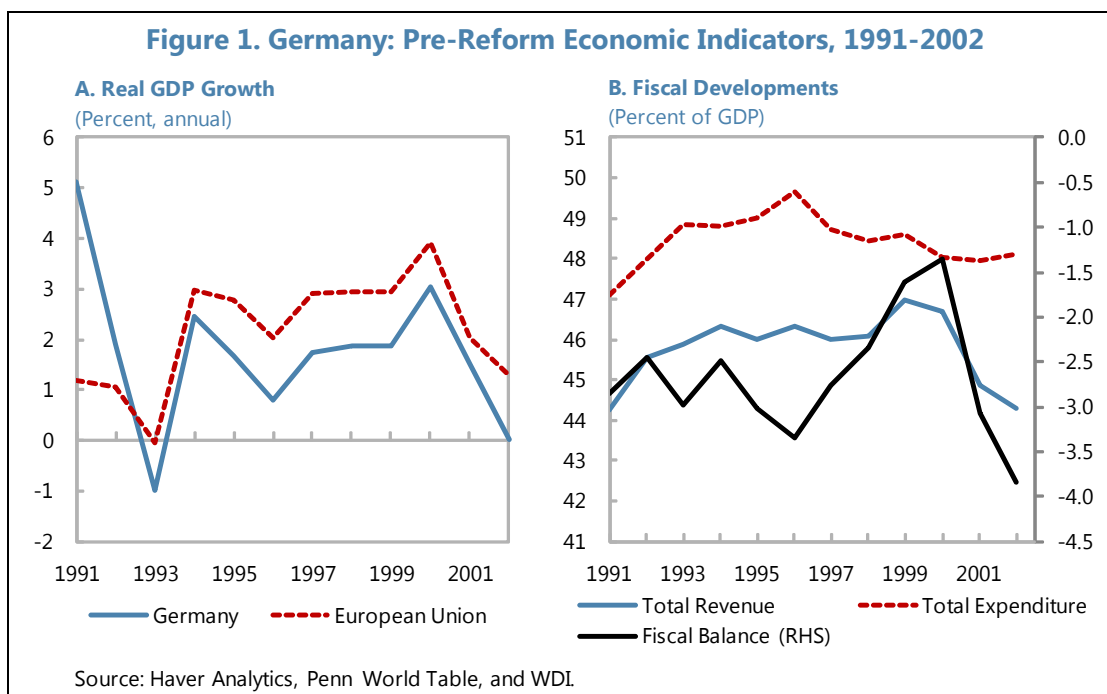


# GERMANY: FISCAL POLICY AND LONG-TERM GROWTH

## A. Background

1. **By the late 1990s and the early 2000s, Germany was often referred to as ‘the sick man of Europe’ given its weak growth performance and poor unemployment record relative to its peers.** Between 1993 of 2002, Germany’s growth was consistently below the EU average, and in 2002 and 2003, Germany’s growth was even trailing that of almost all other EU and OECD countries (Figure 1). The weak growth performance was mirrored by rising unemployment from 5.5 percent in 1992 to 11.3 percent in 2005.

2. **By 2003, the fiscal balance had worsened significantly.** A fiscal deficit widened from around 1 percent in 2000 to a peak of over 4 percent of GDP in 2003, and by 2005, Germany’s deficit had exceeded the 3 percent threshold laid down in the Stability and Growth Pact several years in a row. While cyclical effects – the German economy stagnated in 2002 and was in recession in 2003 – certainly contributed to undermining revenue performance and to rising social expenditure, there was also long-term deterioration of the fiscal stance. The debt ratio rose from around 41 percent of GDP in 1991 to 68 percent of GDP in 2005, and on average, the fiscal deficit was around 2.5 percent of GDP during the same period. Key factors that contributed to the deterioration of the fiscal position included large spending programs in Eastern Germany following German reunification in 1990, the persistently weak economic performance and the burden associated with liabilities inherited from the former Eastern Germany.



# FISCAL POLICY REFORMS: EXPENDITURE-BASED CONSOLIDATION AND LABOR MARKET REFORMS

## A. Overview

3. **In 2003, Germany embarked on an ambitious and wide-ranging reform program commonly referred to as “Agenda 2010”** (Table 1). The reforms were designed to fix several key structural economic problems underlying Germany’s weak long-term economic performance. They included the introduction of more flexible hiring and firing rules, a massive modernization and reorganization of the labor office, which were aimed at facilitating job placements, a reduction of the duration and eligibility of unemployment and welfare benefits, and the slashing of non-wage labor costs through reduced health insurance premiums. One central motivation was to reform and liberalize the labor market to boost both labor supply and labor demand.<sup>1</sup>

4. **The reforms were also motivated by fiscal concerns and had an important fiscal dimension.** Against the backdrop of significant fiscal deterioration and the breach of the Stability and Growth Pact, expenditure-based consolidation was another important objective. Following the implementation of the reforms, public spending dropped by almost 5 percent of GDP from its peak at around 47 percent of GDP until 2007 which was especially driven by declines in the wage bill and social spending (amounting to 3.7 percent of GDP). Accordingly, the measures that had important immediate implications for public spending included in particular the reforms affecting unemployment and welfare benefits. Moreover, the potential indirect effects on public spending – through a reduction in unemployment and stronger growth – also helped to contain social spending.

**Table 1. Germany: Major Fiscal Reforms**

Reform Areas	Year	Reform Steps
1. Fiscal Consolidation	2003-	Expenditure-based fiscal consolidation led to overall fiscal deficit of 4 percent of GDP in 2003 to 0.2 percent of GDP surplus in 2007.
2. Tax Reform		
PIT	2005-	Cut from 48 percent to 42 percent in 2005.
CIT	2008-	Cut from 25 percent to 15 percent in 2008.
VAT	2007-	Raised from 16 percent to 19 percent in 2007.
3. Spending Reform		
Health Care Reform	2004, 2007-09	Increase in copayment, limits on dental coverage (2004).
Pension Reform	2004, 2007	Linking benefit levels to the old-age dependency ratio (2004); raising statutory retirement age from 65 to 67 (2007).
Entitlement Reform	2005-06	Tightening of eligibility and maximum duration of unemployment benefit; merger of long-term unemployment and social assistance.
4. Labor Market Reform		
Reform of Active Labor Market Policy	2003-05	Deregulation of part-time work; streamlining of job protection regulation; and improvement in job intermediation.

Source: Cheptea and others (2014), Dullien (2006), IMF, and WEO.

<sup>1</sup> See OECD (2009) for a detailed analysis of the labor market reforms in Germany.



5. **The savings on the expenditure side were large enough to create fiscal space that allowed for tax cuts.** The top marginal income tax rate was cut from 48 percent to 42 percent in 2005 (which was however partially reversed in 2007), whereas the marginal tax rate for low incomes was cut from approximately 20 percent to 15 percent between 2003 and 2005. In 2008, the federal corporate tax rate was further reduced from 25 percent to 15 percent as part of a larger corporate tax reform that also entailed base broadening as various possibilities for tax deductions were eliminated. While some of the potential demand-side effects were undone by the increase of the standard VAT rate from 16 percent to 19 percent in 2005, the tax system became in any case much less distortionary.

6. **After a brief deterioration of the fiscal stance in 2009 and 2010 due to the global financial crisis, these gains in terms of consolidation were 'locked in' through a new fiscal rule referred to as 'debt brake'.** The debt brake requires the structural deficit of the federal government not to exceed 0.35 percent of GDP, and that the structural deficit of the German states remains at zero. It will be phased in over the 2011–2020 period and becomes fully binding for the federal government from 2016 onwards. While Germany had already been subject to the Stability and Growth Pact, the debt brake is much more binding as it is included in the German constitution. The debt brake is also much more effective in limiting debt compared to the golden rule that had already been part of the constitution. The introduction of the debt brake may have therefore been instrumental in that the progress towards lowering public deficits has not been reversed in the years after the global financial crisis.

## B. Notable Design Features

7. **At the onset of the reform episode, the government targeted key rigidities of the labor market and non-wage labor costs, although the immediate fiscal benefits of these reforms in terms of expenditure savings were likely another important motivation.** Economically, this type of prioritization was sensible in this situation as the potential growth dividend of structural reforms will only slowly unfold over time and may take many years to materialize. In addition, boosting medium- and long-term growth is an essential precondition for fiscal consolidation to be ultimately successful. As the examples of several European countries are showing, fiscal consolidation targets are very difficult to achieve when potential growth is low, in particular, when the economy is shrinking (Abbas and others, 2012).

8. **While the reforms were controversial given their far-reaching changes in social policy, they gained broad support in Parliament.** The reforms were initiated by a coalition government of the social democrats, and the green party, implying that the opposition at that time consisted virtually only of the conservative party and the liberal party, which were both sympathetic with the general impetus of the reforms.

9. **The sequencing and prioritization of reform efforts helped to safeguard political support.** Over time, political capital for reform is likely to wane as voters become 'tired' of relentless reform efforts. Therefore, it is important to target the most important impediments and implement

the most difficult reforms in political terms first. Indeed, cuts in long-established health benefits and changes in job security, which were not only sensitive issues for the majority of voters, but also critical from an economic perspective, were implemented in the beginning of the reform episode.

10. **In addition, political support was not further undermined by additional fiscal consolidation measures.** Quite to the contrary, cuts in personal income taxation in 2005 that roughly coincided with the reforms but that were agreed upon in 2000 already may have been important to safeguard voters' support. In addition, the government concentrated on economic reforms with the biggest 'bang for the buck' rather than implementing less important structural reforms that still induce economic pain. However, favorable economic conditions in the mid 2000s that were in part driven due to factors outside of government influence may also have helped to safeguard political support.

11. **While from an economic perspective, it would have been desirable to implement the reforms earlier, from a political economy perspective, the timing of the reforms was probably not a coincidence.** One factor that triggered the reforms may have been the persisting economic stagnation despite the global economic recovery in the early 2000s which in turn resulted in widespread pessimism about Germany's growth prospects (Bornhorst and Mody, 2012). At the same time, it may have not been feasible to implement the structural reforms earlier because scarce political capital required to implement them was tied up in issues relating to reunification throughout the 1990s (Kastrop, 2013).<sup>2</sup>

### C. Economic Performance after the Reform

12. **Germany's economic performance since the implementation of the reforms has certainly been remarkable, apart from a relatively deep recession in 2009.** Germany recorded strong growth of significantly above 3 percent in 2006 and 2007. Following the global economic crisis, Germany showed a relatively strong growth performance with average growth rates of 2.2 percent between 2010 and 2013 whereas its potential growth is estimated to be 1-1.5 percent. While such a growth record is usually considered as mediocre, by European standards during that period, it was relatively strong. However, Germany is especially praised for its progress towards reducing unemployment: the unemployment rate was almost halved between 2004 and 2013 and reached historically low levels. In the light of the fiscal challenges in other countries in Europe, the improvement in the fiscal consolidation was also impressive, despite a temporary deterioration of the fiscal position during the global financial crisis. An overall deficit of 4.2 percent in 2003 had

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<sup>2</sup> In 2001, there was also an important corporate tax reform that involved a cut in the statutory tax rate from 40 percent to 25 percent and various other measures affecting the tax based on local taxation of corporate profits; however, as this reform precedes the 'Agenda 2010'-reform package which is widely seen as most critical for Germany's recent economic success, we choose 2003 as a cut-off year. Nevertheless, provided that the potential growth effects of the 2001 tax reform persisted or even materialized from 2003 onwards, our analysis still covers them.

turned into a fiscal surplus of almost 0.2 percent by 2013, which is projected to persist in 2014 and 2015.

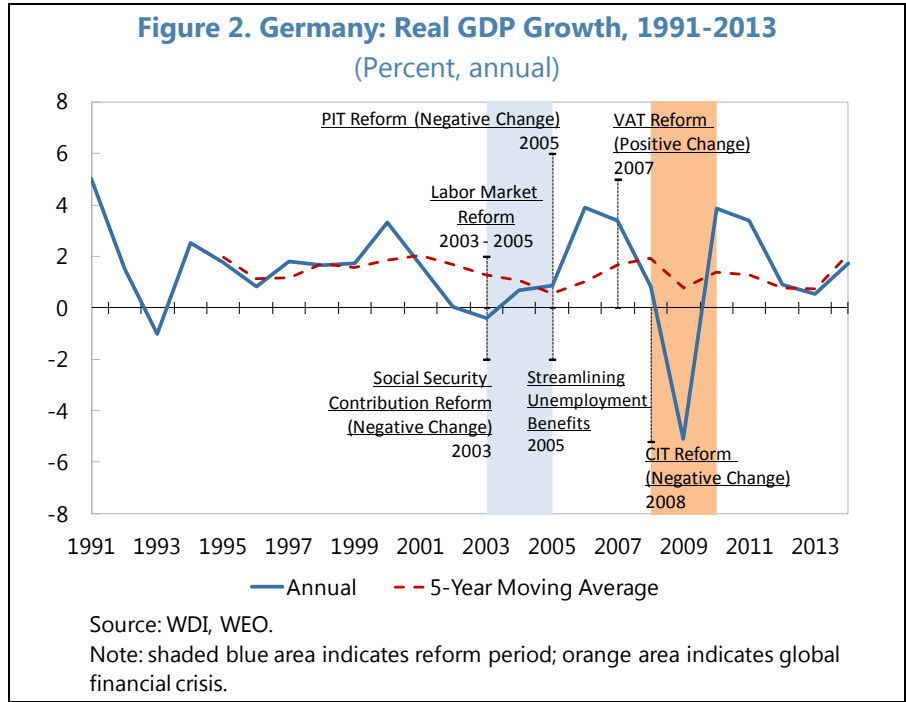
13. **After its 10th anniversary, the reform program is therefore widely believed to have been largely successful.** Against the background of significant decreases in unemployment, this seems plausible, given that the wide-ranging reforms in the mid 2000s of the 'Agenda 2010' targeted the labor market. Measures of the reform packages that are routinely believed to have been especially important include the introduction of more flexible labor contracts and stronger incentives for the unemployed to speed up their job search.

14. **However, the contribution of the reforms to the economic resurgence of Germany remains nevertheless controversial.** First, wage restraints played an important role in increasing the competitiveness of the German economy. In turn, wage restraints were facilitated by Germany's highly decentralized system of wage bargaining at the regional, industry or even firm level, and, related to this, by the fact that negotiations are far more often consensus-based compared to other countries (Dustmann and others, 2014). Second, another, important explanation for the muted effects of the global financial crisis on employment may be related to subsidized short-time work arrangements and firm-level working time accounts which both allowed firms to cut working hours per worker rather than the number of workers. Having retained the workers then enabled firms to quickly respond to rising labor demand from 2010 onwards (Burda and Hunt, 2011).

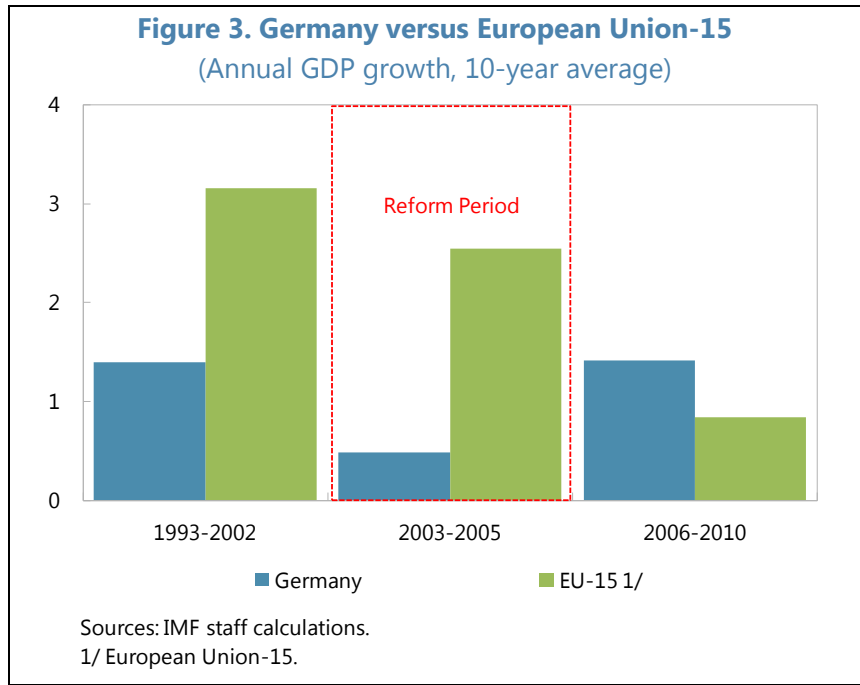
## IMPACT ON LONG-TERM GROWTH

### A. Long-Term Growth Dissected

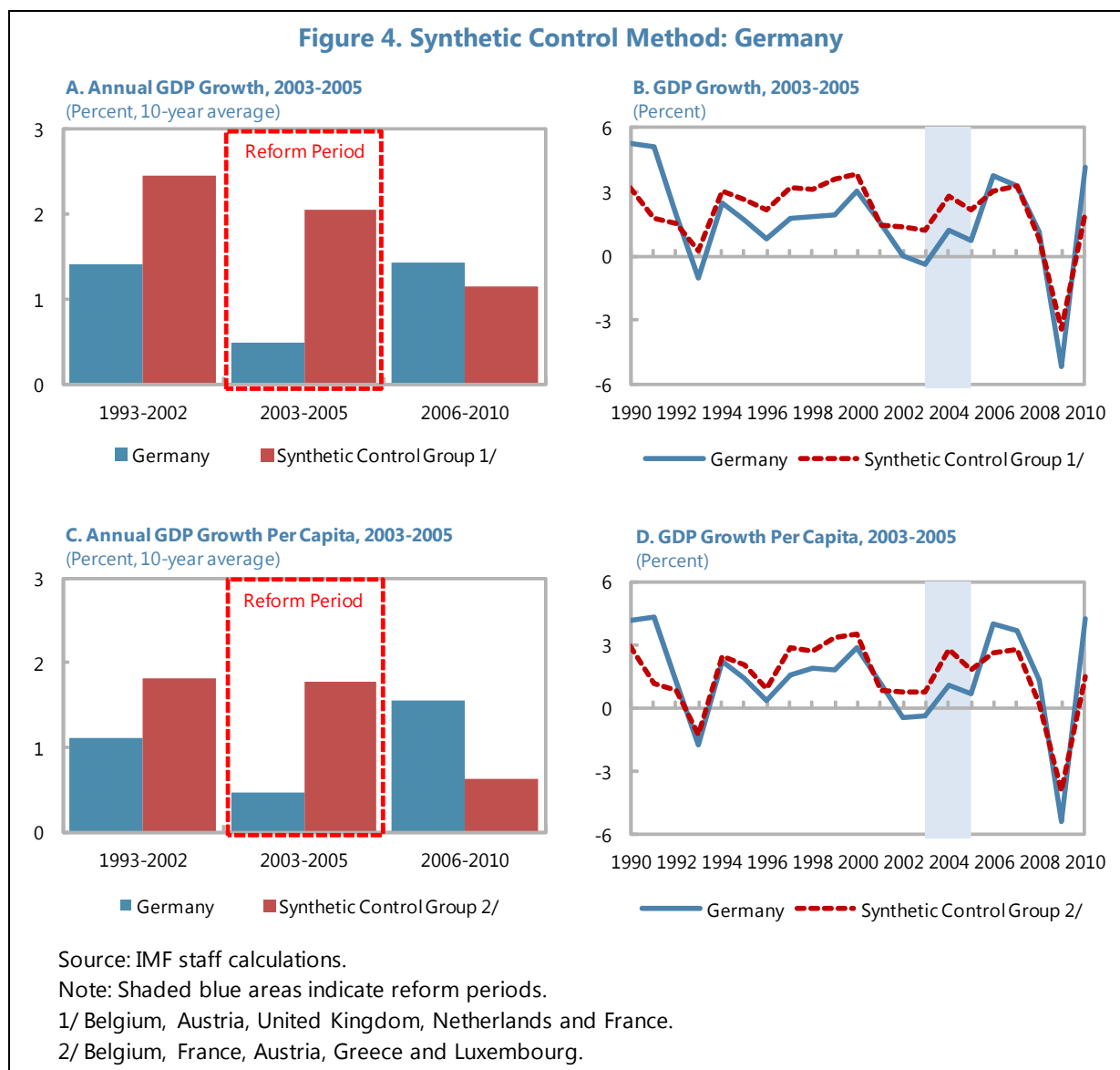
15. **Evaluation of Germany's growth performance needs to be placed in a proper context, especially given the GFC that took place post-reform** (Figure 2). Late 1990s to early 2000s saw a sharp slowdown in growth. The pickup in growth in 2005–07 was followed by a negative growth in 2008–09 and subsequent recovery. Output growth is qualitatively similar in many industrial economies, however, and a more formal approach is needed. The GFC led to abnormally-large output fluctuations, which adds to a difficulty in discerning the long-term trend post-reform.



16. **Simple comparisons of post-reform growth in Germany with its peers indicate that Germany's growth is relatively favorable post-reform** (Figure 3). While Germany's growth lagged its peers by about 2 percentage points in the 10 years before the reform, post-reform it has been higher by about 0.5 percentage points.



17. **Counterfactual simulations using the SCM confirm that the fiscal reform has resulted in the growth acceleration.**<sup>3</sup> Depending on whether we use GDP growth or per capita GDP growth, fiscal reform in Germany has resulted in growth acceleration of about 0.7–1.5 percent (Figure 4 and Table 2).



<sup>3</sup> The results should be interpreted cautiously, as there are differences other than the fiscal reform between Germany and its comparators. In particular, the global financial crisis likely affected Germany and its comparators differently.

**Table 2. Germany: Economic Growth Predictor Means before Fiscal Reform**

Variable	Reform Period 2003 1/	
	Real	Synthetic
<b>GDP Growth</b>		
GDP Growth (Percent)	2.0	2.2
GDP Per Capita (2005 I\$/Person)	29013.9	29014.6
Trade Openness (Percent)	50.4	86.0
Terms of Trade (Percent)	103.7	103.7
Inflation Rate (Percent)	2.2	2.2
Human Capital Index	2.8	2.8
<b>GDP Growth Per Capita</b>		
GDP Growth Per Capita (Percent)	1.4	1.5
GDP Per Capita (2005 I\$/Person)	29013.9	28979.9
Trade Openness (Percent)	50.4	91.8
Terms of Trade (Percent)	103.7	104.1
Inflation Rate (Percent)	2.2	2.2
Human Capital Index	2.8	2.8

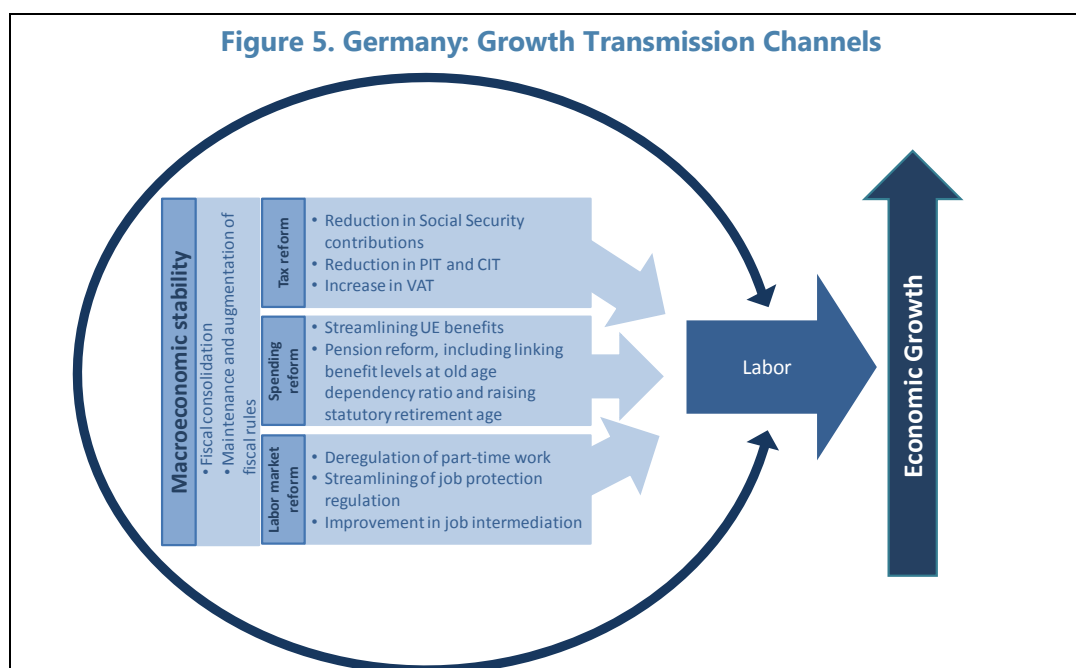
Source: IMF staff calculations.

1/ All variables except GDP growth and GDP growth per capita are averaged for the 1990-2002 period. The average for GDP growth and GDP growth per capita is calculated using the years 1990, 1996 and 2002.

## B. Fiscal Reform: A Game Changer?

18. **Examining post-reform developments of the factors of production, it appears that labor was the main channel that the fiscal reform affected growth outcome.** The growth accounting shows that labor and TFP were the main drivers of the post-reform growth performance (Figure 6, Table 3). While developments in labor can be traced to fiscal and labor market reform, the TFP might have been mainly affected by other factors.

19. **The above chart identifies potential transmission channels from fiscal policy to growth** (Figure 5). Spending reform, such as streamlining unemployment benefits and pension reform, increased incentives for job search and contributed to an increase in labor supply. The spending reform also created fiscal space for a reduction of the tax burden, which contributed to an increase in labor supply as well. Finally, labor market reform made job matching more efficient, and thus increased the level of job creation for given levels of labor supply and demand.



20. **Superior employment performance to its peers reflects the effect of comprehensive package of fiscal and labor market reforms.**<sup>4</sup> The continuous contribution of labor reflects structural changes that moderated wages, increased steady state employment, and improved matching in the labor market. In addition, enhanced flexibility of the labor market enabled cyclical responses to the severe negative shock without massive layoffs.<sup>5</sup>

21. **Developments of the TFP may be explained by factors other than the fiscal reform: the GFC and product market reform.** After a negative growth in the first half of the 2000s, there was an uptick in the TFP growth from 2006–07, with notable contributions by the services/financial and business services sector. (Poirson, 2013). The TFP sharply decreased in 2008–09 in the face of the GFC, from which it recovered sharply and returned to a positive growth path. Product market reform may have been a contributing factor (OECD, 2014).

22. **Capital accumulation was subdued.** Capital contribution to growth has seen a gradually decreasing trend. Both public and private investment to GDP ratio continues to be lower than euro area average. (IMF, 2014d) There is no clear evidence that fiscal and labor market reform affected investment.

<sup>4</sup> There are additional explanations that may have contributed, such as enhanced flexibility in the wage bargaining process in the private sector starting in the mid-1990s, and the adoption of euro in 1999 which maintains the competitiveness gain of Germany via fixed exchange rate (Dustmann and others, 2014).

<sup>5</sup> The extended use of short-time labor subsidies might have also prevented strong increases in unemployment (Krause and Uhlig 2012).

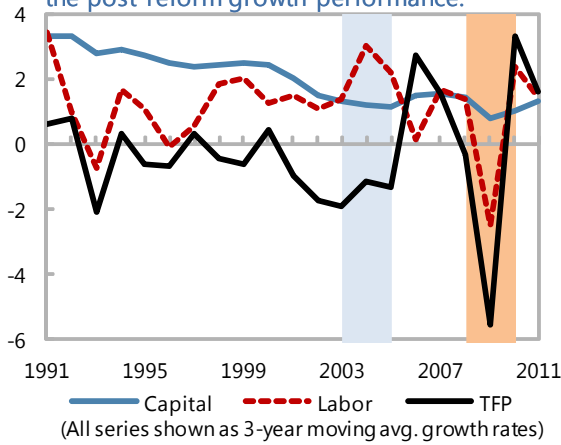
23. **Income inequality saw a slight increase until 2007, both before and after redistribution, and has largely stabilized afterwards.** The market Gini coefficient may have been affected by changes in capital income and greater labor income dispersion. Additionally, the net Gini coefficient was also affected by the weakening of the tax and public transfer system, due to the decrease in top income tax rates, and replacement of public transfer by labor income that accompanied a trend increase in employment (Schmid and Stein, 2013).

24. **Summing up, there is evidence that fiscal and labor market reforms may have contributed to an increase in long-term growth by facilitating strong employment growth.** However, it should be noted that potential growth dividend of structural reforms only slowly unfolds over time and may take many years to materialize. Given the interruption from the global financial crisis, the full effects of structural reforms are yet to be seen, including indirect effects through the increase in inequality.

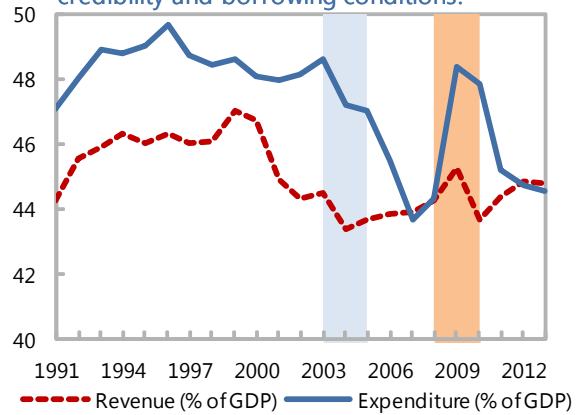


**Figure 6. Germany: Fiscal Policy and Growth, 1991-2013**

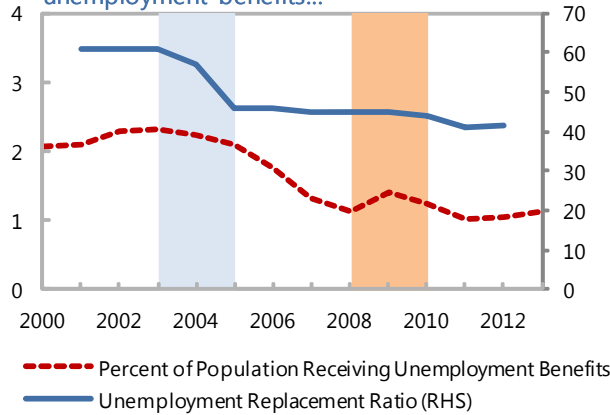
Labor and TFP were the main drivers of the post-reform growth performance.



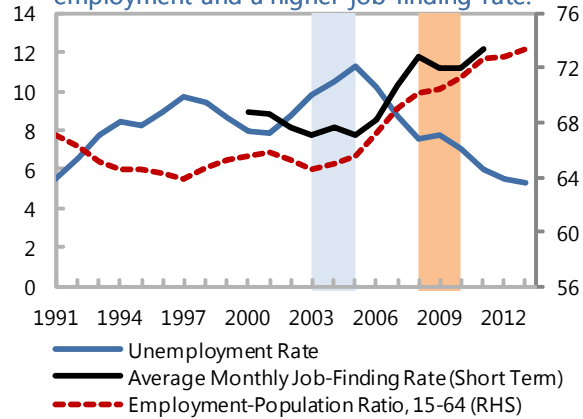
The fiscal consolidation improved policy credibility and borrowing conditions.



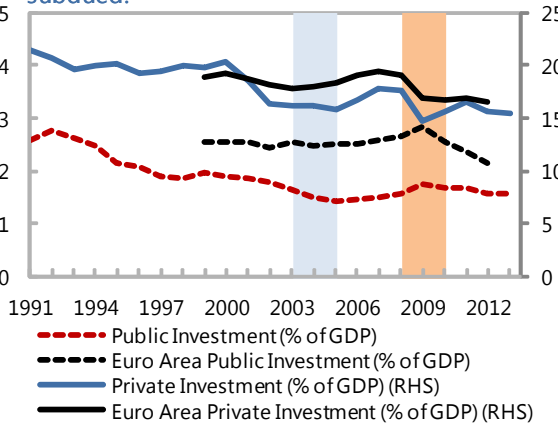
Labor market reform led to a decrease in unemployment benefits...



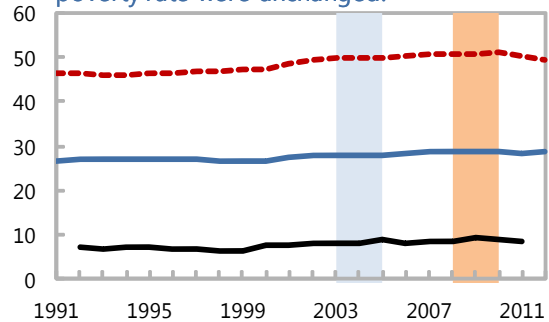
...which contributed to an increase in employment and a higher job-finding rate.



Both public and private investment remained subdued.



The income distribution and relative poverty rate were unchanged.



Source: Bundesagentur für Arbeit, Haver Analytics, IMF staff calculations, OECD, Penn World Table, SWIID 5.0, and WEO.

Note: Shaded blue areas indicate reform period; orange areas indicate global financial crisis.

**Table 3. Germany: Selected Indicators**  
(Period Averages)

	Reform Episode				
	1993-97	1998-2002	2003-05	2006-10	2011-13
<b>Real Economy</b>	(Percent change, unless otherwise indicated)				
Real GDP 1/	1.1	1.7	0.5	1.4	3.0
Contributions to Growth (Percent) 2/					
Capital	0.8	0.7	0.4	0.5	0.5
Labor	0.3	1.0	1.4	0.4	0.9
Total Factor Productivity	0.0	-0.1	-1.3	0.6	1.7
CPI Inflation (Period Average)	2.3	1.2	1.6	1.6	2.1
<b>General Government</b> 3/	(Percent of GDP, unless otherwise indicated)				
Total Revenue	46.1	45.8	43.8	44.2	44.7
<i>Of which</i> Tax Revenue	22.8	23.0	21.7	23.0	23.3
Total Expenditure	49.0	48.2	47.6	45.9	44.8
<i>Of which</i> Current Expenditure	46.8	46.4	46.1	44.3	43.2
<i>Of which</i> Capital Expenditure	2.2	1.9	1.5	1.6	1.6
Fiscal Balance	-2.9	-2.4	-3.7	-1.8	-0.2
Primary Balance	0.5	0.7	-0.8	1.0	2.1
Gross Debt	53.6	59.2	64.8	69.5	77.8
Ten Year Bond Yield	6.5	4.8	3.8	3.6	1.9
<b>Labor Market</b>	(Percent, unless otherwise indicated)				
Real Wage Index (2013=100)	91.1	94.7	95.9	96.3	99.1
Employment Ratio 4/	64.5	65.3	65.0	69.6	72.9
Unemployment Rate	8.6	8.5	10.5	8.3	5.6
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)				
Corporate Income Tax Top Rate (Percent)	40.0	30.0	25.5	19.0	15.0
Private Investment	19.7	19.0	16.1	16.5	15.9
Foreign Direct Investment	0.3	3.8	0.8	1.1	1.0
<b>Income Distribution</b>	(Percent, unless otherwise indicated)				
Market Gini Coefficient 5/	46.2	47.3	49.7	50.7	49.4
Net Gini Coefficient	27.0	26.6	27.8	28.8	28.6
Relative Poverty Rate 6/	6.9	7.3	8.5	8.7	8.7

Source: Deutsche Bundesbank, Haverly Analytics, OECD, Penn World Table, SWIID 5.0, WEO, and WDI.

1/ The figures listed under "2011-13" for real GDP, growth contributions, and poverty reflect 2011 data only.

2/ Growth accounting estimates are calculated using Penn World Table 8.0.

3/ ESA 95 accounting.

4/ Percent of the working age population (15-64) that is employed.

5/ "Market" Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

6/ Proportion of the population falling below the poverty line, which is defined as half the median household income after taxes/transfers.

## LESSONS

25. **Reforms that aimed at promotion of long-run growth were helpful in sustained growth and fiscal consolidation.** Despite a temporary deterioration of the fiscal position during the global financial crisis, fiscal consolidation over the last 10 years has been very successful. In this context, the central lesson from Germany is that consolidation measures should ideally result in spending cuts and in the promotion of long-run growth. The reforms in Germany targeted key rigidities of the labor market and entailed cuts in unemployment benefits. The rationale for this strategy is that in case of a prolonged recession, improving the fiscal position is very difficult: debt as a share of GDP increases if the economy shrinks even in the absence of deficits, and lowering deficits is considerably harder with automatic increases in social spending and automatic decreases in tax revenue in recessions.

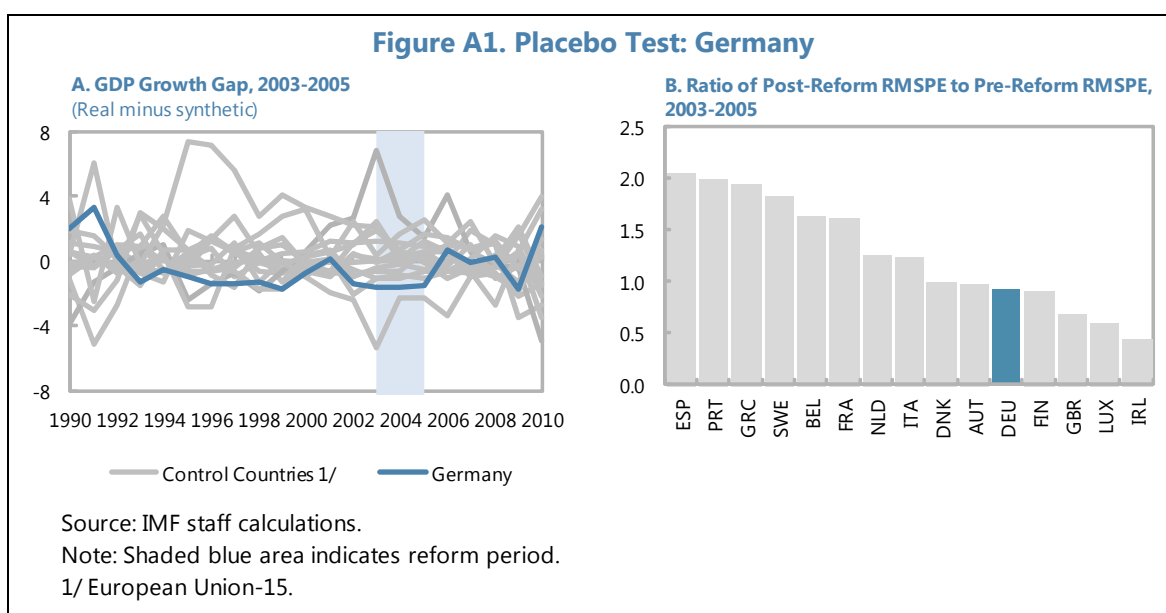
26. **However, there are signs that the recent strong economic performance and buoyant public revenue made it harder for politicians to safeguards the economic achievements of the reforms.** In the area of pensions, recent measures facilitated early retirement in some cases and resulted in higher pensions for specific population groups. Other controversial measures include recently introduced child care-benefits, which have been shown to be a powerful incentive for labor participation by the parents, however can be economically costly. Finally, a uniform minimum is set to become effective which will result in significant wage increases in some regions.

27. **The reforms may have contributed to the slight increase in income inequality.** Dustmann and others (2014) report wage growth of different percentiles of the wage distribution in western Germany (they argue that similar wage growth decomposition for eastern Germany is not insightful due to the transition after German reunification). They show that real wages at the 15th percentile fell significantly, in particular between 2003 and 2008, whereas wages at the 85th percentile still increased over the same time horizon.

## Appendix. Robustness Tests For Germany

### A. Placebo Tests

1. **Every country in the comparator group<sup>1</sup> was alternatively chosen as the tested country when in fact no fiscal reform took place in that country<sup>2</sup>** (Figure A1). If the estimated effect for Germany is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform.



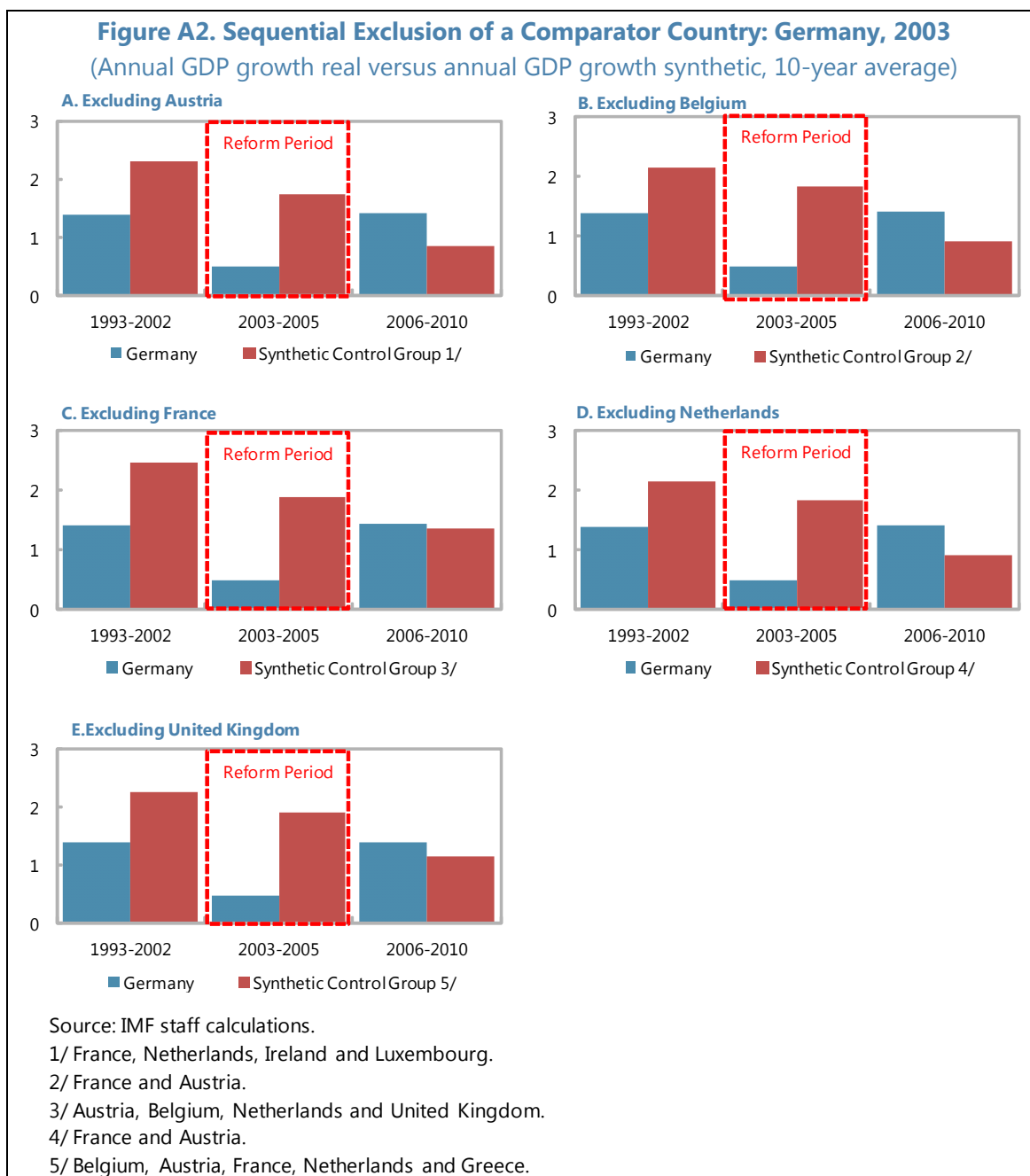
2. **Post-reform growth in Germany was not demonstratively higher relative to the growth gap distribution of non-reformers (countries in the comparator group), in terms of either the size of growth gaps or ratios of post-reform and pre-reform RMSPEs.** Thus the tests cannot rule out the possibility that the growth estimate in the baseline could be due to factors other than the fiscal reform. Results of this placebo test should be interpreted with caution, however, because pre-reform match was poor in application to some comparator countries (Figure A1).

<sup>1</sup> European Union-15.

<sup>2</sup> Countries were not used in the placebo test due the existence of missing values in the pre-intervention period at least in one variable.

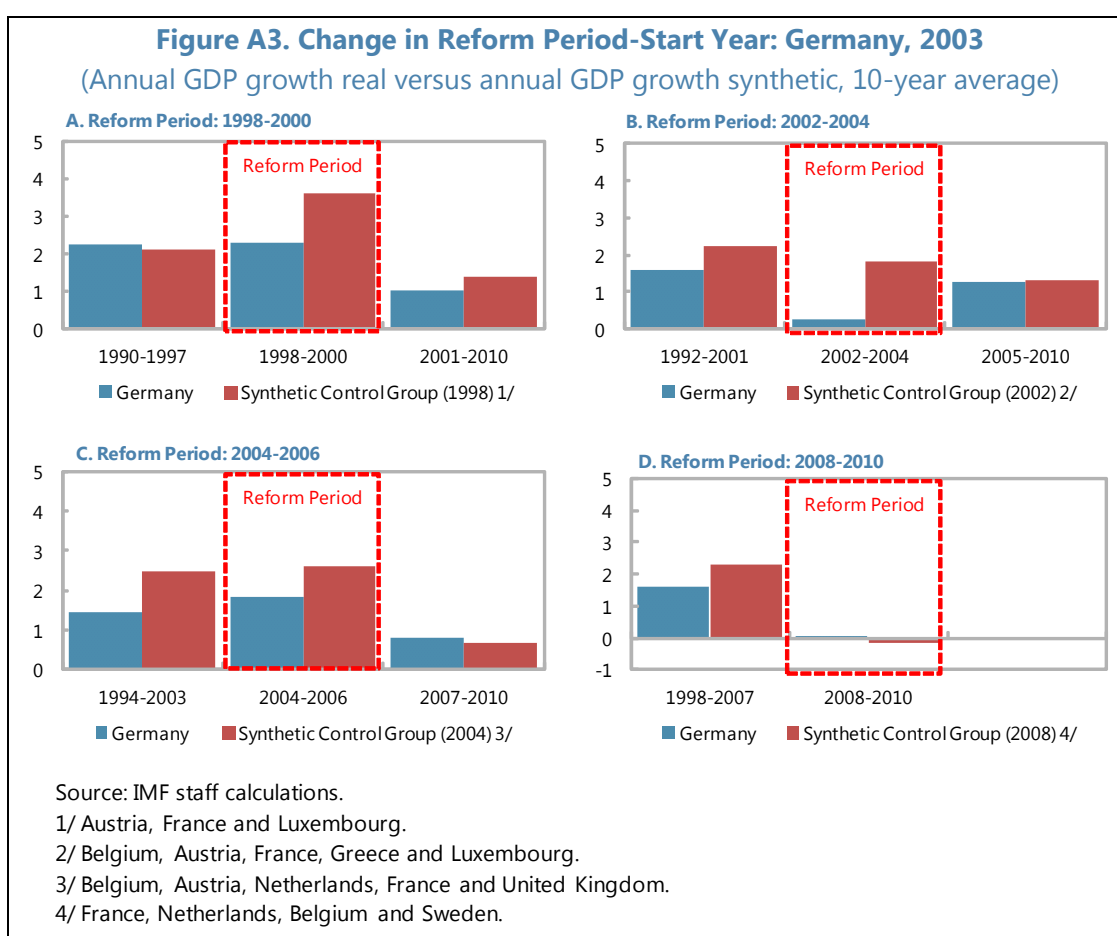
## B. Sequential Exclusion of a Comparator Country

3. **The sensitivity of the baseline results was tested by sequentially excluding each of the countries in the comparator group that received a positive weight and re-estimating the model** (Figure A2). This implied the sequential exclusion of the following countries: Austria, Belgium, France, Netherlands and United Kingdom. The post-reform growth gap is higher than the pre-reform growth gap in all cases, confirming the baseline.



### C. Changes in the Reform Periods

4. **The synthetic series was re-estimated for the years 1998, 2002, 2004 and 2008** (Figure A3). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (2002 and 2004), but setting the start of reform in 1998 results in disappearance of the growth effects. These results confirm that the fiscal reform is the likely reason for the positive growth effect in the baseline.



### D. Changes in the Reform Periods

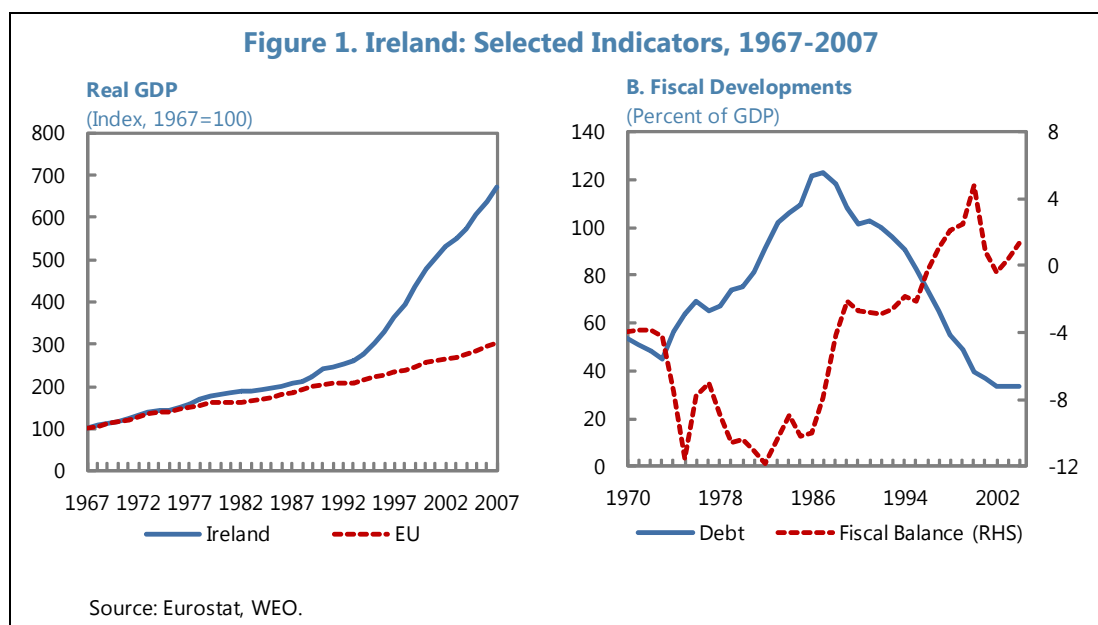
5. **Omitted as there are not enough post-reform observations.**

## IRELAND: FISCAL POLICY AND LONG-TERM GROWTH

### A. Background

1. **Fiscal policy has played both positive and negative roles in shaping the trends in Irish growth.** During the 1970s and 1980s the poor design and execution of fiscal policy likely acted as a drag on growth. Likewise, pro-cyclical policies and corresponding structural deficits in the mid-2000s left Ireland ill-equipped to deal with a housing and commercial property crash and global financial crisis. On the other hand, as this case study seeks to highlight, fiscal policy played a contributing role in creating the conditions under which economic growth could flourish during the ‘Celtic Tiger’ period of the 1990s.

2. **The 1967 to 1986 period in Ireland was characterized by slow growth, stagnant living standards and a deteriorating fiscal position** (Figure 1). Real GDP growth<sup>1</sup> averaged 3.8 percent over this period and GDP per capita averaged 62 percent of the level in the EU and improved only marginally. Due to a rapid fiscal expansion and an unfavorable external environment, the fiscal position deteriorated significantly with budgetary deficits averaging 7.6 percent of GDP and the debt-to-GDP ratio doubling to 123 percent of GDP by 1987 from 53.6 percent in 1970.



<sup>1</sup> Due to the high foreign ownership of corporations and the impact that the low corporate tax rate has on reported profits, Gross National Product (GNP) is often used to describe economic performance in Ireland. Using GNP, which excludes income accruing to non-residents and includes income from residents living abroad, would lower the level of economic activity, and growth rates to a lesser extent, but would not change the trend. As such, and in order to remain consistent with other case studies presented in this paper, real GDP growth will be used as the primary measure of growth.

3. **Building on education and investment measures implemented earlier, the reforms of the period 1987–89, marked the beginning of a remarkable economic expansion.** Over the near 18-year period post 1989, real GDP growth averaged 6 percent and living standards, measured using GDP per capita, caught up to and eclipsed the EU average. Primary deficits turned to surplus in 1987, balanced budgets were achieved in 1997 and the debt to GDP ratio declined dramatically to 24 percent by 2007. Various factors contributed to what is often referred to as the “Celtic Tiger.” Fiscal consolidation helped reduce economic uncertainty and because it had the support of social partners, a virtuous cycle of low taxes and increased labor competitiveness was created. Low labor costs, a high degree of trade openness, an underutilized labor force that was better educated than the generation before it, and favorable tax rates allowed FDI to flourish.

4. **Ireland’s growth performance took place against a backdrop of an improving external environment.** The exchange rate environment stabilized when Ireland adopted wider exchange rate bands within the European Exchange Rate Mechanism in the second half of 1993. Ireland was a recipient of EU structural funds and the signing of the Maastricht Treaty in 1992 solidified Ireland’s commitment to the European Monetary Union which sent a positive signal to foreign firms looking for investment opportunities within the EU. Finally, the external environment improved considerably as the United States, one of Ireland’s largest trading partners and a source of significant FDI, emerged from recession in 1991.

5. **The “Celtic tiger” period of growth ended abruptly with the bursting of the property bubble in 2007** (Figure 2).<sup>2</sup> Property-related tax revenues became an ever increasing share of total revenues throughout the 1990s. This trend accelerated in the mid-2000s as export and FDI driven growth gave way to one driven by credit, real estate (see first chart below). The property boom itself was partly driven by tax incentives, including tax relief for property development and mortgage interest tax deductibility. Irish authorities believed these revenues were structural rather than cyclical and increased public spending as a result.<sup>3</sup> A crash in the property market and bailouts for an over-extended banking sector turned what might have been a severe recession into a sovereign debt crisis that culminated in Ireland participation in a \$67.5 billion<sup>4</sup> International Monetary Fund (IMF) and European Union (EU) supported program.

6. **The economic and fiscal impact of the crisis on the Irish economy has been severe** (Figure 2). Over the period 2007 to 2013, GDP growth averaged 1.1 percent, the overall deficit excluding financial sector support averaged 11 percent of GDP<sup>5</sup> and the debt-to-GDP ratio increased

<sup>2</sup> Estimates in Kelly (2009) suggest that at the peak of the property bubble in 2006–07, housing construction was contributing 15 percent to national income compared to 4–6 percent in the 1990s.

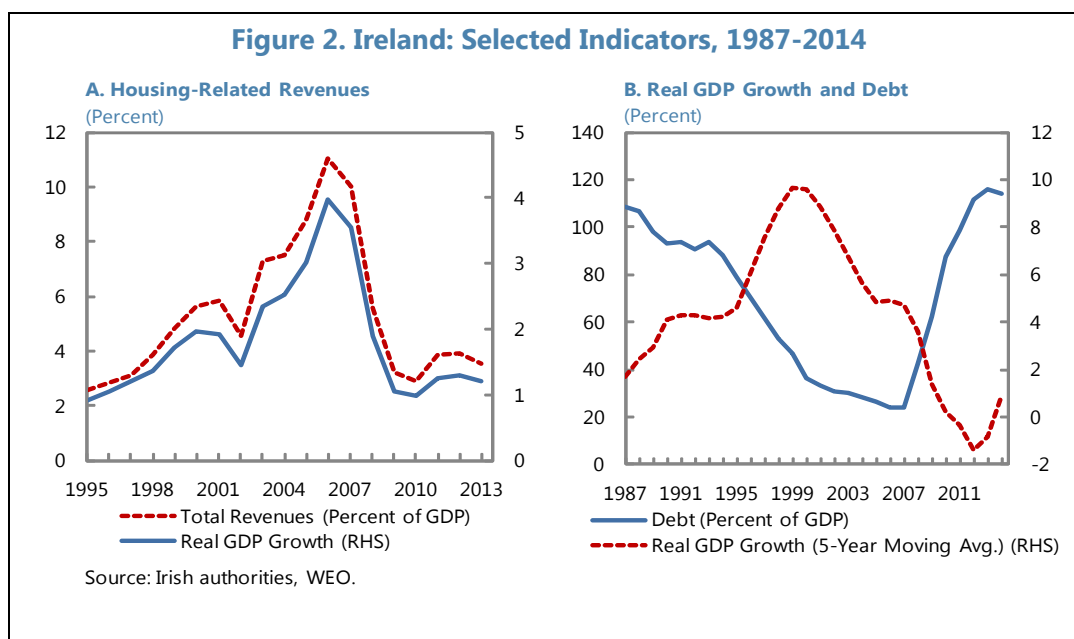
<sup>3</sup> Although not prominent in the discussion of Irish fiscal policy at the time, it is now understood the fiscal balances were likely overestimated partly because the property price cycle was not properly taken into account.

<sup>4</sup> Ireland contributed €17.5 billion and the external commitment consisted of €22.5 billion from the IMF, and €45 billion (EFSM € 22.5 billion, EFSF €17.7 billion and bilateral loans of €4.8 billion) from the EU. A large portion of the Irish contribution came from the National Pensions Reserve Fund.

<sup>5</sup> The overall deficit including financial sector support averaged 19 percent over the 2007 to 2013 period.



to 116 percent in 2013 from 24 percent of GDP in 2007. The financial crisis has led to a new series of reforms meant to stabilize the Irish economy and repair the fiscal damage the crisis wrought. While it is difficult at this stage to assess the long-run impact on growth of the reforms, recent IMF Staff Reports suggest they have been effective at achieving a major fiscal consolidation while preserving social cohesion and protecting key public services and the most vulnerable. The financial crisis has led to a new series of reforms meant to stabilize the Irish economy and repair the fiscal damage the crisis wrought. While it is difficult at this stage to assess the long-run impact on growth of the reforms, recent IMF Staff Reports suggest they have been effective at achieving a major fiscal consolidation while preserving social cohesion and protecting key public services and the most vulnerable.



## FISCAL POLICY REFORMS

### A. Overview

#### Early reform period: 1987–89

7. **Early reforms occurred after a period of unfavorable external conditions and disastrous fiscal policy** (Table 1). Economic headwinds, including two oil crises and a UK recession, negatively impacted the Irish economy during the 1970s and early 80s but the fiscal deterioration was exacerbated by an aggressively expansionary fiscal policy in the form of lavish national pay agreements, government hiring and increased social payments. Rising debt became ever more difficult to finance as interest rates increased in the early 1980s leading to increased taxes which further stifled growth (Barry, 1999). Despite attempts to correct the fiscal situation throughout the 1980s it was not until a new government came to power in 1987 that a lasting fiscal reform took

hold. Key measures included labor market reforms, expenditure-based fiscal consolidation and tax reductions. Policies enacted in earlier periods, such as enhanced openness and education reform were maintained, and began to bear fruit. Growth in Ireland in the 1990s also benefitted from and improved external environment in particular an increase in demand from its largest trading partners and a more stable exchange rate environment.

**Table 1. Ireland: Major Fiscal Reforms**

Reform Areas	Year	Reform Steps
1. Fiscal Consolidation	1987- 2008-	Substantial cuts in public-sector spending. Tax increases and base broadening (1/3) and expenditure cuts (2/3).
2. Tax Reform		
PIT	1987-	PIT rate reduced from 65 percent in 1985 to 42 percent in 2001.
CIT	1987-	CIT rate reduced from 50 percent in 1987 to 12.5 percent in 2003.
Capital Gains Taxes	1987-	Capital gains tax reduced from 60 percent in 1985 to 20 percent in 2001.
3. Labor Market Reform		
Wage Bargaining	1987-	Debut of the Social Partnership agreements which continued until they collapsed in 2009.
4. Public pension	2009	Pension levy; changes to the retirement age; and reduction in benefits.
5. Education	1967-	Expansion of the education system.
6. Economic Openness	1958-	Industrial Development Agency created; import levies removed; and tax concession for manufacturing exporters.

Source: IMF staff reports, Barry (1999).

### Reform Area 1: Spending Reforms

8. **Government spending was significantly reduced.** A hiring freeze was initiated in the public sector, an early retirement scheme was developed and special pay awards were deferred. These reforms together with wage moderation from the social partnership agreements reduced the public sector wage bill. Significant reductions and postponement of infrastructure reduced government capital expenditures. This expenditure-based consolidation likely led to improved macroeconomic stability, which was 'locked-in' due to Irish commitments under the Maastricht treaty, creating conditions for improved business confidence and investment.

### Reform Area 2: Labor Market Reforms

9. **A tripartite agreement was reached to encourage wage and strike moderation.** The first of what would become triennial social partnership agreements was signed in 1987. The Programme for National Recovery, as it was titled, was an agreement between the Irish government and social partners including the trade unions and employer organizations. Although the government only had direct control over public sector wages, the partnership agreement was ultimately used as the basis for all public and private wage settlements. Consistently renewed social partnership agreements were the key element in the process of fiscal normalization whereby moderate wage growth was exchanged for reduced personal income taxes. This created a virtuous cycle of a tax cuts and sustained competitiveness which in turn boosted FDI and growth. Although the labor market

agreements had a positive impact on wage restraint in the early reform period it could be argued that they became part of mechanism that exacerbated procyclical policies in the 2000s.

### Reform Area 3: Tax Reforms

10. **High marginal tax rates were slowly reversed.** In an attempt to address fiscal crises in the 1970s and 1980s, taxes were increased substantially with marginal income tax rates as high as 85 percent in 1975 and 65 percent in 1985. Income tax, corporate tax and capital gains taxes were all lowered beginning in 1987 (Duff, 2003). A special tax rate of 10 percent for manufacturing activities meant to encourage FDI was introduced in 1981. This rate was maintained throughout the reform period and in subsequent years. Generally lax rules on the definition of manufacturing and the activities that qualified meant that a large number of firms likely benefited from this reduced rate. Lower taxes, in addition to the improved macroeconomic conditions, likely further encouraged FDI and ultimately growth.

### Reform Area 4: Education Reforms

11. **The education system underwent significant reforms beginning in the late 1960s.** Fees for secondary education – a significant barrier to entry for many Irish families – were removed in 1967. The minimum school leaving age was raised from 14 to 15 in 1972. A means-tested grant system enhanced access to universities. Tertiary education was expanded with the development of the Regional Technical Colleges which offered sub-degree-level courses in engineering, the sciences and businesses. These subjects would prove to be highly valuable to the IT, software and pharmaceutical companies that would soon locate in Ireland.

### Financial crisis reform period

12. **In response to a fiscal crisis that began in 2008 the Irish government instituted a number of reforms independently beginning in 2009 and as part of the 2010 IMF/EU supported program.** The program consisted of three main elements. First, the Irish banking sector would be stabilized by publicly financed recapitalizations. Second, fiscal consolidation would place public finances on a sustainable path. Finally, structural reforms would restore competitiveness and improve potential growth. Fiscal measures implemented under the IMF/EU program totaled EUR 13 billion (8 percent of GDP), two-thirds of which were due to expenditure cuts with the other third from tax increases. The banking crisis resulted in cumulative public support costs of about 40 percent of GDP. Expenditure-based fiscal consolidation is expected to help reduce uncertainty and encourage investment, ultimately boosting growth. Indeed, expenditure-based fiscal adjustments have been shown to be associated with lower uncertainty and higher investment (Alesina and others, 2012; Dixit and Pindyck, 1994).

### Reform area 2: Broadening the tax base and increasing rates

13. **Various steps were taken to increase revenues as part of the consolidation process.** The personal income tax base was broadened by reducing the income tax bands (10-percent reduction),

introducing the universal social charge, and eliminating Pay-Related Social Insurance reliefs and exemptions. Taxes were increased on capital and savings and the VAT standard rate was increased from 21 percent to 23 percent in 2012 (IMF, 2012c). Excise taxes on both fuel and tobacco were increased and an additional tax on property was introduced.

### Reform area 3: Spending reforms

14. **The majority of the consolidation took place on the expenditure side.** Public wages were cut by 14 percent and salary progression for public servants was halted for a period of three years, welfare rates were reduced by 8 percent and the public service was reduced by 10 percent relative to its size in 2008. Non-pay current and capital budgets were reduced by 17 and 63 percent, respectively (IMF, 2012b).

### Reform Area 4: Pension Reforms

15. **State and public sector pensions were substantially reformed as part of the fiscal consolidation process.** The portion of the state pension related to living expenses was reduced substantially in the 2013 budget, retirement ages were increased and pension benefits, which were normally increased annually, were frozen at 2009 levels. Beginning in January 2011, a Public Service Pension Reduction was applied which resulted in average reduction of 4 percent of gross benefits. Further changes occurred in 2013 with the creation of the Single Public Service Pension Scheme. New-hires pensions will be based on career-average earnings, retirement age will be linked to the State pension, meaning it will rise progressively over time and pension payments will increase with CPI rather than average earnings. Although implemented to help with the consolidation effort rather than address an ageing population, reduced pension benefits will likely encourage older workers to remain in the labor force longer—a positive impact on growth.

### Reform Area 5: Structural Fiscal Reforms

16. **Budgetary reforms in Ireland were key structural benchmarks under the EU/IMF Programme of Financial Support and culminated with the Fiscal Responsibility Act, which came into effect in December 2012.** Consistent with EU governance rules and the new fiscal compact, the Act established a budgetary rule, a debt rule, and a medium-term budgetary objective. It also established the Irish Fiscal Advisory Council (IFAC) as a statutory body whose mandate is to endorse, as they see fit, the macroeconomic forecasts produced by the Government, which it has been doing since its inception, and to monitor and assess compliance with the budgetary rule beginning in 2016. The fiscal rule and monitoring by IFAC is expected to encourage fiscal discipline and will help to lock-in the consolidation efforts.

## B. Notable Design Features

17. **An unwavering commitment to policies that were meant to encourage FDI has been a pillar around which fiscal policy has been designed over the last 50 years.** The Irish government believes trade openness and FDI are the backbones of their economy and have designed fiscal

policies accordingly. During the fiscal consolidation period of the 1980s, the favorable tax rates for (largely foreign) manufacturers were left untouched. In 2000, when special treatment of manufacturing exporters was set to expire under conditions imposed by EU membership, the Irish government lowered some corporate tax rates rather than increase taxes for that sector.<sup>6</sup> Even during the financial crisis and EU-IMF-supported programs no real consideration was given to increasing the very low corporate tax rates, despite additional pressure from EU partners.

18. **Labor reform was a consultative process between the government and labor partners.** The first social partnership agreement was forged with collaboration between all relevant stake holders. Its success, and the feeling that everyone benefitted helped enhance the credibility and durability of the reform and set the stage for future partnership agreements.

### C. Outcomes

19. **After the 1987 reforms were implemented, economic growth accelerated and remained strong until the onset of the financial crisis.** In the ten years prior to reforms, GDP growth averaged 2.9 percent whereas it averaged 7.1 percent in the ten years after the reform. The improvement is similar on a GDP-per-capita growth basis where it averaged 2 percent in the ten years leading up to reforms and 6.2 percent in the ten years afterwards. The improvement in GDP per capita allowed Ireland to surpass the EU average level of GDP per capita in 1999. To put this into context, Irish GDP per capita was just 70 percent of the EU average in 1986.

20. **The fiscal situation also improved considerably. Budgetary deficits peaked at 13.1 percent of GDP in 1982.** The deficit fell throughout the 1980s, but remained elevated at 10.5 percent of GDP in 1986 largely due to high interest payments on the debt. The first primary surplus was recorded in 1987 and fiscal consolidation through reductions in expenditures further reduced the deficit by nearly 8 percentage points to 2.8 percent of GDP by 1990. The consolidation process continued throughout the 1990s with budget surpluses beginning in 1997 continuing largely uninterrupted until 2008.<sup>7</sup>

21. **Wage growth slowed considerably as did days lost to strikes.** After the social partnership agreement was signed, hourly compensation growth in the manufacturing sector slowed considerably, declining from an average of 13.6 percent over the 1977 to 1986 period to an average of 4.5 percent over the 1987 to 1996 period. Labor unrest was also less frequent with the number of strikes declining from 192 in 1984 to 38 in 1987. The average number of work days lost to strike in the 1980s was 317,078 while in 1994 it was only 25,500 as reported by the Labor Commission in 2006.

<sup>6</sup> The favorable rate for manufacturers was 10 percent, but the headline corporate tax rate was set to 12.5 percent to comply with EU rules. The headline corporate tax rate was 20 percent.

<sup>7</sup> A small budget deficit, related to the slowdown in the high-tech sector, occurred in 2002.

22. **Employment as a share of the population grew significantly due to increased labor force participation, favorable demographics and large reductions in unemployment.** All three factors contributed to improved post-reform labor utilization (i.e., growth in employment per capita). After peaking at 18.1 percent in 1987, the unemployment rate steadily declined over the next 15 years reaching 3.7 percent by 2001. It remained close to the natural rate of unemployment up until the global recession. Labor force participation also accelerated during this period, especially for women. From 1987 to 1997, female participation rates increased by approximately 8 percentage points—the second largest improvement in the OECD next to the Netherlands (OECD 1999). Finally, a delayed baby boom that began in the 1970s and peaked only in 1980, increase the share of the working age population.

23. **Education attainment improved considerably over the nearly 30 years from 1967 to 1994.** The proportion of students taking the Junior-cycle examinations rose from about 40 percent in 1967 to close to 100 percent in 1994 while the proportion taking senior-cycle examinations rose from about 21 percent to 82 percent. Data from the 1996 Census reveals that while only 30 percent of the 55–64 age group had completed at least upper secondary education in 1996 the corresponding figure for the 25–34 age group was 66 percent. Similar results hold for university-level educational attainment. As of 1996, nearly 28 percent of the Irish labor force had a tertiary education compared with the OECD average of 26 percent (OECD, 1999).

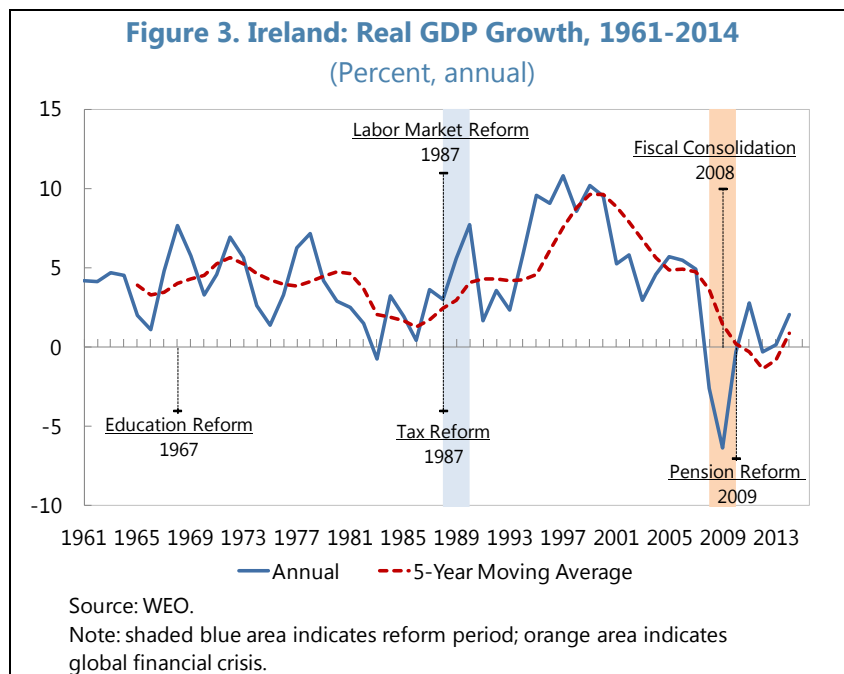
24. **Recent fiscal consolidation has reduced the budget deficit considerably, with two-thirds of the consolidation coming from expenditure cuts.** After peaking at 11.5 percent of GDP in 2009, overall budget deficits excluding bank support, are estimated to be around percent of GDP in 2014—the point at which primary surpluses are expected to begin. The majority of the consolidation has occurred on the expenditures side (IMF, 2012b).

## IMPACT ON LONG-TERM GROWTH

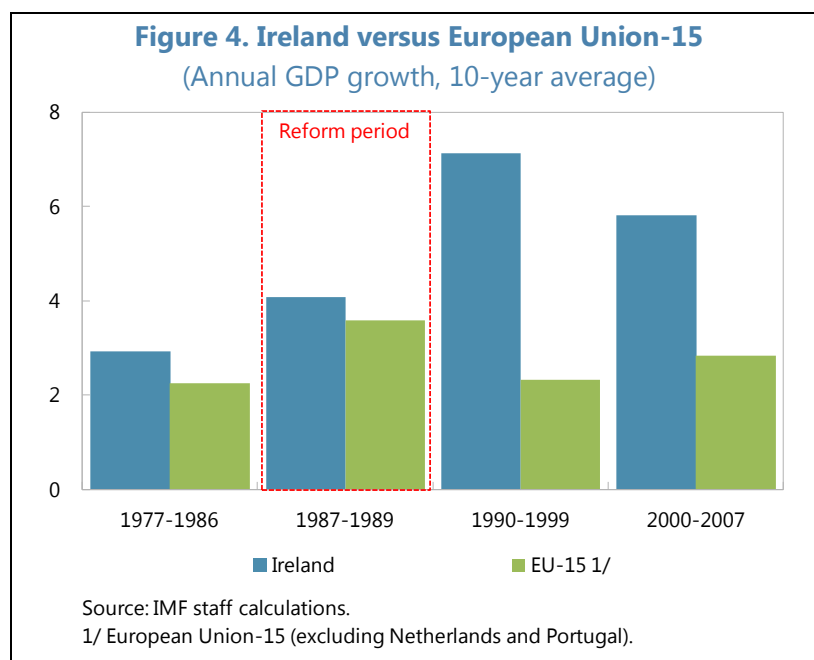
### A. Long-Term Growth Dissected

25. **The increase in growth during the 1990s can be put in context by evaluating it against a set of appropriate comparators** (Figure 3).<sup>8</sup> Output growth exhibited a clear turnaround beginning in 1987 after slowing steadily since 1980. Growth increased steadily over the next decade and remained high until the onset of the global financial crisis. In order to assess whether the growth performance in Ireland was stronger than it would have been in the absence of fiscal reforms, it must be evaluated against a set of appropriate comparator countries.

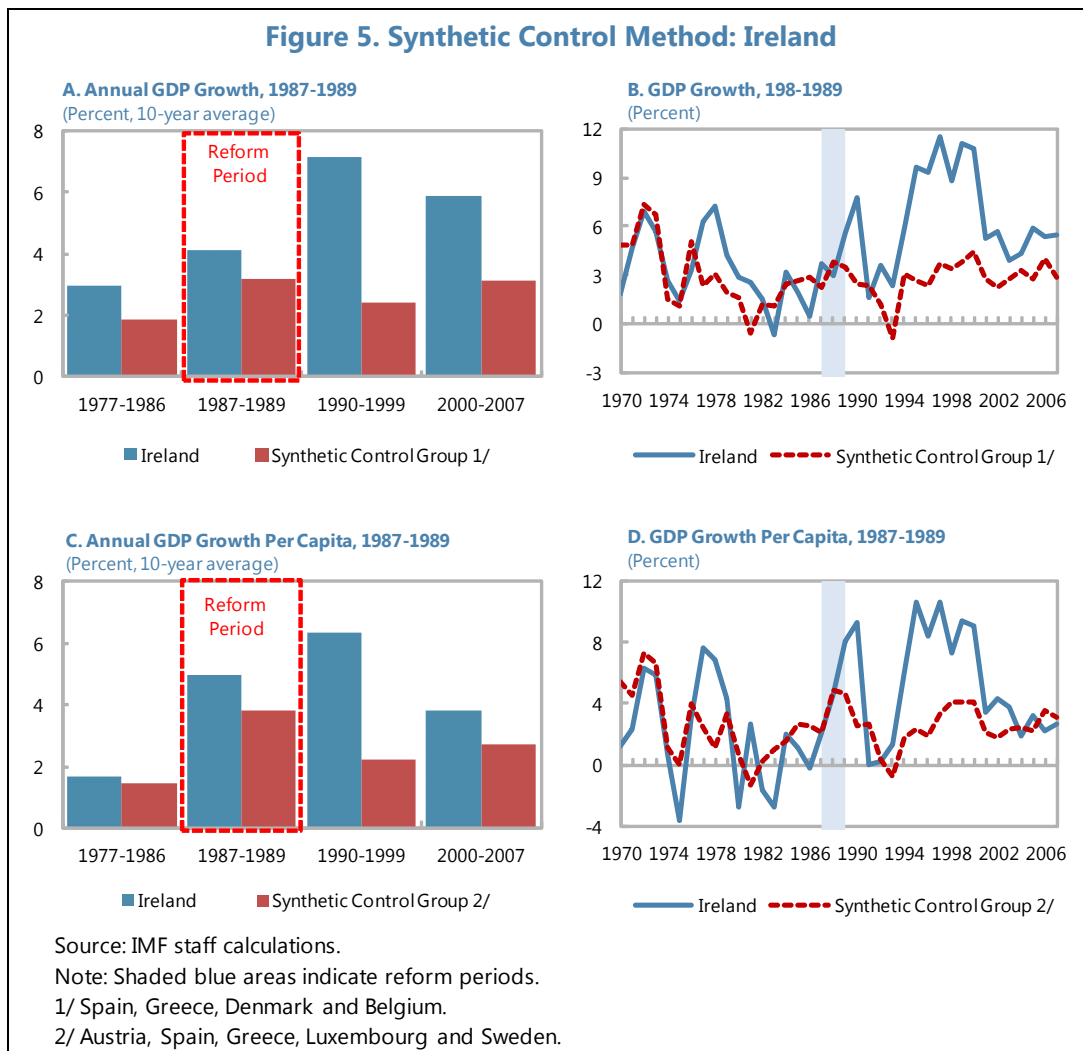
<sup>8</sup> Only the early reform period was analyzed using the synthetic control method as an insufficient amount of time has elapsed since the end of the second set of reforms.



26. **A simple comparison between Ireland’s post-reform real GDP growth and the growth of its EU peers indicates that long-run growth was substantially higher in Ireland** (Figure 4). Irish real GDP growth averaged 2.9 percent in the 10 years leading up to the reform, and averaged 7.1 percent over the ten-year period after the reforms. Average growth in the 10 years following the reform period (1990–99) was 4.4 percentage points higher than the average growth in the EU-15 group of countries. Although the gap between Irish growth and growth in the EU narrowed over the 2000 to 2007 period, it still remained 2.9 percentage points higher than the EU-15.



27. **This result is supported by comparing post-reform growth with an estimated counterfactual growth series that would have prevailed in the absence of reforms based on the synthetic control method** (Figure 5 and Table 2). In order to further test the hypothesis that Irish growth rates increased post-reforms, a counterfactual growth series was created using a synthetic control group and a set of common growth predictors.<sup>9</sup> The results show that average real GDP growth during the ten-year period following the reform was about 4.8 percentage points higher than the average growth generated by the synthetic control group. Again, the relatively superior performance was maintained beyond the 10-year reform period, with growth exceeding that of the synthetic country by 4.1 percentage points.



<sup>9</sup> See methodological annex for details on the synthetic control method.



**Table 2. Ireland: Economic Growth Predictor Means before Fiscal Reform**

Variable	Reform Period 1987 1/	
	Real	Synthetic
<b>GDP Growth</b>		
GDP Growth (Percent)	3.1	3.6
GDP Per Capita (2005 I\$/Person)	13531.9	17092.9
Trade Openness (Percent)	50.7	35.2
Terms of Trade (Percent)	86.0	91.0
Inflation Rate (Percent)	12.4	11.9
Human Capital Index	2.9	2.3
<b>GDP Growth Per Capita</b>		
GDP Growth Per Capita (Percent)	2.6	3.0
GDP Per Capita (2005 I\$/Person)	13531.9	18423.7
Trade Openness (Percent)	50.7	48.1
Terms of Trade (Percent)	86.0	91.6
Inflation Rate (Percent)	12.4	10.6
Human Capital Index	2.9	2.3

Source: IMF staff calculations.

1/ All variables except GDP growth and GDP growth per capita are averaged for the 1970-1986 period. The average for GDP growth and GDP growth per capita is calculated using the years 1970, 1978 and 1986.

28. **To check the robustness of the results above, a series of tests, including the placebo test, was performed.** A placebo test checks whether the results for Ireland differ significantly from those obtained by choosing a country at random. Following Abadie and others (2012) each country in the group of fifteen EU countries was assumed to have had the identical event of interest (i.e., the fiscal reforms) as Ireland when, of course, it did not. The effect of the fiscal reform can then be deemed significant if the estimated effect for Ireland is significantly larger than the placebo effects. Figure A1.A shows that the difference between the selected countries' GDP growth and synthetic countries' GDP growth is considerably larger for Ireland (blue line) than the placebo countries (grey lines). Figure A1.B displays the ratios between the post-reform RMSPE and pre-reform RMSPE and the ratio is largest for Ireland suggesting that the impact of the reform on Ireland is significantly greater than any other country chosen at random.<sup>10</sup> Additional tests also confirm the robustness of the baseline results.

29. **The results of the synthetic control method are also robust to the choice of the dependent variable and the selection of comparator countries.** To test the sensitivity of the

<sup>10</sup> The ratio of post-reform to pre-reform RMSPE is used to eliminate the case where a large post-reform RMSPE exists only because the pre-reform fit is poor.

results to the selection of comparator countries, each country in the control group was systematically removed from the donor pool of fifteen EU countries. Figure A2 shows that the results are not sensitive to comparator selection. Similar results were obtained by performing the same exercise with GDP per-capita growth.

## B. Fiscal Reform: A Game Changer?

30. **A decomposition of the GDP per capita growth performance shows that capital deepening, TFP and labor utilization all contributed significantly over the 1990–2007 period while the contribution from human capital was much more muted** (Figure 6). Labor utilization was the most consistent contributor to growth over the period 1990–2007. Capital deepening did not play a large role in the growth performance over the 1990–99 period, but it contributed significantly over the 2000–07 period. The contribution of TFP over the period is mixed. It provided a large contribution to growth from 1990 to 1999 as foreign investment in productive industries accelerated, but subtracted from growth when investment shifted to less productive industries, such as construction, during the property boom. The contribution from human capital appears smaller than the other factors but the measure of human capital may fail to capture the quality of the education investment that was particularly important in Ireland.

31. **The significant increase in labor utilization may have been affected by the comprehensive package of fiscal and structural reforms although demographics and increased female labor force participation also contributed** (Figure 6). Labor utilization (the employed share of the population) can be decomposed into three factors, the employment rate (share of labor employed), labor force participation (share of working-age population in the labor force) and the share of the population that is of working age. All three of these factors contributed positively to labor utilization over the 1990–2007 period. Consecutive labor market agreements kept wage growth moderate, which helped to stimulate the demand for labor, increasing the employment rate. At the same time, a delayed baby boom in Ireland increased the share of the population that was of working age and improved participation of woman in the labor force increased labor force participation.

32. **Although small relative to the other factors, human capital contributed to economic growth.** The positive impact of human capital accumulation can have on output has been explored extensively in the endogenous growth literature. For example, Lucas (1988) emphasized that economies with high levels of human capital have higher instances of learning from others and these positive spillover effects can increase productivity. However, empirical evidence on the returns to education has been mixed which De la Fuente and Domenech (2006) argue is often due to data deficiencies. Although the human capital index used in the decomposition is from the widely used Penn World Tables<sup>11</sup> it is possible that alternate education indexes would show a larger contribution

<sup>11</sup> The index is constructed using years of education from Barro and Lee (2010) and returns to education from Psacharopoulos (1994).

from education. Indeed, Bergin and Kearney (2004) construct an alternate index of human capital and use it to estimate the effect of keeping education attainment at its 1980 level. They find GNP per capita would have been 20 percentage points lower under this scenario.<sup>12</sup> It is also possible that the index of human capital fails to capture the quality of education that was particularly important in the case of Ireland. As noted earlier, education investment was focused on expanding technical colleges, which produced graduates with skill sets that would be highly valuable to drug and technology companies that were expanding their investments in Ireland.

33. **Reduced corporate taxes and a high degree of trade openness increased investment by foreign companies, which increased productivity and growth** (Table 3). Sustained fiscal consolidation supported by positive external conditions enhanced fiscal sustainability and provided the space for large reductions in taxes which created an environment conducive to investment. Foreign direct investment increased steadily from 0.2 percent of GDP in 1989 to 3.4 percent of GDP in 1997 and this investment occurred in industries with high productivity including ICT and health. Productivity may have also been enhanced through trade as countries with a high degree of trade openness have been shown to benefit more from productivity growth in partner countries (Helpman, 2006).

34. **At the end of the 1990s, investment patterns began to change.** A sectoral shift in investment occurred beginning in 2000 from manufacturing and other high-productivity industries into construction, which was considerably less productive (Crafts, 2014). This may help to explain the relatively large contribution to growth from capital deepening (including capital used the property sector) after 2000 and the negative contribution to growth from TFP over the same period.

35. **The reforms that took place in 1987–89 appear to have had a positive impact on long-run growth in Ireland.** The expenditure-based fiscal consolidation and the subsequent tax cuts helped to create conditions in which private-sector investment, especially from foreign owned corporations, could flourish. These firms were able to hire workers that were more educated than the previous generation due to education reform and were able to stay competitive due to moderate wage growth and labor stability that came from the labor partnership agreements. Fiscal reforms were not the only contributors to the growth improvement—other factors played a role. In particular, favorable demographics and increased labor participation supported the growth take-off by supplying labor and supportive external environment was a source of strong demand. As a signatory to the Maastricht Treaty, Ireland was able signal to investors that it was serious about its commitments on the fiscal front and EU structural funds helped to offset some of the fiscal consolidation with additional public capital spending (Honohan and Walsh, 2002).

36. **While it is too early to assess the impact of the recent reforms on long-run growth, they appear to be of high quality and are likely to operate through similar channels as the earlier reforms.** Substantial fiscal consolidation has occurred since the onset of the crisis and most

<sup>12</sup> Their model assumes unchanged demand for labor despite the much less education workforce, which is certainly contributing to the dramatic result.

of it has come from reductions in expenditures. These measures are likely to be “locked in” with monitoring by the IFAC. Significant cuts to the public sector wage bill have occurred while protecting public services and the progressive nature of the consolidation has helped to protect the most vulnerable.

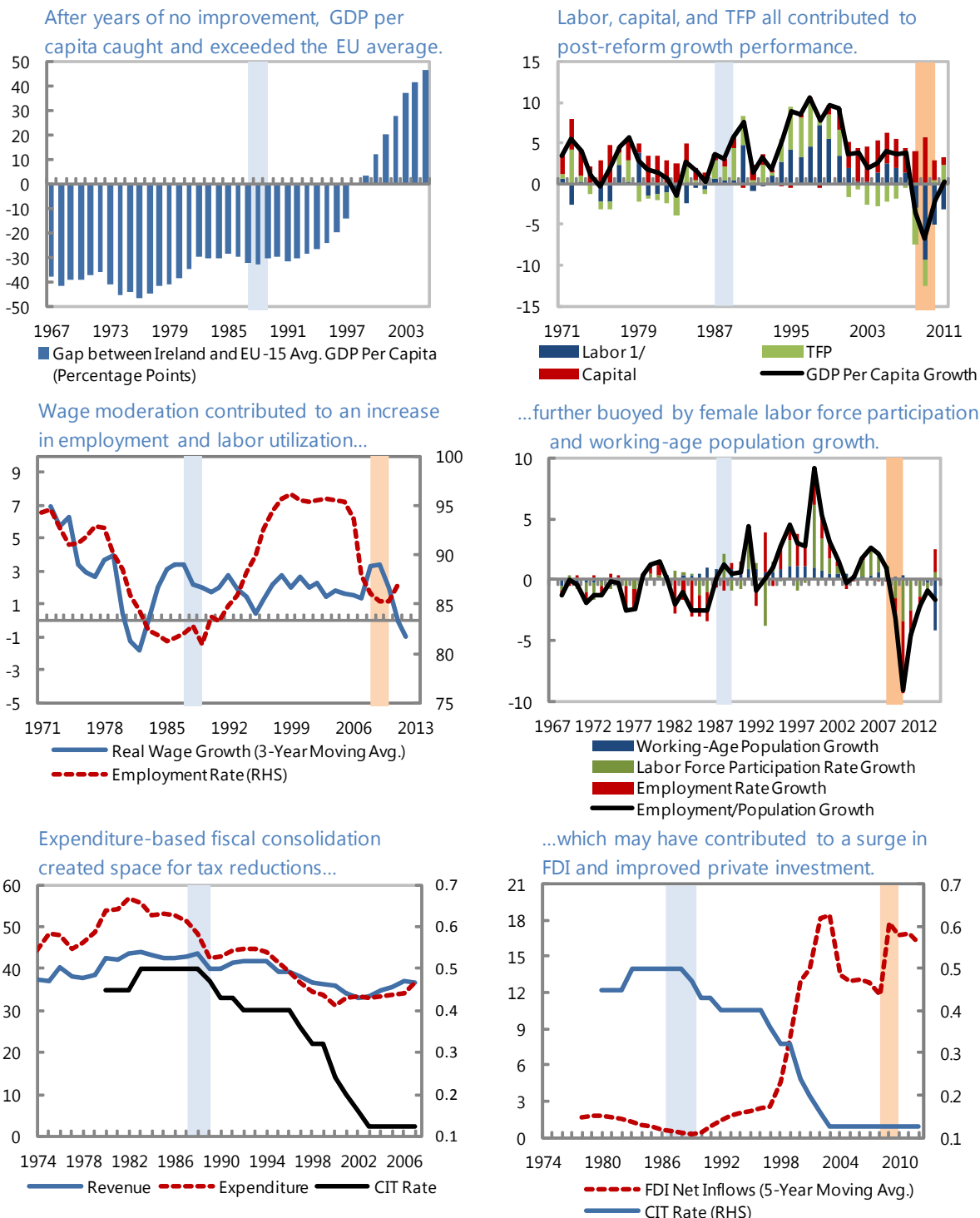
## LESSONS

37. **Fiscal policy can hinder growth as well as encourage it.** Many of the reforms, such as increased education spending and openness towards FDI, attributed to Ireland’s economic success in the 1990s were in place long before the surge economic growth took place. These growth-enhancing policies should have helped Ireland close the living standards gap with the rest of Europe but they did not, due in part to poorly designed and executed fiscal policy in the 1970s and 1980s. A demonstrable commitment to macroeconomic stability and fiscal sustainability appears to have played a crucial role in both reform periods.

38. **Political will and buy-in from social partners is essential for durable reforms.** Reforms had been attempted before 1987–88 with little success partly due to a poor external environment, but also because there were differing views on how to deal with the deteriorating fiscal position and frequent changes in government as a result. In the early reform period governing and opposition parties collaborated with labor leaders to establish a partnership that formed the basis of future cooperation. It was not until all sides agreed that something needed to be done that reforms took hold.

39. **External fiscal enforcement mechanisms increase the credibility of reforms.** Both reform periods contained commitment and enforcement mechanisms that helped to ‘lock-in’ the savings from the fiscal consolidation. During the early reform period Ireland signed the Maastricht Treaty, which signaled to investors that they would not revert to the years of high deficits and debts. Going forward, the EU’s fiscal compact and the IFAC could have a similar impact on investor confidence.

**Figure 6. Ireland: Fiscal Policy and Growth, 1967-2013**



Source: IMF staff calculations.

Note: Shaded blue areas indicate reform period; orange areas indicate global financial crisis.

1/ Human capital contributions are included in labor contributions.

**Table 3. Ireland: Selected Indicators**  
(Period Averages)

	<b>Reform Episode</b>						
	<b>1975-79</b>	<b>1980-86</b>	<b>1987-89</b>	<b>1990-94</b>	<b>1995-99</b>	<b>2000-04</b>	<b>2005-09</b>
<b>Real Economy</b>	(Percentage change, unless otherwise indicated)						
Real GDP	4.5	1.7	4.1	4.2	10.1	6.0	1.8
Contributions to Growth (Percent) 1/							
Capital	3.3	2.1	1.2	1.4	3.2	5.2	4.0
Labor	1.1	1.2	1.2	0.8	0.6	-0.1	-0.1
Total Factor Productivity	0.0	-0.4	2.7	2.0	4.1	-0.9	-2.4
CPI Inflation (Average)	14.7	11.9	3.1	2.7	2.1	4.1	1.8
<b>General Government</b>	(Percent of GDP, unless otherwise indicated)						
Total Revenue	38.5	42.9	42.1	41.5	38.0	34.3	35.9
<i>Of which</i> Tax Revenue	...	28.3	29.5	28.2	26.6	24.1	24.1
Total Expenditure	47.1	54.1	47.4	44.1	37.2	32.8	39.3
Fiscal Balance	-8.6	-11.2	-5.2	-2.6	0.8	1.4	-3.4
Primary Balance	-4.1	-3.2	3.2	4.4	4.7	2.9	-2.1
Gross Debt	51.0	69.7	83.1	92.4	64.4	33.2	37.2
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)						
Wage Growth 2/	18.3	12.9	5.3	4.7	4.0	5.9	4.4
Labor Force Participation Rate	73.0	73.2	73.1	73.2	75.4	80.6	83.9
Employment Rate	91.9	86.6	81.6	83.1	90.2	95.7	93.6
Unemployment Rate	8.1	13.4	18.4	16.9	9.8	4.3	6.4
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)						
Corporate Income Tax Rate (Percent)	...	47.9	49.0	41.2	36.0	17.0	12.5
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)						
Market Gini Coefficient 3/	45.4	47.3	49.9	49.3	48.0	46.6	49.9
Net Gini Coefficient	33.9	33.7	32.9	33.5	32.9	31.1	29.7

Source: Eurostat, Fiscal Prudence and Profligacy Database, Historical Debt Database, Eurostat, Penn World Table, and WEO.

1/ Growth accounting estimates are calculated using Penn World Table 8.0.

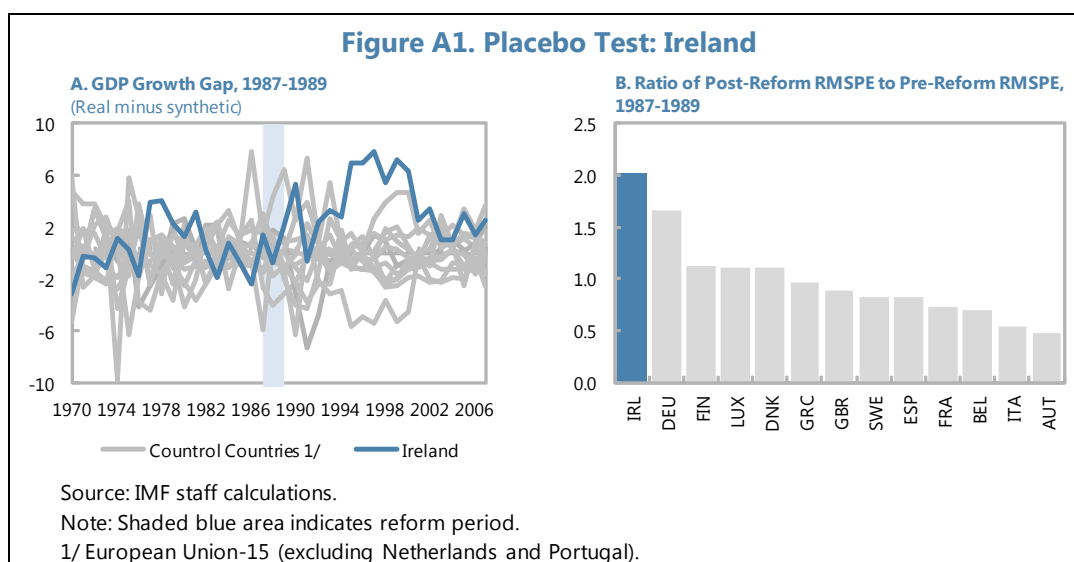
2/ Wage reflects hourly compensation in the manufacturing sector.

3/ "Market" Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

## Appendix. Robustness Tests for Ireland

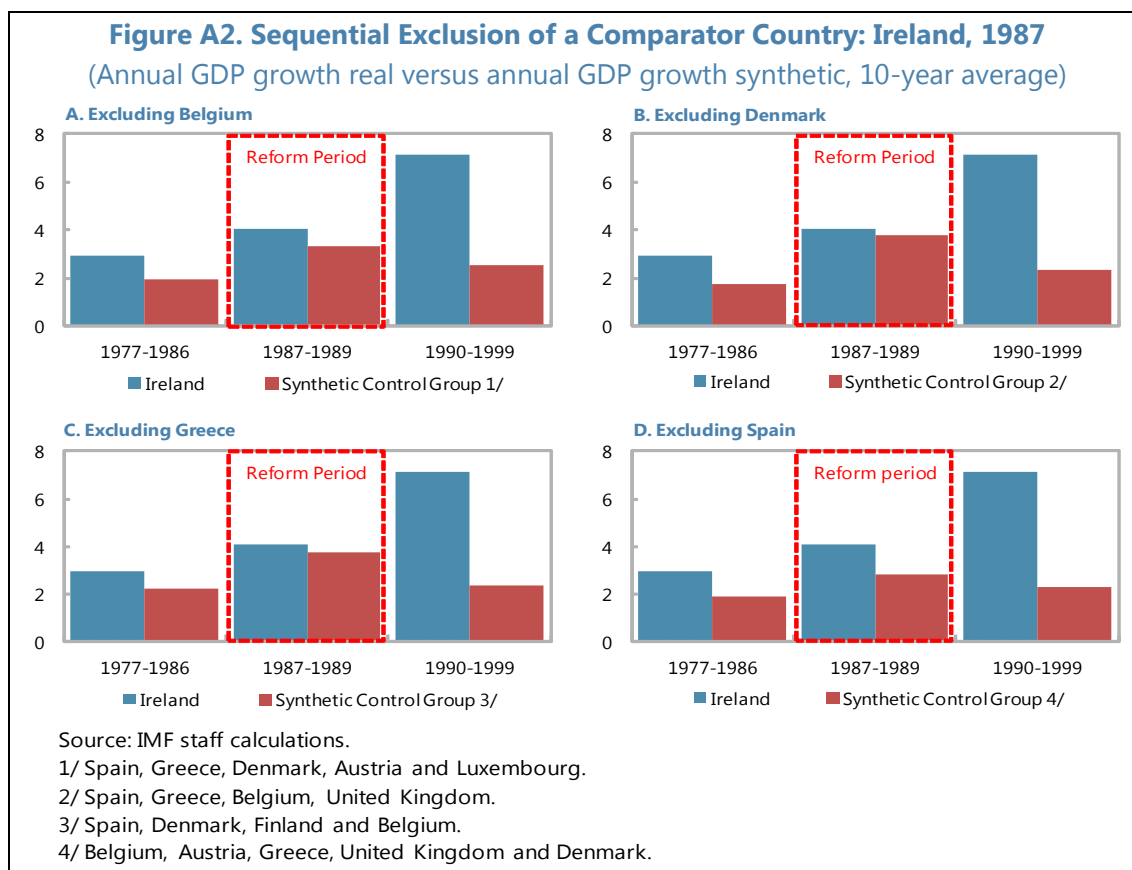
### A. Placebo Test

1. **Each country in the comparator group was alternatively chosen as the tested country when in fact no fiscal reform took place in that country** (Figure A1). If the estimated effect for Ireland is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in Ireland was clearly higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of either the size of growth gaps or ratios of post-reform and pre-reform RMSPEs. This indicates that the fiscal reform likely has made a positive difference in the growth performance in Ireland.



### B. Sequential Exclusion of a Comparator Country

2. **The sensitivity of the baseline results was tested by sequentially excluding each of the countries in the comparator countries that received a positive weight and re-estimating the model** (Figure A2). The post-reform growth gap is higher than the pre-reform growth gap in all cases, confirming the baseline.

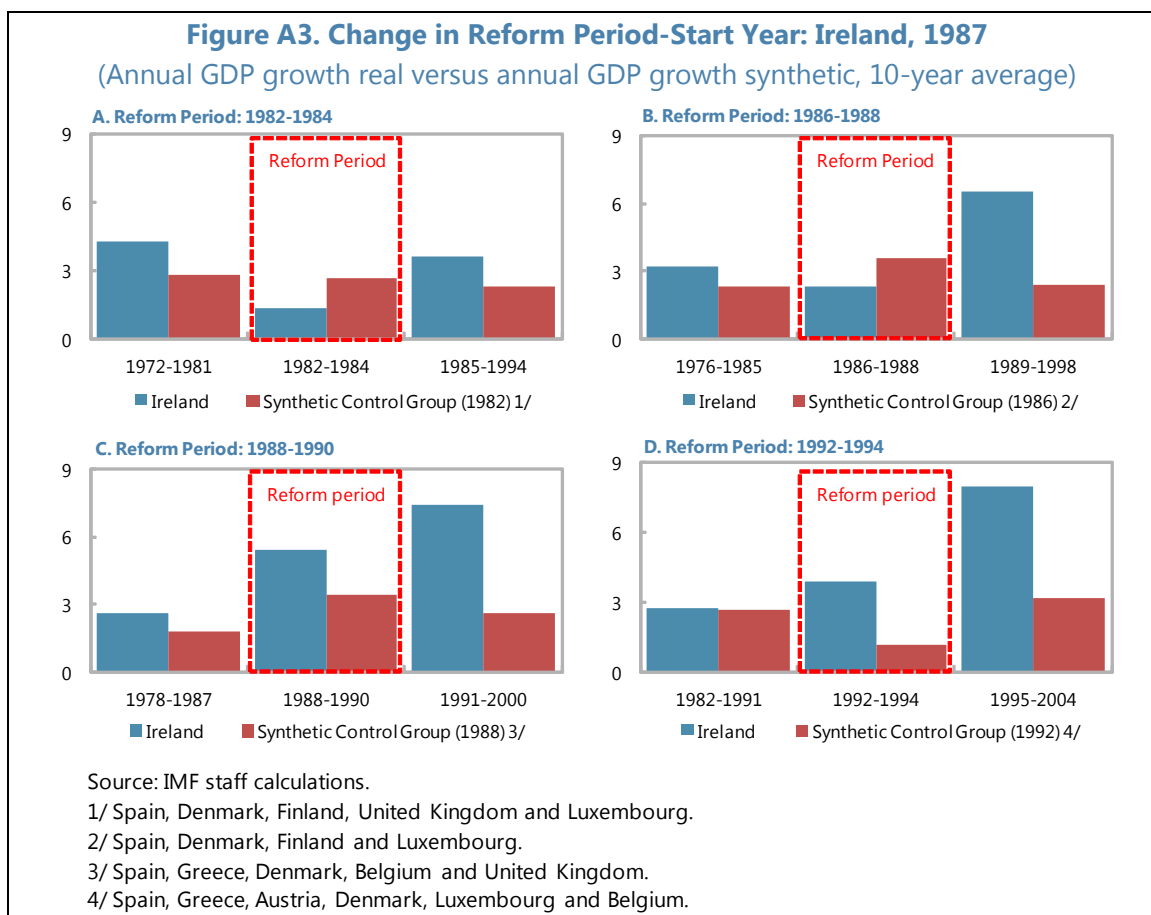


## C. Changes in the Reform Timing

### Changes in the start year of reform

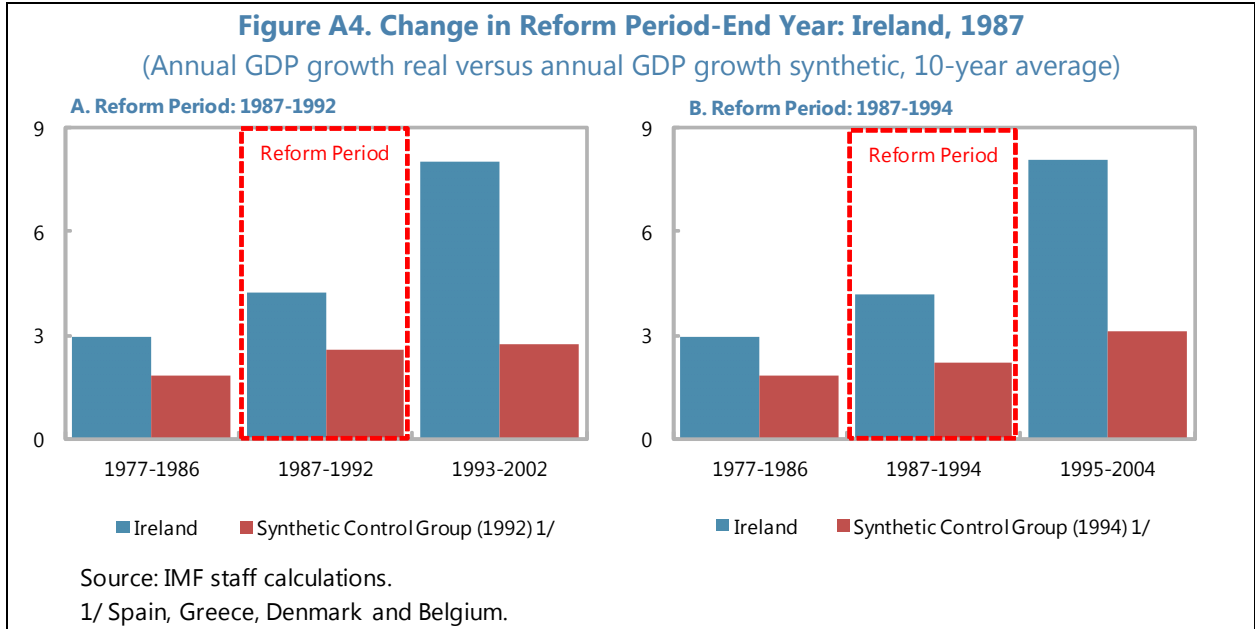
3. **The synthetic series was re-estimated for the years 1982, 1986, 1988 and 1992** (Figure A3). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (1986 and 1988), but setting the start of reform in 1982 results in disappearance of the growth effects. These results confirm that the fiscal reform is the likely reason for the positive growth effect in the baseline.





### Changes in the end year of reform

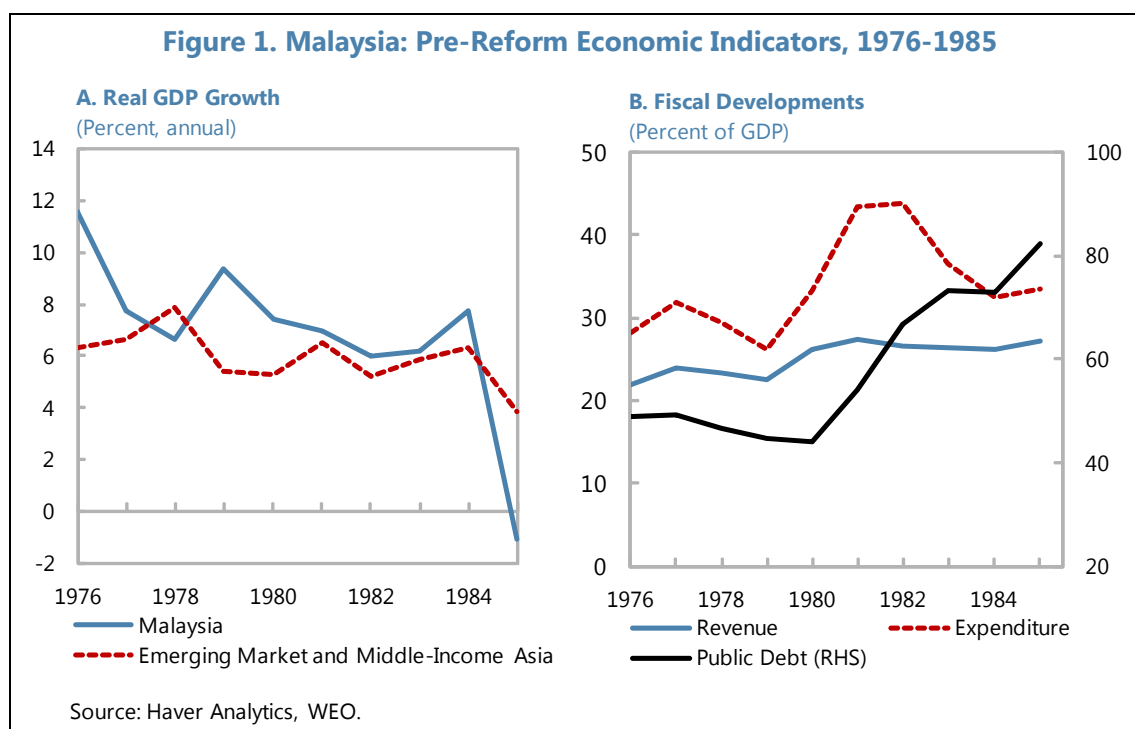
4. **The difference in average growth rates was recalculated by setting the end of the fiscal reform period to 1992 and 1994, respectively** (Figure A4). The purpose of this exercise is to examine whether our conclusion is sensitive to the timing of the end of the reform, given its uncertainty. The difference in average growth rates was recalculated by setting the end of the fiscal reform period to different years. The purpose of this exercise is to examine whether our conclusion in the baseline is sensitive to the timing of the end of the reform, given its uncertainty. Results confirm that the conclusion holds when the end of the fiscal reform period changes.



# MALAYSIA: FISCAL POLICY AND LONG-TERM GROWTH

## A. Background

1. **During the 1970s, Malaysia followed a public sector-led development strategy.** As a response to the racial conflicts of 1969, the government's New Economic Policy (NEP) was geared towards promoting growth while eradicating poverty and reducing ethnic and regional disparities. As a result there was a significant expansion in public investment and the state owned enterprise (SOE) sector, as well as the introduction of targeted programs. Public investment spending alone grew at an average of 1 percentage point of GDP, resulting in deficits of around 6.5 percent of GDP. Higher public outlays boosted economic growth to around 8 percent and poverty declined from about 50 percent in 1970 to 37 by 1980. In particular, the reduction in poverty can be attributed to a rapid growth and employment as well as the emphasis on agriculture and rural development, the two sectors which had the highest concentration of poverty. Also, widespread access to free public education contributed to the reduction of poverty and income disparities.



2. **In the early 1980s, the growth model became unsustainable, culminating in the sharp recession of 1985** (Figure 1). While the economy continued to grow at an average of 7 percent during 1980-84, this was mainly driven by countercyclical fiscal policies aimed to offset the impact of the global recession. Large scale development programs such as launching a state-owned heavy industry sector resulted in the fiscal deficit skyrocketing to 17 percent of GDP by 1982. While the government initiated adjustment measures such as expenditure cuts starting from 1983, this

adjustment process was interrupted in 1985 as the downturn in external demand and a fall in the prices of Malaysia's major primary export commodities, led to a sharp recession. The economy contracted by 1 percent and unemployment reached the historic high of 7.5 percent. By 1985, government debt had doubled, reaching 83 percent of GDP. The inefficient allocation of investment resources via nonfinancial public enterprises resulted in SOEs accounting for about 25 percent of GDP by 1985—one of the highest shares among non-socialist countries—and displacing private investment. Strict regulations on licensing requirements and constraints on equity ownership also hampered private investment.

## FISCAL POLICY REFORMS: MACROECONOMIC STABILIZATION AND REDUCING THE SIZE OF THE PUBLIC SECTOR

### A. Overview

**Table 1. Malaysia: Major Fiscal Reforms**

Reform Area	Year /1	Reform Steps
1. Fiscal Consolidation	1987-1990	Expenditure-led consolidation led to a decline in overall fiscal deficit from <b>10.5 percent</b> of GDP in 1986 to <b>2.9 percent</b> in 1990.
2. Expenditure Reform		Total expenditure cuts of 9 percentage points of GDP.
Wage Bill	1987-90	Public employment freeze and deferral of civil service salary adjustment.
Public Investment	1987-88	Reduce the level and change the composition of public investment.
3. Tax Reform		
Sales Tax	1986-90	Broadening of the sales tax; tightening of tax exemptions.
Excess Profit Tax	1988	Abolished excess profit tax
CIT	1989	Reduction in the corporate tax rate from 40 to 35 percent.
Development Tax	1990-94	Phase out development tax.
Trade Taxes	1986-90	Reduction in import duties.
4. SOE Reform	1986-90	Rehabilitation and privatization of public enterprises.
5. Labor Market		Decrease in fringe benefits; phasing out of accelerated depreciation; and a smoother and faster arbitration process.

Source: IMF Malaysia Staff Report (1989), Narayanan (1996), and Somogyi (1991).

1/ Most of structural reforms mentioned in the table were introduced in the Fifth Malaysia Plan (1986-1990)

3. **In response to the recession, the authorities launched far-reaching structural reforms** (Table 1). Under the government's Fifth Malaysia Plan covering the period 1986–90, the authorities initiated a comprehensive reform program seeking to achieve macroeconomic stability and revitalize the private sector.<sup>1</sup> Key fiscal reform initiatives included the resumption of the expenditure-based

<sup>1</sup> While Malaysia has undergone multiple reform periods in the past three decades, the selected period reflects the application of the selection criteria discussed in the methodological annex. The selection is based on a set of quantitative and qualitative indicators which identify significant and long-lasting fiscal reform episodes.

fiscal consolidation, a shift in spending towards infrastructure projects to enhance private sector development, provision of tax incentives to investors, and lowering tariffs. Reforms also included the rehabilitation and privatization of public enterprises with the objective of downsizing of public sector participation in the economy.

4. **The fiscal strategy primarily aimed at reducing government expenditure while increasing its efficiency and targeting.** The expenditure-based adjustment strategy served the ultimate objective of strengthening the delivery of key public services and infrastructure to foster a private sector-led recovery. Spending reforms included a freeze on public employment, a deferral of wage adjustments in the public sector, and the rationalization of non-essential capital expenditure. Total government expenditure fell by 9 percentage points between 1986 and 1990, of which 7 percentage points were in current expenditure. These reforms were complemented with institutional reforms aimed at improving strategic prioritization, including the establishment of a budget dialogue with economic stakeholders, and greater devolution of decision-making to line agencies. The objectives of alleviating poverty and fostering education were maintained despite the ongoing expenditure squeeze, and government spending on health and education continued to support the rural poor.

5. **Tax reforms also sought to lower the tax burden and incentivize private investment.** The excess profit tax was abolished and the corporate income tax rate was reduced to a level comparable to that of other South East Asian countries. Tax cuts were coupled with liberal tax incentives for investment. The Promotion of Investment Act of 1986 provided added tax incentives such as tax holidays and targeted allowances. Also, import duties on manufacturing sectors that had enjoyed extensive tariff protection over the previous ten years were dismantled. Potential revenue losses were to be partially offset by closing tax loopholes, improving revenue administration, and widening of the sales tax base.

6. **A wide-spread privatization program and economic liberalization rounded off the reform package.** As the budgetary burden of the SOEs had become unsustainable, the authorities launched a reform package encompassing measures to restructure or liquidate SOEs. Privatization receipts were earmarked to pay down public debt. In addition, deregulation policies formulated in the Investment Act and Industrial Coordination Act of 1986 aimed at liberalizing the regulatory framework and relaxing foreign ownership requirements, with the objective of improving the business environment and attracting foreign direct investments.

7. **The government also introduced a series of measures to address high unemployment.** Job creation had been impeded by rigidities in the labor market such as cumbersome wage-setting and arbitration systems, high retrenchment costs, and biases in the tax system in favor of capital-intensive production. In response, the government revised the labor legislation to lower fringe benefits and to ensure faster and smoother arbitration processes. In addition, accelerated depreciation was phased out in order to remove one of the biases in favor of capital-intensive production.

## B. Notable Design Features

8. **The reform strategy aimed at a significant shift in moving from a state-led to a more private sector driven model of growth.** With the state's ubiquitous presence in the economy, the Malaysian authorities considered reducing the state's direct involvement as a top priority. Fiscal reforms aimed at reducing the government's share in GDP and raising the efficiency of spending while consolidating public finances. Revisions in the tax system aimed at providing investment incentives by further lowering tariff protection of the domestic manufacturing, a reduction in direct taxes while broadening the sales tax base.

9. **Fiscal reforms were complemented with comprehensive structural reforms.** To further stimulate private sector growth, authorities introduced a wide range of industrial deregulation measures to remove barriers to entrepreneurship and to create a level playing field, such as by relaxing industrial licensing and ownership rules for foreign direct investments.

## C. Outcomes

10. **The reform package, coupled with prudent macroeconomic policies, put the Malaysian economy on a rapid growth trajectory** (Table 3). Up until the onset of the Asian Crisis in 1997, the Malaysian economy enjoyed high growth, supported by high levels of investment. In particular, private investment surged from 14 percent in 1986 to 32 percent of GDP in 1997, and growth averaged around 8 percent over the same period. Real per capita income nearly doubled. Unemployment declined by 5 percentage points from its 1986 level, to below 3 percent in 1997 and poverty declined from 19 percent in 1986 to 6 percent by 1997.<sup>2</sup>

11. **The overall fiscal balance and public debt dynamics improved significantly.** Restoring fiscal sustainability was one of the central elements of the reform program. Government expenditure declined by 8.6 percent of GDP between 1986 and 1990. As a result, the authorities managed to eliminate the overall budget deficit of 10.5 percent of GDP in 1986 and maintain small budget surpluses and deficits during the 1990s. Expenditure was focused on priority areas such as infrastructure investments as well as health and education spending, whose level as a share of GDP was kept relatively unchanged despite the ongoing expenditure consolidation. Cuts in spending were also important in facilitating tax incentives such as reductions in direct taxes and import duties which were only partially offset by a tightening of exemptions and the broadening of the sales tax base. Overall, revenues followed a downward trend reaching 23 percent of GDP in 1997 from 27 percent of GDP in the first half of the 80s.

12. **The overhaul of the SOE sector combined with economic liberalization led to significant efficiency gains and a surge in FDI inflows.** A large number of public enterprises underwent substantial restructuring, which together with extensive privatizations greatly improved

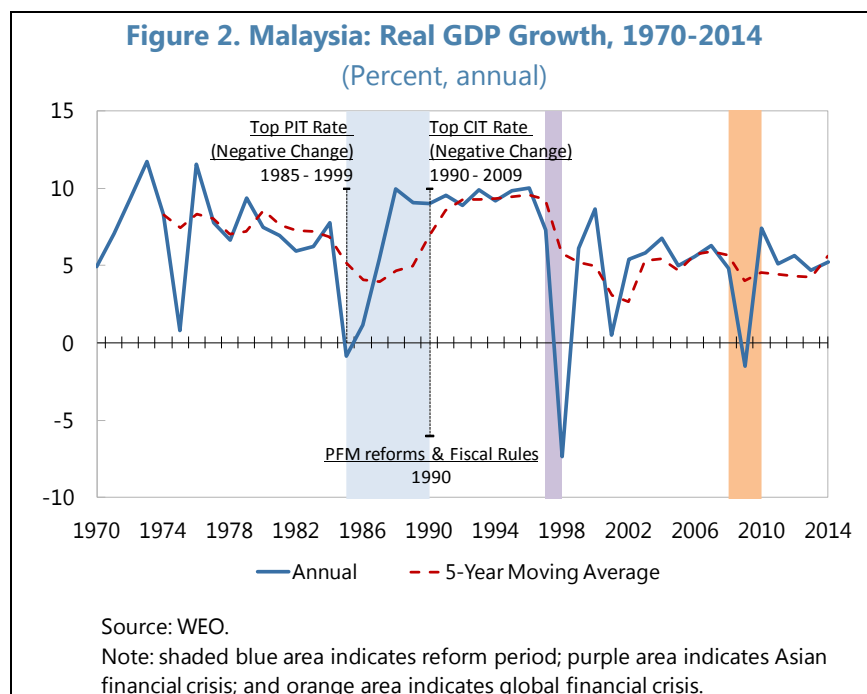
<sup>2</sup> The official poverty rate is defined as the share of population below the poverty line.

the efficiency of SOEs and helped lower the administrative and financial burden on the central government. By 1994, some of the largest corporations had been privatized in sectors such as transportation, telecommunications, electricity and steel. Deregulation and tax incentives were also successful in attracting foreign direct investment, which increased from an annual flow of 4 percent of GDP in the first half of the 1980s, to an annual average of 6 percent during the decade following the reform period.

13. **The surge in private investment supported job creation, contributing to a significant decline in unemployment.** After initially persisting despite the quick turnaround in growth, unemployment declined sharply as private investment picked up and production expanded in the labor-intensive export oriented manufacturing sector. The unemployment rate dropped from 7 percent in 1986 to below 3 percent by 1997. In addition to FDI inflows, various labor market measures played an important role. These included lowering fringe benefits, ensuring faster arbitration processes, and phasing out accelerated depreciation to support the shift to labor intensive production.

## IMPACT ON LONG-TERM GROWTH

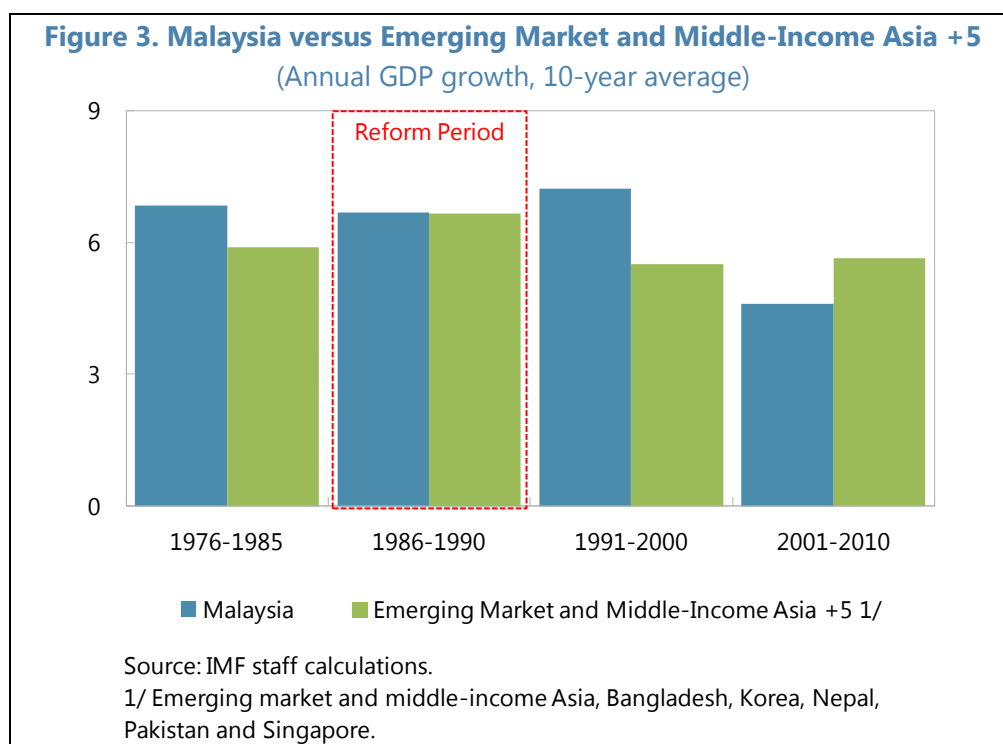
### A. Long-Term Growth Dissected



14. **Malaysia's growth performance improved throughout the 1990s, only to be disrupted by the Asian financial crisis.** As shown in Figure 2, trend output growth exhibited a turnaround at the end of the 1980s, after following a declining path in the previous decade. Higher growth was sustained throughout the 1990s, and remained strong until the wake of the Asian financial crisis.

However, in order to establish whether growth was indeed higher than it would have been in absence of fiscal reforms, we need to put Malaysia's growth performance into perspective.

15. **A comparison with emerging market peers indicates that Malaysia's long-term growth performance was higher than it would have been in absence of comprehensive reforms** (Figure 3). Comparing growth in Malaysia across time, average growth in the 7 years following the reform period and preceding the Asian Crisis (1991–97) was 3 percentage points higher than average growth in the decade prior to the reform period (1975–85). Compared with its peers, average growth in the 10 years following the reform period (1991–2000) was about 1.6 percentage points higher than the average growth in emerging Asia.<sup>3</sup> This trend reverses in the following decade, however.



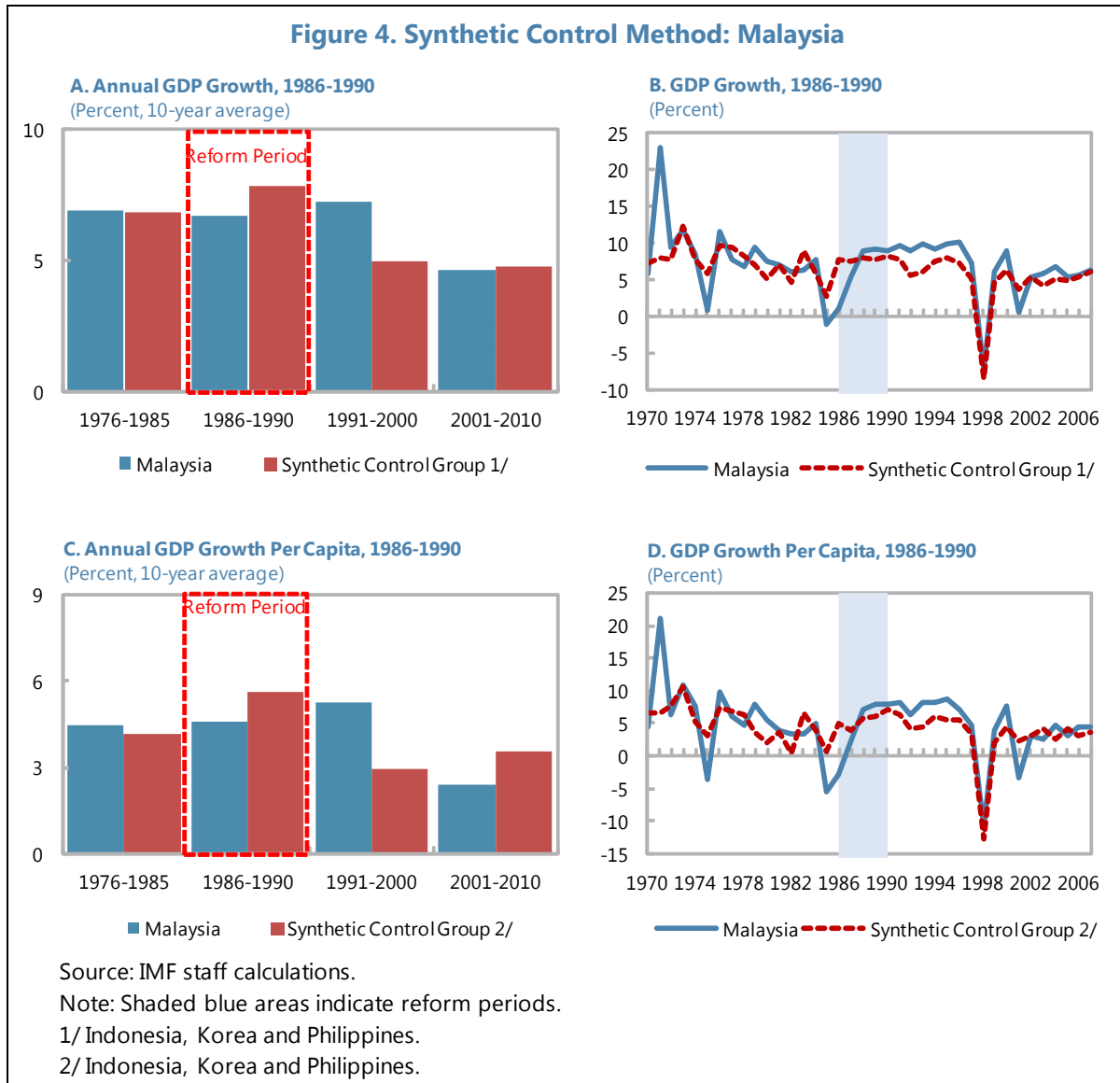
16. **This result is supported by a comparison of growth in the post-reform period with a counterfactual growth series, based on a synthetic control group.**<sup>4</sup> In order to evaluate whether Malaysia's growth rate indeed picked up after the reforms were initiated, we create a counterfactual growth series for a hypothetical Malaysia, on the basis of a synthetic control group and common growth predictors. Our results show that average growth during the 10-year period following the reform period was about 2.3 percentage points higher than average growth generated by the

<sup>3</sup> If we use a crude control for the 1998 Asian Crisis, and restrict the comparator group to include only countries experiencing negative growth in 1998 (Indonesia, Korea, Philippines, Singapore, and Thailand), Malaysia outperforms its peers by 1.8 percentage points.

<sup>4</sup> See methodological annex for a detailed description of the synthetic control method (SCM).



control group (Figure 4 and Table 2). Growth in the following decade (2001–10) appears to be broadly similar to Malaysia’s synthetic counterpart. Repeating the same exercise with per capita GDP growth renders a similar result for the post-reform decade, with Malaysia growing by 2.3 percentage points faster on average than its synthetic counterpart. However, the results reverse during the following decade.



**Table 2. Malaysia: Economic Growth Predictor Means before Fiscal Reform**

Variable	Reform Period 1986 1/	
	Real	Synthetic
<b>GDP Growth</b>		
GDP Growth (Percent)	4.2	6.4
GDP Per Capita (2005 I\$/Person)	3635.4	2654.1
Trade Openness (Percent)	86.9	41.2
Terms of Trade (Percent)	104.7	95.7
Inflation Rate (Percent)	5.5	14.8
Human Capital Index	2.0	2.0
<b>GDP Growth Per Capita</b>		
GDP Growth Per Capita (Percent)	1.7	4.7
GDP Per Capita (2005 I\$/Person)	3635.4	2235.1
Trade Openness (Percent)	86.9	44.8
Terms of Trade (Percent)	104.7	98.5
Inflation Rate (Percent)	5.5	14.9
Human Capital Index	2.0	1.9

Source: IMF staff calculations.

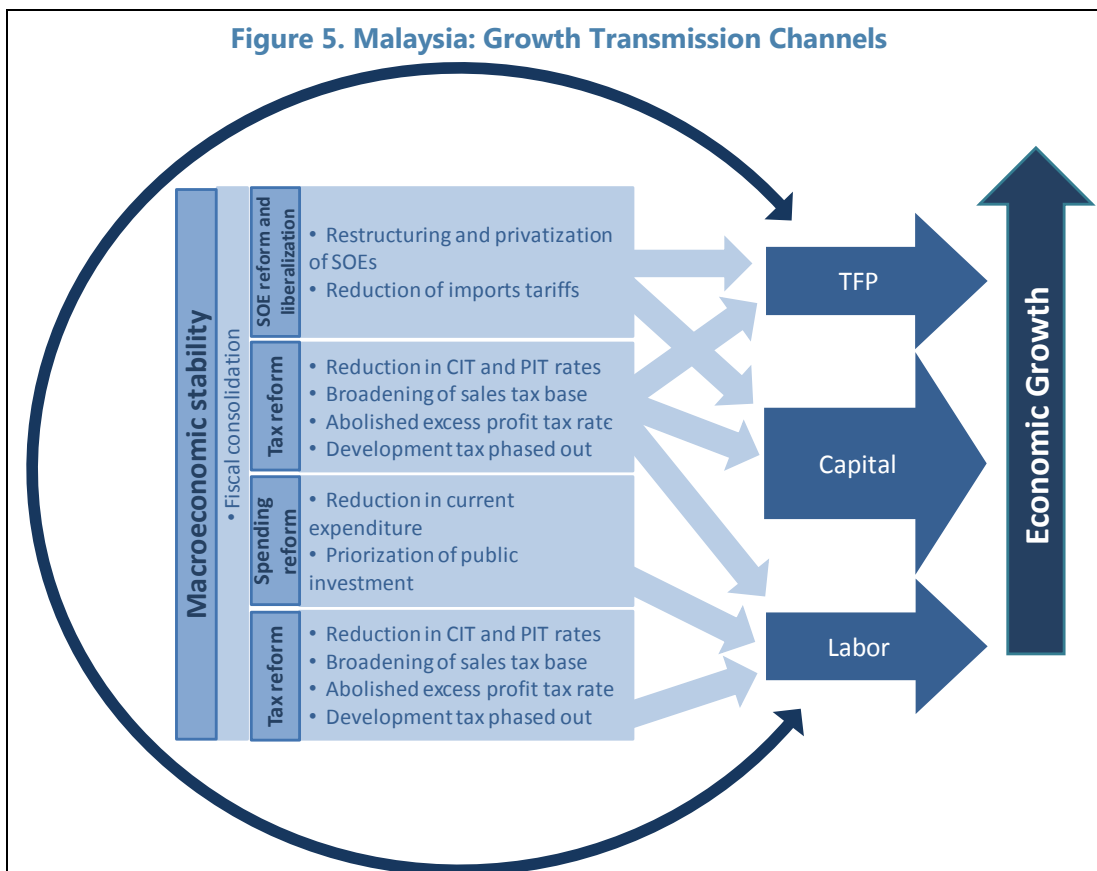
1/ All variables except GDP growth and GDP growth per capita are averaged for the 1970-1985 period. The average for GDP growth and GDP growth per capita is calculated using the years 1970, 1977 and 1985.

## B. Fiscal Reform: A Game Changer?

17. **Growth accounting shows that capital accumulation contributed primarily to the rebound in growth, with smaller contributions of labor and TFP** (Figure 6). The sharp pick up in private investment seem to have resulted in a fast accumulation of capital and improved efficiency of investment. These may be reflected in the large contribution of capital to growth. While the capital contribution shows a sustained increase until the Asian crisis of 1997, TFP's contribution rises sharply during the reform but quickly declines thereafter possibly reflecting diminishing gains in after a certain level of investment. The contribution of labor, mainly led by the expansion of labor intensive manufacturing, similar to capital, remains positive and rising.

18. **Potential transmission channels from fiscal policy to growth are identified in Figure 5.** Tax reform together with the prioritization of expenditure and structural reforms in the SOE sector enabled a shift from public to private investment, leading to an increase in capital accumulation and investment efficiency. Labor contribution to growth followed, as the improved domestic policy environment and the increase in FDI inflows to labor intensive manufacturing processes led to significant job creation.

19. **The significant pick-up in private investment may have been facilitated by policies to reduce the state’s role in the economy and support private sector-led growth.** Tax reform reduced the overall tax burden on the corporate sector and introduced new tax incentives for investments, hence contributing to an increase in private sector investment. SOE reform and privatization opened to competition many sectors that were previously monopolized by the government. As a result, efficiency and profitability of these companies increased.



20. **The substantial decline in unemployment was mostly a result of an improved private investment environment and favorable external sector developments.** The favorable domestic policy environment as well as low-cost and skilled labor force combined with relatively well-developed infrastructure, attracted significant foreign direct investment to Malaysia. Production shifted to labor intensive manufacturing. As a result, during the 90s the proportion of labor absorbed by the manufacturing sector increased by 9 percent annually. While labor market reforms improved the flexibility of the labor market, spending in education and health over the past three decades ensured a persistent significant contribution of labor to growth by improving human capital.

21. **Overall, there is indication that fiscal policy may have contributed to Malaysia's strong growth performance following the reform period.**<sup>5</sup> Fiscal reforms appear to have provided an impetus to the revival in private investment via putting a stop to ineffective public investment as well as providing incentives to investors. Other reforms such as deregulation in the industrial sector complemented fiscal efforts and resulted in an increase of foreign investment. This private investment driven growth absorbed a large part of the labor market resulting in a substantial decline in unemployment.

**Table 3. Malaysia: Selected Indicators**  
(Period Averages)

	Reform Episode						
	1976-80	1981-85	1986-90	1991-95	1996-2000	2001-05	2006-10
<b>Real Economy</b>	(Percent change, unless otherwise indicated)						
Real GDP	8.6	5.2	6.7	9.5	5.0	4.8	4.5
Contributions to Growth (Percent) 1/							
Capital	4.3	5.0	2.8	5.7	3.4	2.0	2.4
Labor	3.1	2.8	2.4	2.9	2.5	1.2	2.1
Total Factor Productivity	1.2	-2.7	1.5	0.9	-1.0	1.5	0.0
CPI Inflation (Average)	4.5	5.1	1.4	4.0	3.1	1.8	2.7
<b>Government</b>	(Percent of GDP, unless otherwise indicated)						
Total Revenue	23.6	26.8	24.4	24.7	20.6	21.4	21.0
Of Which Tax Revenue	20.2	21.2	17.1	18.9	16.4	16.1	14.4
Total Expenditure	29.8	38.0	31.4	25.4	22.7	26.3	25.8
Of which Current Expenditure	19.5	23.7	23.8	19.1	16.1	18.2	19.5
Of which Capital Expenditure	10.3	14.3	7.7	6.3	6.6	8.1	6.2
Fiscal Balance	-6.0	-10.8	-5.6	0.1	-1.5	-4.6	-4.6
Primary Balance	-3.1	-5.8	1.1	4.2	1.0	-2.2	-2.7
Health Expenditure	...	1.4	1.4	1.4	1.4	1.9	1.9
Education Expenditure	...	5.5	5.7	5.0	4.9	6.5	6.1
Gross Debt	46.7	69.9	93.3	56.4	35.2	43.4	44.5
3-Month Government Bond Rate (Percent)	3.9	4.9	4.3	6.1	5.2	2.6	2.9
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)						
Employment Ratio 2/	34.8	36.3	37.1	38.9	40.5	39.7	40.2
Unemployment Rate	...	4.5	6.4	3.6	3.0	3.6	3.4
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)						
Corporate Income Tax Top Rate (Percent)	40.0	40.0	38.0	33.2	28.8	27.4	26.2
Private Investment	16.2	17.3	16.8	26.3	20.7	10.7	11.7
Foreign Direct Investment	3.1	3.7	2.9	7.0	4.4	2.5	3.4
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)						
Market Gini Coefficient 3/	49.3	48.8	46.5	46.6	47.6	46.1	44.4
Net Gini Coefficient	45.7	45.2	42.5	43.3	44.4	41.2	41.4
Poverty Rate (Percent) 4/	37.6	20.7	18.0	10.6	7.3	5.9	3.7

Source: Haver Analytics, IFS, Penn World Table, SWIID 5.0, WEO, and WDI.

1/ Growth accounting estimates are calculated using Penn World Table 8.0.

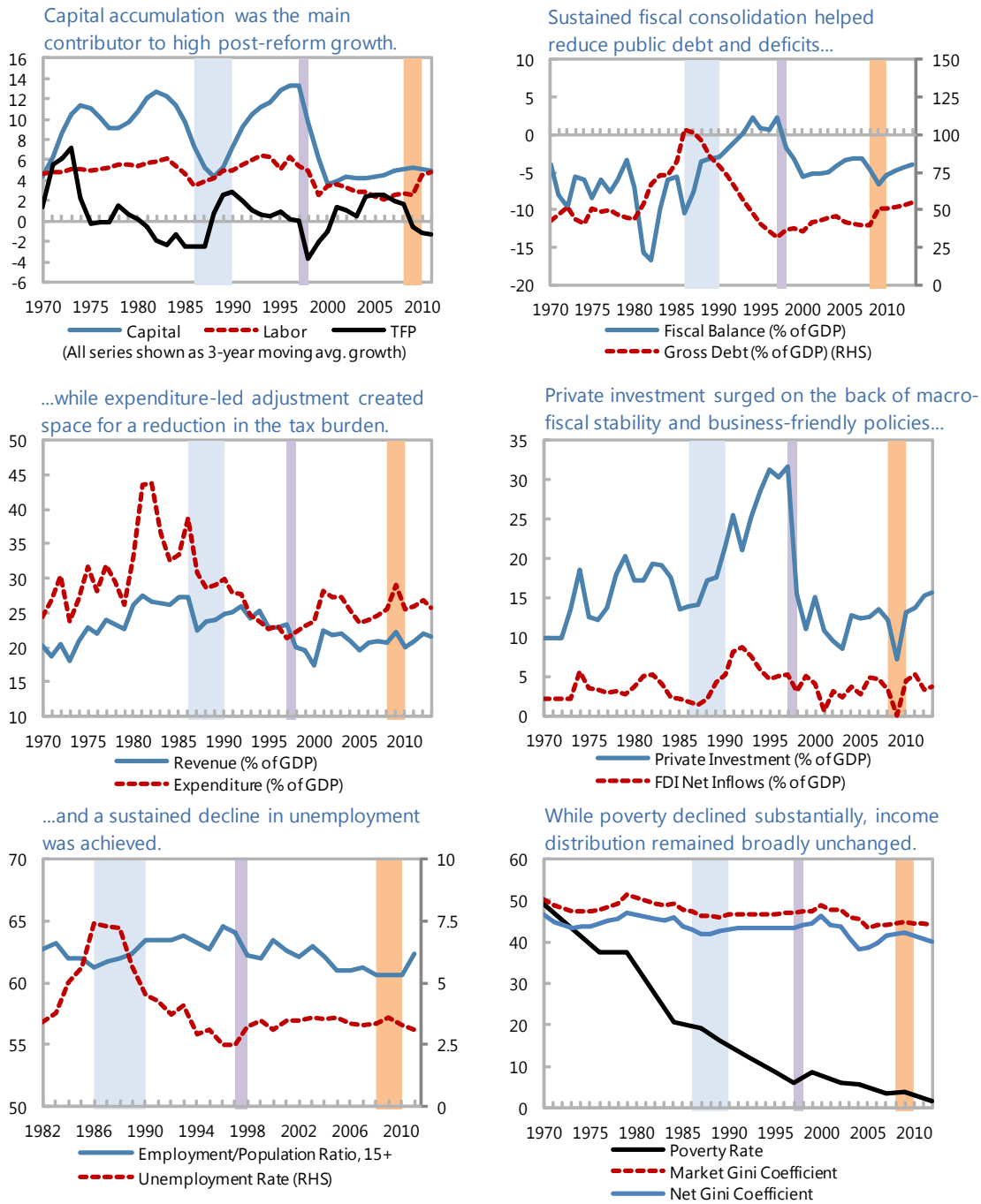
2/ Percent of the entire population that is employed.

3/ "Market" gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

4/ Percent of the population living below the nationally defined poverty line.

<sup>5</sup> Given the concurrence of other reforms such as industrial deregulation and liberalization of foreign investment, it is difficult to quantify the contribution of each reform on growth. This section describes the incentives that fiscal reforms created for a private investment-led growth. The overall positive growth impact can only be attributed to the reform package as a whole.

**Figure 6. Malaysia: Fiscal Policy and Growth, 1970-2012**



Source: Haver Analytics, IFS, Penn World Table, SWIID 5.0, WDI, and WEO.

Note: Shaded blue areas indicate reform period; purple areas indicate Asian financial crisis; and orange areas indicate global financial crisis.

## LESSONS

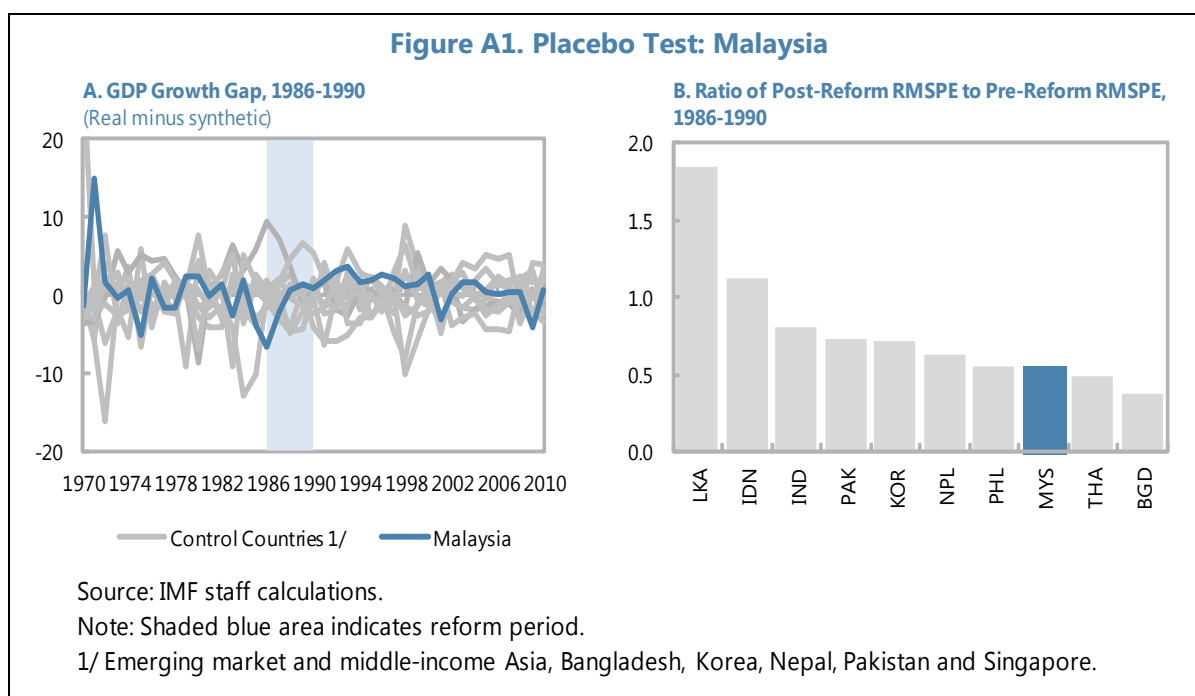
22. **High growth rates can disguise growing structural weaknesses therefore delaying adjustment and adding to the cost of reforms.** By only taking steps from 1983 onwards, the Malaysian authorities waited too long to address the weaknesses associated with its state-run economic model. Strong external and domestic demand, the latter largely supported by rapidly growing debt-financed public spending, helped mask the underlying vulnerabilities. However, the weak economy helped push through substantial policy reforms that implied a significant shift in the development strategy from a state-led to a more private sector driven growth model.
23. **Complementing fiscal reforms with structural reforms - in particular deregulation was key to achieving a reversal of the state-led growth model.** Downsizing of the government sector via the SOE reform as well as the tax reform created space and incentives for private investment growth. This was complemented with industrial policies such as relaxing administratively cumbersome regulations and ownership requirements, which ensured a very attractive environment for both domestic and foreign private investors.
24. **Safeguarding spending on basic public services such a health and education enabled that the full benefits of the rebound on growth were reflected in a reduction in poverty.** As broad-based productivity increases and sustained growth resulted in a steady decline in unemployment, this was fully reflected by more than a 15 percentage point decline in the incidence of poverty. Despite the expenditure led consolidation, expenditures on health and education, which have been crucial in targeting poverty, were maintained at a steady level of 1.5 and 5 percent of GDP respectively, above ASEAN neighbors.

## Appendix. Robustness Tests for Malaysia

To test the sensitivity of the baseline results for Malaysia, the following robustness tests, broadly in line with Abadie (2014) were performed: (i) placebo test; (ii) sequential exclusion of each comparator country from the synthetic series; and (iii) changes in the reform period.

### A. Placebo Tests

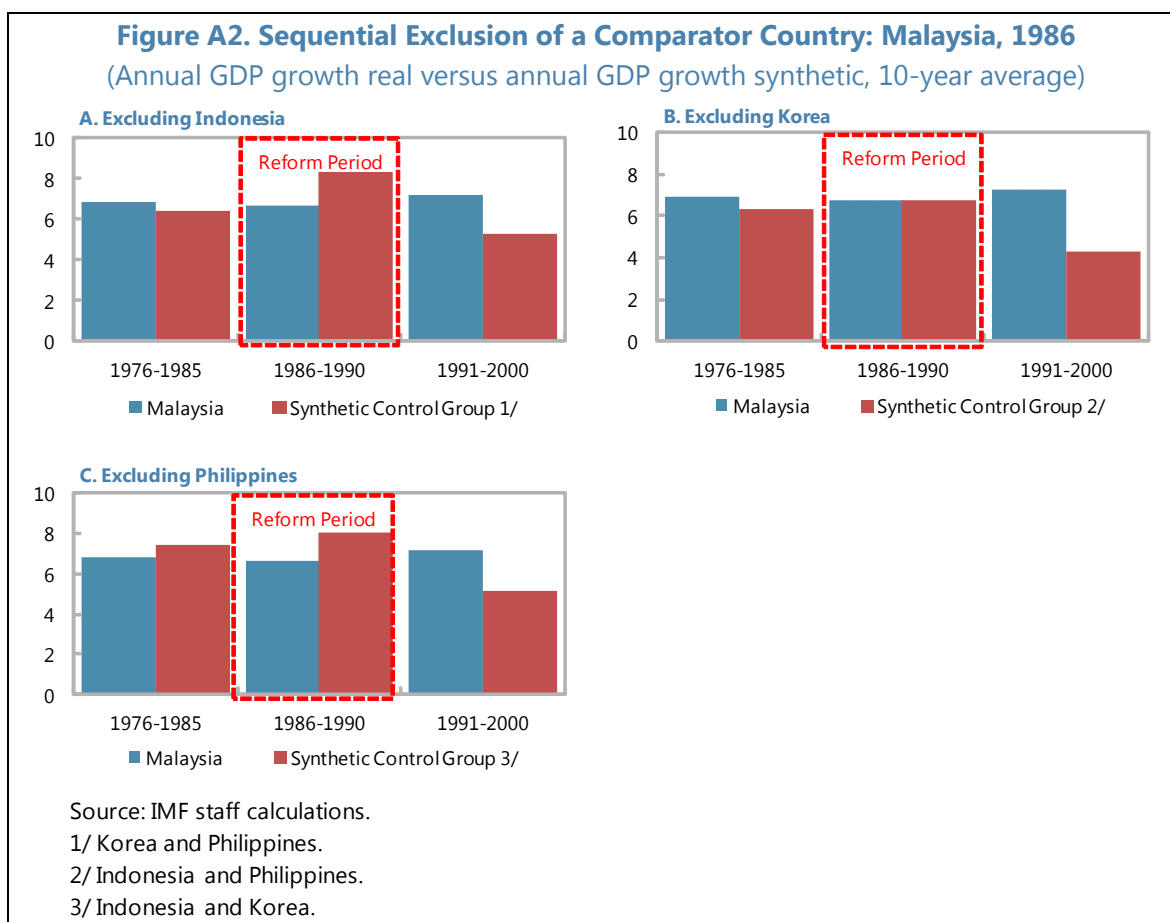
1. Each country in the group of the input group used was alternatively chosen as the tested country when in fact no fiscal reform took place in that country (Figure A1). If the estimated effect for Malaysia is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in Malaysia was not particularly higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of either the size of growth gaps or ratios of post-reform and pre-reform RMSPEs. Thus the tests cannot rule out the possibility that the growth estimate in the baseline could be due to factors other than the fiscal reform. Results of this placebo test should be interpreted cautiously, however, because pre-reform match was poor in application to some comparator countries.



### B. Sequential Exclusion of a Comparator Country

2. The sensitivity of the baseline results was tested by sequentially excluding each of the countries that contributed to the synthetic control group that received a positive weight and

**re-estimating the model** (Figure A2). This implied the sequential exclusion of the following countries: Indonesia, Korea and The Philippines. The post-reform growth gap is higher than the pre-reform growth gap in all cases, confirming the baseline.

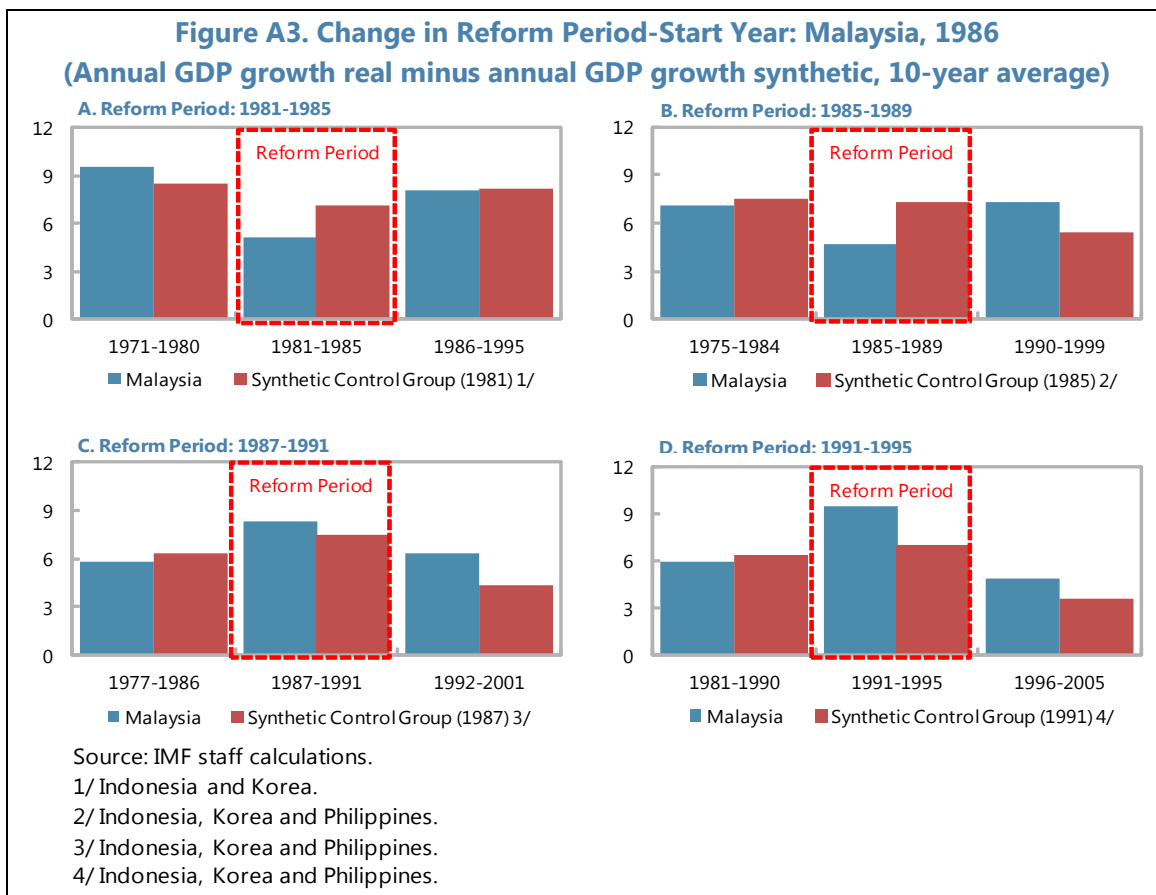


## C. Changes in the Reform Timing

### Changes in the start year of reform

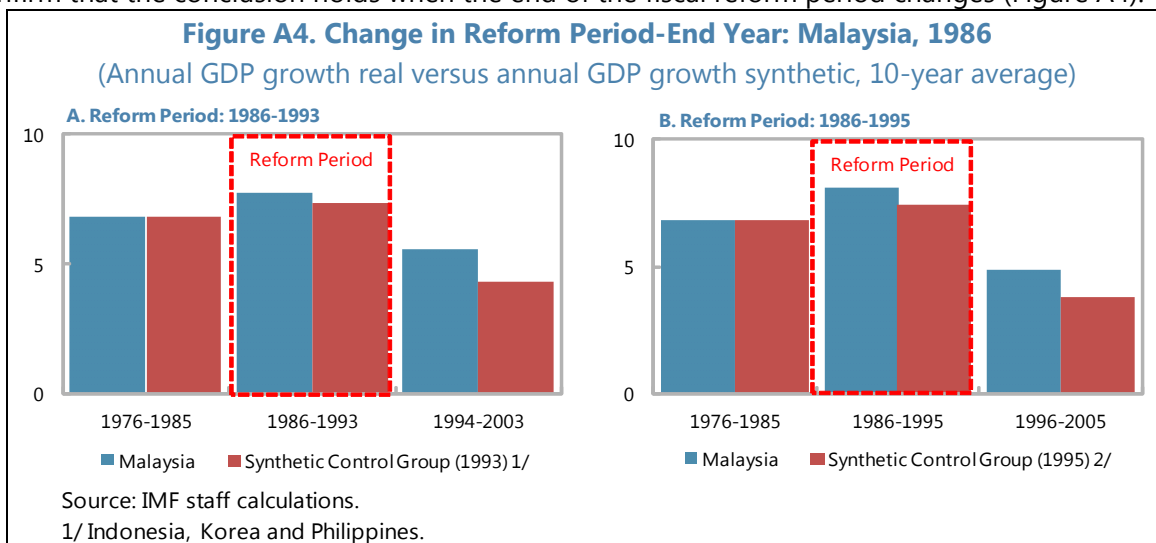
3. **The synthetic series was re-estimated for the years 1981, 1985, 1987 and 1991** (Figure A3). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (1985 and 1987), but setting the start of reform in 1981 results in disappearance of the growth effects. These results confirm that the fiscal reform is the likely reason for the positive growth effect in the baseline.





### Changes in the end year of reform

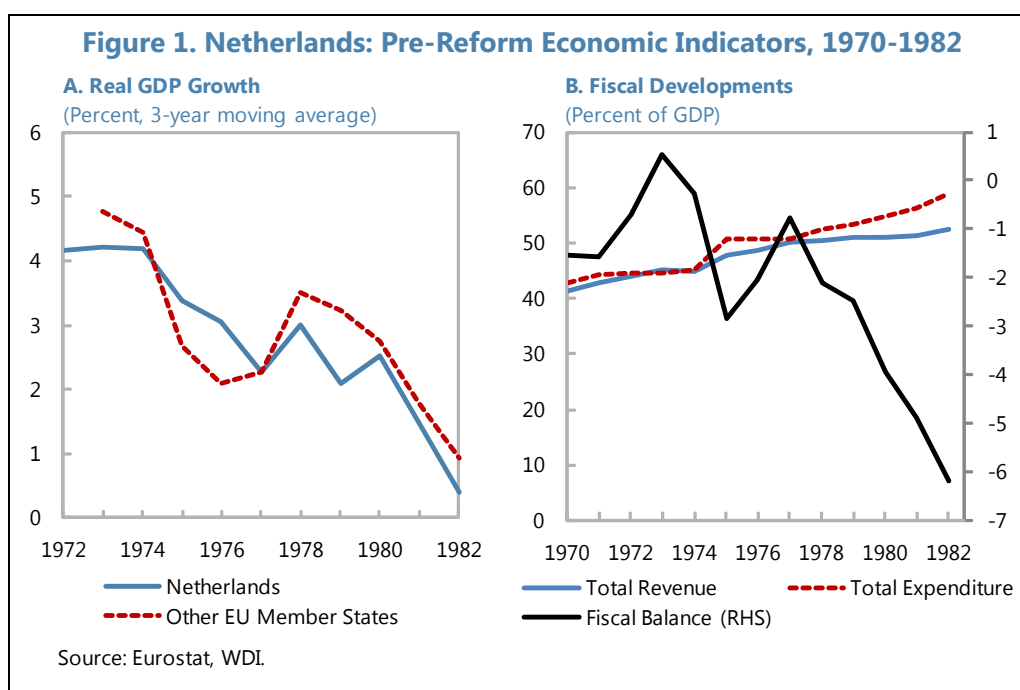
4. **The difference in average growth rates was recalculated by setting the end of the fiscal reform period to 1993 and 1995, respectively.** The purpose of this exercise is to examine whether our conclusion is sensitive to the timing of the end of the reform, given its uncertainty. Results confirm that the conclusion holds when the end of the fiscal reform period changes (Figure A4).



# NETHERLANDS: FISCAL POLICY AND LONG-TERM GROWTH

## A. Background

1. **Up to the early 1980s, the Netherlands' growth performance deteriorated steadily.** In the decade leading up to the 1981-82 recession GDP growth rates fell increasingly below those of other European countries, with wage developments at the core of the weak performance (Figure 1). Due to price-indexation, wages continued to grow rapidly despite a number of external shocks in the 1970s, eventually reducing corporate profitability to near zero. As a result, private investment and job creation stagnated. The decline in employment intensified after the collapse in housing prices in 1978, and—after initially being buffered by low and declining participation rates—unemployment reached a high of 12 percent in 1982.



2. **Concurrently, the fiscal position deteriorated on the back of high public expenditure, particularly on social transfers.** Initially, an increase in public expenditure was financed by higher tax receipts and a rapid increase in natural gas revenues on the back of higher energy prices. However, increases in spending, including on a ballooning number of welfare recipients, exceeded the amount of new resources. The economic slow-down after 1978 exacerbated the fiscal imbalance, resulting in significant deficit overruns and an overall deficit of 6 percent of GDP by 1982.

## FISCAL POLICY REFORMS: EXPENDITURE-BASED CONSOLIDATION AND LABOR MARKET REFORMS

### A. Overview

3. **In late 1982, the depth of the crisis motivated comprehensive reforms to address fundamental macroeconomic and structural weaknesses.** As the economy was mired in a deep recession, a new government came into power. In consultation with social partners, the authorities devised a comprehensive reform package that was to bring about a fundamental shift in policies. With macroeconomic stabilization and reduced state intervention as key objectives, the reform agenda included an expenditure-based fiscal consolidation, tax reductions, and labor market reforms (Table 1).<sup>1</sup>

**Table 1. Netherlands: Major Fiscal Reforms**

Reform Areas	Year	Reform Steps
1. Fiscal Consolidation	1982-	Expenditure-based fiscal consolidation led to overall fiscal deficit of 6 percent of GDP in 1982 to 2 percent of GDP surplus in 2000.
2. Tax Reform		
Social Contributions		Cut in employer social security contributions, in particular for low-skilled workers and long-term unemployed.
PIT	1990-	Cut from 72 to 60 percent in 1990 and to 52 percent in 2001.
CIT	1985-	Cut from 50 to 42 percent between 1982 and 1986 and to 32 percent in 2005.
3. Spending Reform		
Wage Bill	1983-	Reduced from 13.6 percent of GDP in 1982 to 9.5 percent in 2000.
Entitlements	1984-	Reduction in unemployment and disability benefit replacement rates in real terms; tightened access criteria.
4. Labor Market Reform		
Wage Bargaining	1982-	Wage bargaining was decentralized, consensus around wage moderation.
Minimum Wages	1984-	Frozen in nominal terms for most of the 1980s, decreased in real terms.
Wage Indexation	1982-	Automatic price indexation virtually disappeared by mid-1980s.
5. Fiscal Institutions	1983-	Overall balance rule in 1983, amended to expenditure rule in 1994.

Source: IMF staff reports, Watson and others (1999).

4. **At the heart of the reform effort, an expenditure-based fiscal consolidation aimed at securing macroeconomic stability.** A significant fiscal consolidation was aimed to be achieved largely on the basis of expenditure reductions—in particular, through rolling back some of the excessive and unsustainable increases of the 1970s. Spending cuts reached approximately 2.5 percent of GDP between 1983 and 1986. At the same time, the consolidation was targeted to be gradual and at a constant pace, anchored by a fiscal rule.

<sup>1</sup> We chose the reform period to cover 1983-86 (despite continued and repeated reform efforts in subsequent years) in light of the fact that a set of key reforms were initiated during these years, which marked a complete departure from previous policies.

5. **Spending reforms primarily focused on a permanent reduction in social transfers and the civil service wage bill.** Specifically, expenditures—that had reached around 60 percent of GDP—were reduced by implementing three main reform steps: social transfers to households were reduced by cutting benefit levels, including the reduction of unemployment and disability benefit replacement rates; the civil service wage bill was curtailed through wage moderation and some employment reductions; and on-lending and capital transfers were sharply reduced and partially replaced by an accelerated depreciation system.

6. **In turn, expenditure retrenchment created the fiscal space to lower the tax burden on labor and capital.** Personal income taxes and social security contributions were cut substantially, the latter in particular for low-skilled workers and the long-term unemployed. As a result, the average tax wedge decreased by about 5 percentage points between the early 1980s and the early 1990s. Also, the top CIT rate was cut from about 50 percent in 1982 to 42 percent in 1986, and reduced further subsequently.

7. **Lending further credence to the reform effort, fiscal adjustment was anchored by a fiscal rule.** In 1983, a numerical deficit target was introduced to guide and enforce fiscal consolidation efforts. Specifically, the new fiscal framework was based on a time-path approach for reducing the deficit: regardless of the economic cycle, the budget deficit was to be reduced by 1 percent of GDP per year, while taxes and social security contributions were to remain unchanged and kept at a minimum.

8. **Finally, labor market reform and social consensus-building on wage moderation rounded off the fundamental shift in policies.** In 1982, a watershed agreement (“Wassenaar Agreement”) between labor unions and employers set the tone to reverse the previous trend of rapid wage growth. For unions in particular, acceptance of the need for wage moderation represented a fundamental shift in attitudes. On the other side of the bargain, the agreement was supported by a number of measures to compensate for lower wages (such as tax reductions) and to boost employment. Additional measures to secure a reduction in wage costs included a substantial reduction in the minimum wage, especially for youth, and the suspension of automatic wage-indexation.

## B. Notable Design Features

9. **Fiscal reforms were part of a well coordinated and complementary policy package.** The entire reform package was very deliberately designed to ensure maximum effectiveness. In particular, key policies were coordinated and designed to reinforce each other. For example, the low employment rate was tackled from many different angles, targeting sluggish job creation as well as low participation, and policies to boost employment—such as tax cuts—were entirely consistent with the fiscal consolidation strategy.

10. **Also, continued consultations, notably with labor unions, enhanced ownership across social groups and greatly supported the credibility and sustainability of the reforms.** The buy-in of the labor unions boosted the credibility of the reforms, and represented a major shift from past

labor relations. While initial reductions in the minimum wage and social benefits encountered heavy resistance given their disproportionate impact on low-income groups, the promise of future gains in terms of job creation and income also helped to sustain the reform momentum.

### C. Outcomes

11. **After the introduction of the reform package, economic growth recovered quite rapidly, and remained fairly strong through the 1980s and 1990s.** Growth turned around relatively rapidly and in a sustained fashion following the initiation of the reforms. Real GDP growth recovered from an average of about 1 percent during the 5 years preceding the reforms (1978-82), to 2½ percent during the reform period (1983-86), and continued to exceed 2½ percent, on average, throughout the 1980s and 1990s (Table 3). Also, the economy apparently became more resilient to external shocks, and suffered comparatively less from the global slow-downs in 1992-93 and 1995, for example. In the same vein, inflation moderated substantially from the high levels of the 1970s.
12. **While uneven at times, fiscal consolidation progressed throughout the 1980s and 1990s, as the size of the government was reduced.** The overall fiscal balance moved from a deficit of 6 percent of GDP in 1982 to a surplus of 2 percent of GDP in 2000—with only small, temporary interruptions, such as the collapse of natural gas revenues in 1986. During the same period, total expenditure was reduced from 59 percent to 44 percent of GDP, largely on the basis of current spending cuts; and total revenue decreased from 53 percent to 46 percent of GDP, driven by the substantial decrease in PIT, CIT and social security contributions.
13. **After the initiation of labor market reforms, private sector employment grew significantly, with a high incidence of part-time jobs.** Job growth was exclusively due to job creation in the private sector, heavily concentrated in part-time employment, while government employment decreased. At the same time, labor force participation increased, driven principally by higher female labor participation, and the workforce was boosted further by demographic developments. As a result, the employment rate grew significantly—from around 45 percent in 1982, to around 60 percent by 2000.<sup>2</sup>
14. **The overall fiscal deficit rule, while helpful in anchoring fiscal consolidation, was found to be too pro-cyclical, and was replaced by an expenditure target in 1994.** Success in implementing the rule ex-post was uneven during the reform period, but it achieved an overall positive trend reduction in the deficit. However, it also forced pro-cyclical fiscal management, such as fiscal loosening during the boom of the late 1980s and fiscal tightening during the downturn of the early 1990s, for example. In 1994, the deficit target was changed to an expenditure-based target to enable a more strategic approach to expenditure management in 4-year fiscal frameworks.

<sup>2</sup> Given the high incidence of part-time employment, there is some debate on how to measure employment in full-time equivalents in order to provide meaningful cross-country comparisons. The employment rate quoted is used by the Dutch authorities and the OECD and includes jobs of at least 12 hours a week.

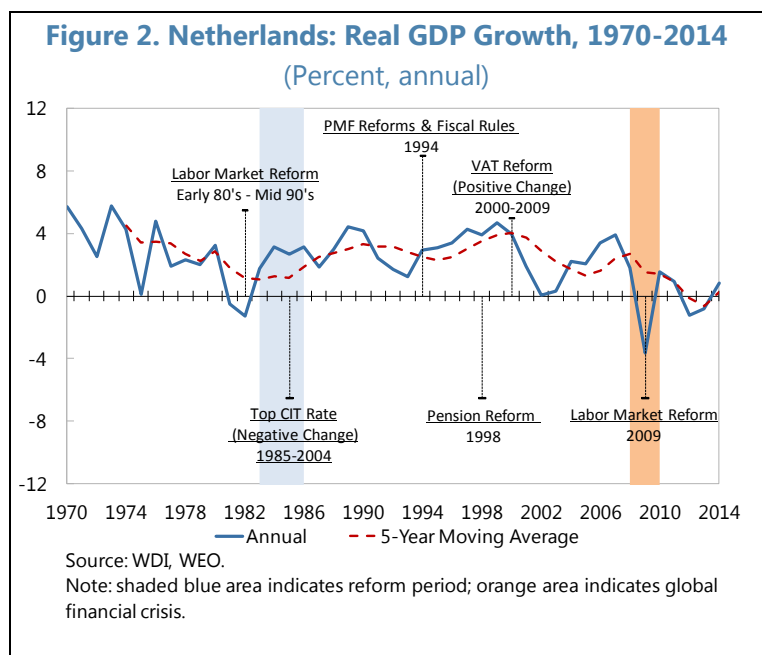
15. **As envisaged prior to implementation, key policies developed a mutually reinforcing, beneficial dynamic.** Reform of social benefits facilitated both fiscal consolidation and a reduction in participation taxes, which stimulated labor supply. Public sector wage moderation also supported general wage moderation, further underpinned by cuts in taxes, social contributions and real minimum wages, in particular for youth. Together with the agreement between labor unions and employers, the credible prospect of sustained wage moderation helped strengthen private investment and the demand for labor. Finally, buoyant employment and growth boosted the tax base, reinforcing the improvement in the fiscal position.

16. **The durability of the reforms was remarkable in light of their overall social impact.** The reform package disproportionately affected low-income groups, and not everyone shared the benefits of higher growth and employment. Employment by the low-skilled remained stagnant, and most long-term employed were not successful in returning to work. While there was a broad consensus amongst social partners on the need for wage moderation, certain policies, such as cuts in the real value of social benefits and minimum wages were met with strong opposition. Still, a higher acceptance of the overall reform package developed over time, as results on growth and employment were delivered to a large part of the population.

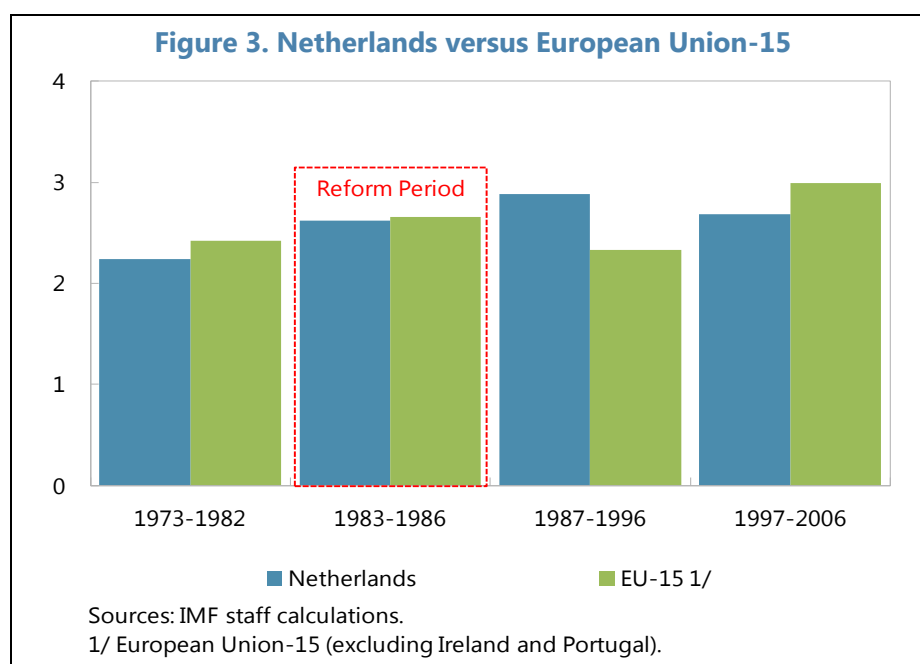
## IMPACT ON LONG-TERM GROWTH

### A. Long-Term Growth Dissected

17. **In order to draw any meaningful conclusions from the increase in growth during the mid-1980s and 1990s, this trend needs to be evaluated in light of appropriate comparators.** As shown below, trend output growth exhibited a turnaround in the early 1980s, after a decline during the previous decade (Figure 2). In addition, higher growth was sustained throughout the 1990s, before it weakened in 2001-02 amidst a global slow-down. However, in order to establish whether growth was indeed higher than it would have been in absence of fiscal reforms, we need to put the Netherlands' growth performance into perspective.



18. **Simple comparisons of growth post-reform with EU peers indicates that long-term growth does appear to have been slightly higher than suggested by this very rough control method.** To start, we compare long-term growth in the post-reform periods with the pre-reform periods and EU peers. Comparing across time, average growth in the 10 years following the reform period (1987-96) was 0.6 percentage points higher than average growth in the 10 years before the reform period (1973-82) (Figure 3). Compared with EU peers, specifically the 15 member countries at the time in question, average growth in the 10 years following the reform period (1987-96) was about  $\frac{1}{4}$  percentage points higher than the average growth in the EU-15. However, this trend reversed in the following decade; the Netherlands underperformed against its EU peers thereafter.



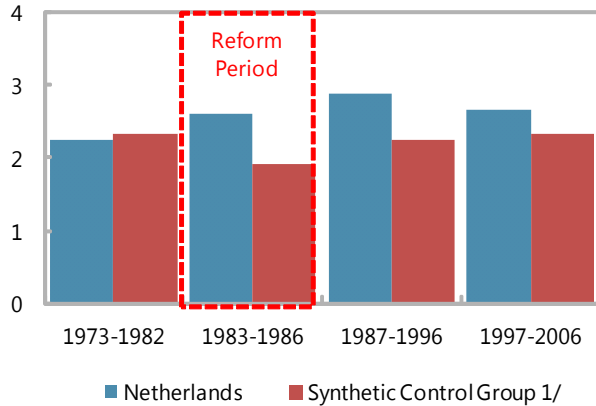
19. **This result is confirmed by comparing growth post-reform with a counterfactual growth series, created using the synthetic control method.**<sup>3</sup> In order to further evaluate whether the Netherlands' growth rate indeed picked up after the reforms were initiated, we create a counterfactual growth series for a hypothetical Netherlands, using a synthetic control group and common growth predictors. Our results show that average growth during the 10-year period following the reform period was about 0.15 percentage points higher than average growth generated by the "control group" (Figure 4 and Table 2). Again, this relative advantage seems to erode during the following decade (1997-2006). For robustness, we repeat the same exercise with per capita GDP growth, which also renders a small advantage of 0.15 percentage points, on average, to the actual Netherlands vs. its "synthetic" counterpart.<sup>4</sup>

<sup>3</sup> Please see the methodological annex for a detailed description of the synthetic control method (SCM).

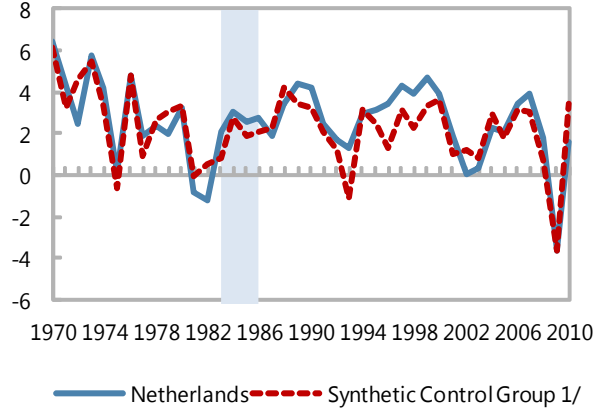
<sup>4</sup> To further test the sensitivity of our results to changes in the initial conditions in the synthetic method, we run a set of additional robustness checks. According to the findings, the results reported are robust to changes in the starting  
(continued)

**Figure 4. Synthetic Control Method: Netherlands**

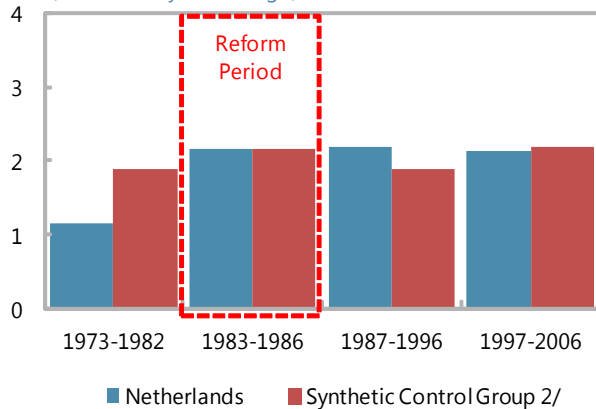
**A. Annual GDP Growth, 1983-1986**  
(Percent, 10-year average)



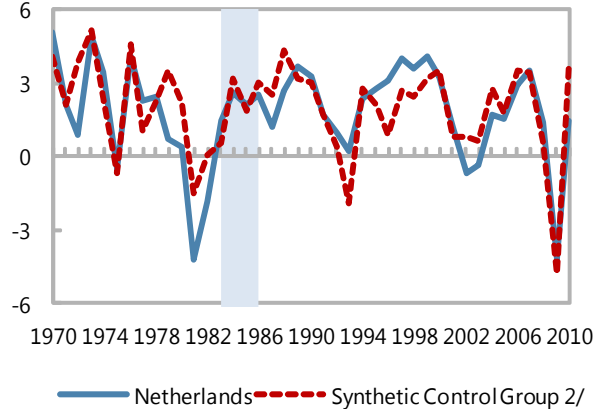
**B. GDP Growth, 1983-1986**  
(Percent)



**C. Annual GDP Growth Per Capita, 1983-1986**  
(Percent, 10-year average)



**D. GDP Growth Per Capita, 1983-1986**  
(Percent)



Source: IMF staff calculations.

Note: Shaded blue areas indicate reform periods.

1/ Belgium, Germany, Sweden and Austria.

2/ Belgium, Sweden, Germany and Luxembourg.

year of the reform, enlargement or reduction of the pre and post estimation sample period and to the exclusion of any particular country from the initial sample in the input group.



**Table 2. Netherlands: Economic Growth Predictor Means before fiscal Reform**

Variable	Reform Period 1983 1/	
	Real	Synthetic
<b>GDP Growth</b>		
GDP Growth (Percent)	3.3	3.8
GDP Per Capita (2005 I\$/Person)	22074.7	19453.6
Trade Openness (Percent)	59.8	66.3
Terms of Trade (Percent)	109.3	105.8
Inflation Rate (Percent)	6.4	7.1
Human Capital Index	2.7	2.5
<b>GDP Growth Per Capita</b>		
GDP Growth Per Capita (Percent)	2.4	2.9
GDP Per Capita (2005 I\$/Person)	22074.7	19894.6
Trade Openness (Percent)	59.8	59.9
Terms of Trade (Percent)	109.3	107.8
Inflation Rate (Percent)	6.4	7.0
Human Capital Index	2.7	2.4

Source: IMF staff calculations.

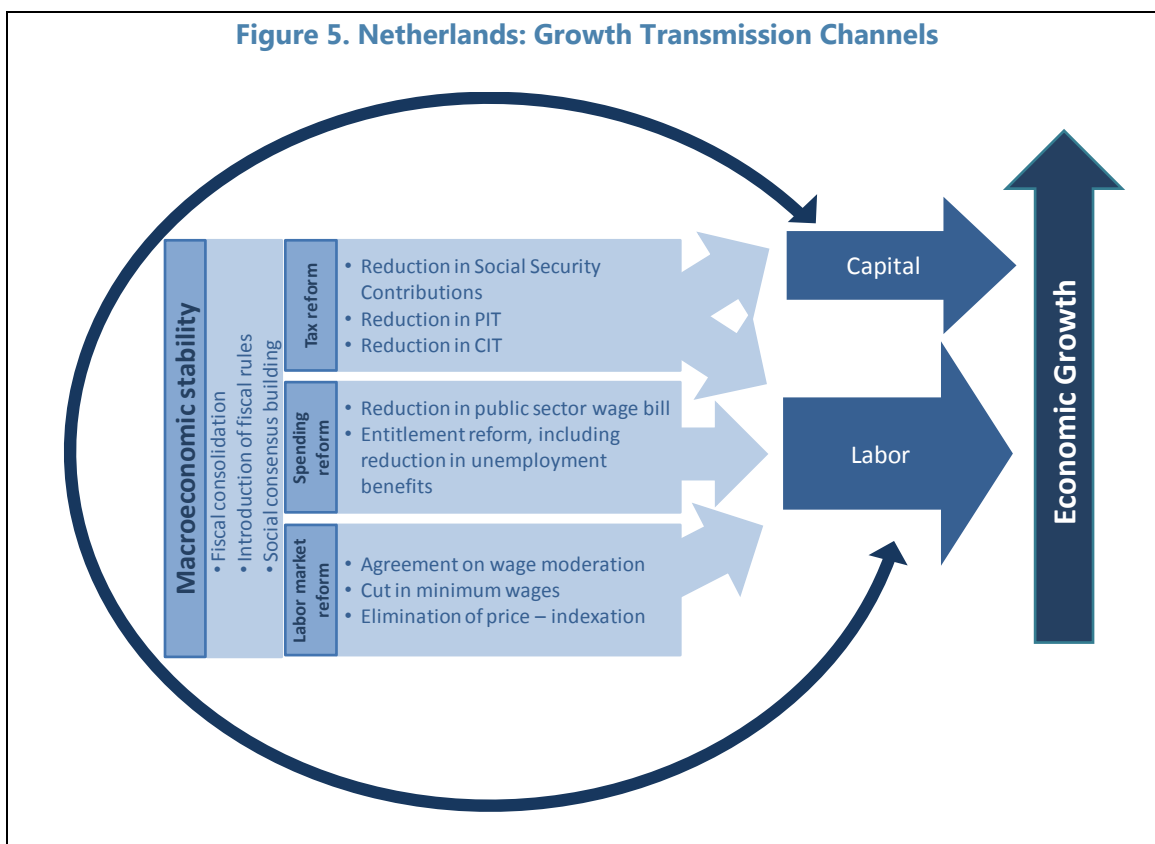
1/ All variables except GDP growth and GDP growth per capita are averaged for the 1970-1982 period. The average for GDP growth and GDP growth per capita is calculated using the years 1970, 1976 and 1982.

## B. Fiscal Reform: A Game Changer?

20. **Digging deeper into the factors underlying the increase in growth post-reform shows that mostly labor, and to some extent private investment, contributed.** Growth accounting shows that the labor share in growth increased significantly throughout the 1980s and 1990s. In other words, the surge in private sector employment represents the main driver of the sustained pickup in growth, turning around early in the reform period and continuing to be significant throughout the 1990s. At the same time, private investment also picked up after 1983. The overall contribution of capital accumulation to growth remained moderate however—perhaps due to an offsetting reduction in public capital spending.
21. **Figure 5 identifies potential transmission channels from fiscal policy to growth.**<sup>5</sup> While most expenditure and tax policy measures may have primarily affected the labor contribution to growth, a number of reform steps—and the broader environment that was created—were also

<sup>5</sup> The analysis in this section draws on the theoretical framework developed in the main paper (SM/15/XX).

conducive to capital accumulation. Specifically, the prospect of macroeconomic stability and policy stability formed a critical basis for strategic medium-term investments and the creation of new jobs.



22. **The significant increase in employment may have been affected by the comprehensive package of fiscal and structural reforms.** The policy package, which stimulated both the demand and supply of labor, included reductions in labor costs and taxes; benefit reform; structural labor market reform (notably sharp reductions in the minimum wage and suspension of price-indexation); and the tripartite nature of the Wassenaar agreement, which underscored the sustainability of the reform package, most notably wage moderation.<sup>6</sup>

23. **Private investment may have been equally boosted by greater macroeconomic stability and a return to profitability of the corporate sector.** The sustained fiscal consolidation backed by fiscal rules and largely implemented through entitlement reform enhanced fiscal

<sup>6</sup> A number of studies have shown the potentially positive impact on job creation of real wage reductions (Sachs 1979, Bruno and Sachs, 1985); reductions in non-wage labor costs (Cahuc and Zylberberg, 2004); and lower corporate taxes (IMF 2012a), while the impact of the latter on low-skilled labor tends to be weakest (Duffy and others, 2004)—a phenomenon also prevalent in the case of the Netherlands. Also, a reduction in social benefits (and personal income taxes) has been associated with an increase in labor supply (Alesina and others, 2005), with female participation decisions being the most sensitive (Causa, 2009)—again, in line with developments in the Netherlands. Moreover, the Netherlands introduced an affordable childcare policy which seems to have helped female labor participation.

sustainability, and underpinned macroeconomic stability more broadly, creating an environment much more conducive to long-term planning and investment. Also, the significant reduction in wage and non-wage labor costs (supported by all social partners), along with cuts in corporate taxation, helped the corporate sector return to profitability and opened the door to higher private investment through reinvested earnings.<sup>7</sup>

24. **Summing up, there is some indication that fiscal reforms may have contributed to the increase in long-term growth by facilitating strong employment growth and higher private investment** (Figure 6, Table 3). The fiscal reform package appears to have contributed to the creation of private sector jobs and an increase in participation rates, as well as enhanced macroeconomic stability. At the same time, other factors played an important role—including a demographic shift boosting the labor force, and not least the unique starting position of high real wages and very low participation rates in the early 1980s, enabling policy measures to “price” workers into jobs relatively easily.

## LESSONS

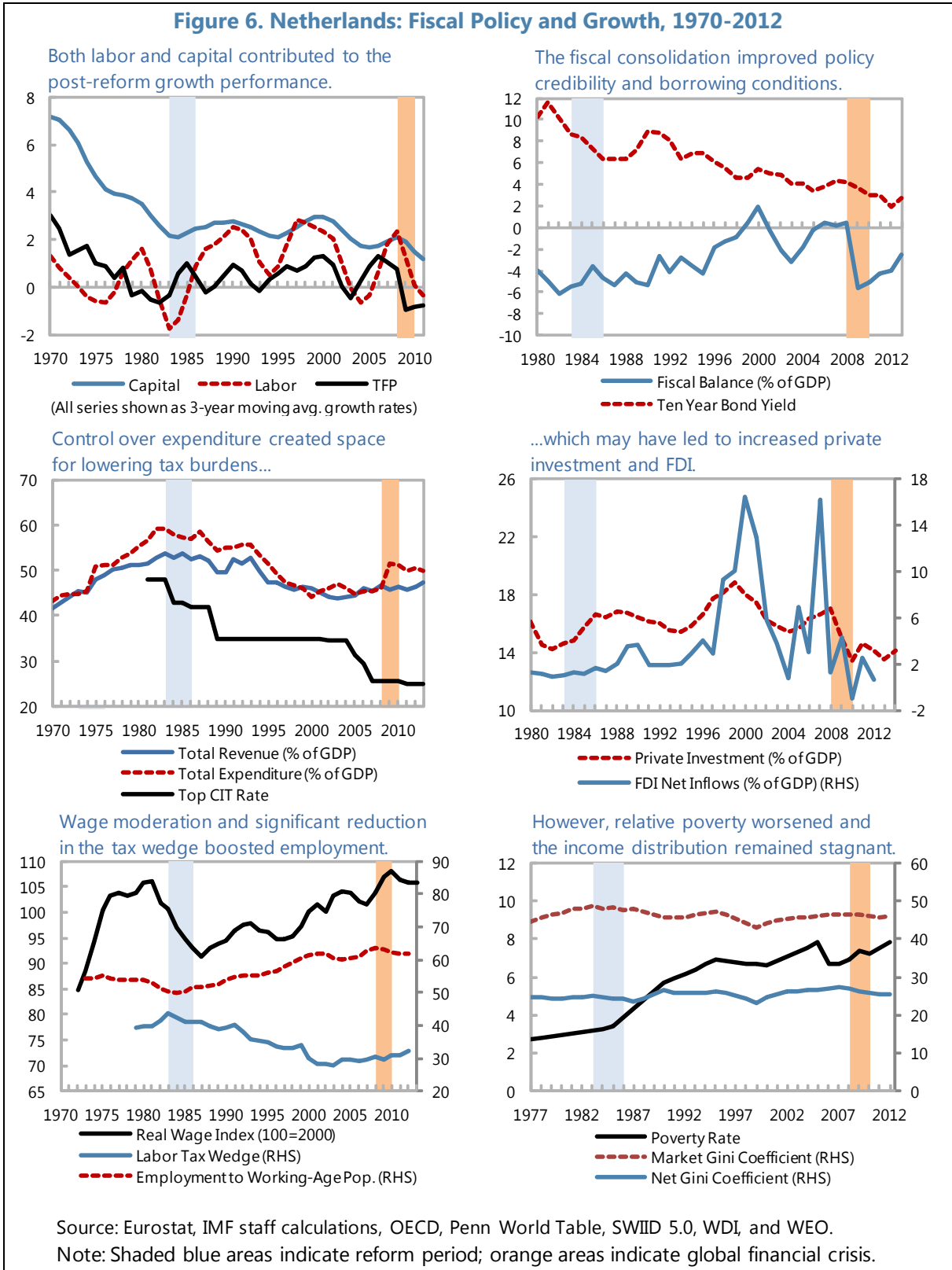
25. **The Dutch reform package stands out in its well thought-out and complementary design.** While each country has to tailor reforms to its particular circumstances, the experience of the Netherlands shows the importance of ensuring the full consistency and mutual reinforcement of policy measures.

26. **Likewise, the consensual approach to achieve wage moderation contributed to the success and durability of the reform episode.** While its replicability might be limited in countries with a different history of labor relations, the case of the Netherlands exemplifies a strategy for reducing the risk of reform-reversals and maximizing the confidence in a sustained shift in policies.

27. **Challenges remain to be addressed in the area of income distribution.** The negative impact on poverty rate demonstrates the limitation of some of the reform measures with regard to growth inclusiveness. Moreover, these measures did not reduce inequality. Those controversial outcomes underscore the notion that growth—while critical—is no panacea, and targeted measures are needed to ensure that growth is more inclusive.

<sup>7</sup> Expenditure-based adjustments are generally associated with lower uncertainty and higher investment (Alesina and others, 2012; Dixit and Pindyck, 1994). Likewise, investment rates are positively associated with lower corporate tax rates (Medina and Valdes, 1998; Hsieh and Parker, 2007; Vergara, 2004).

**Figure 6. Netherlands: Fiscal Policy and Growth, 1970-2012**



**Table 3. Netherlands: Select Indicators**

(Period averages)

	<b>Reform Episode</b>						
	<b>1973-77</b>	<b>1978-82</b>	<b>1983-86</b>	<b>1987-1991</b>	<b>1992-96</b>	<b>1997-2001</b>	<b>2002-2006</b>
<b>Real Economy</b>	(Percent change, unless otherwise indicated)						
Real GDP	3.4	1.1	2.6	3.3	2.5	3.8	1.6
Contributions to Growth (Percent) 1/							
Capital	1.3	0.9	0.8	0.9	0.8	1.1	0.7
Labor	-0.2	0.2	0.1	1.4	0.9	1.4	0.1
Total Factor Productivity	2.3	0.0	1.7	0.9	0.8	1.3	0.9
CPI Inflation (Average)	8.7	5.5	2.1	1.3	2.5	2.6	1.9
<b>General Government</b>	(Percent of GDP, unless otherwise indicated)						
Total Revenue	47.6	51.5	53.2	51.3	49.8	45.9	44.6
<i>Of which</i> Tax Revenue	40.4	42.5	42.9	44.4	43.0	39.5	37.8
Total Expenditure	48.7	55.4	57.9	55.8	53.2	46.0	45.9
Current Expenditure	...	53.6	54.9	53.2	50.4	43.1	42.6
Capital Expenditure	...	3.3	3.0	2.6	2.8	2.9	3.4
Fiscal Balance 2/	-1.1	-3.9	-4.7	-4.5	-3.3	0.0	-1.4
Primary Balance	1.8	0.0	1.2	1.4	1.4	4.1	1.1
Gross Debt	39.5	46.7	66.4	75.1	75.5	59.9	51.3
Long Term Bond Yield (Percent)	...	10.6	7.6	7.5	6.9	5.0	4.1
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)						
Labor Tax Wedge (Percent) 3/	...	40.1	42.1	39.8	35.5	31.7	28.9
Real Wage Index (100 = 2000)	98.0	104.2	96.4	93.9	96.5	97.8	102.7
Employment Ratio 4/	...	45.4	45.9	51.7	55.0	60.3	62.4
Unemployment Rate 5/	4.3	7.5	11.3	8.6	6.5	3.7	3.9
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)						
Corporate Income Tax Top Rate (Percent)	...	48.0	44.0	37.8	35.0	35.0	32.9
Private Investment	...	15.0	15.4	16.5	15.9	18.0	15.9
Foreign Direct Investment	1.1	1.0	1.3	2.5	2.5	10.3	4.1
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)						
Market Gini Coefficient 6/ 7/	46.1	46.9	48.2	46.3	46.6	42.8	45.9
Net Gini Coefficient	25.1	24.4	24.4	25.4	25.9	23.1	26.6
Poverty Rate 8/	2.7	2.9	3.4	5.2	6.6	6.7	7.3

Source: Eurostat, Haver Analytics, IFS, OECD, Penn World Table, Statistics Netherlands, SWIID 5.0, WEO, and WDI.

1/ Growth accounting estimates are calculated using Penn World Table 8.0.

2/ ESA95. Includes settlements under swaps. Non-financial flows at current prices. Neither seasonally nor working day adjusted.

3/ Tax burden as a percent of labor costs, one-earner families with two children. Prior to 2000, series is calculated using OECD's Average Production Worker definition. After 2000, series is calculated using OECD's Average Worker definition.

4/ Proportion of the working age population (15+) that is employed.

5/ From 1987, all data are yearly averages. From 1983 to 1986, data are established at 1 January and derived from the Labour Force Survey. Prior to 1983, the figures are yearly averages (excluding part-time unemployment) of the monthly registered unemployed series.

6/ "Market" Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

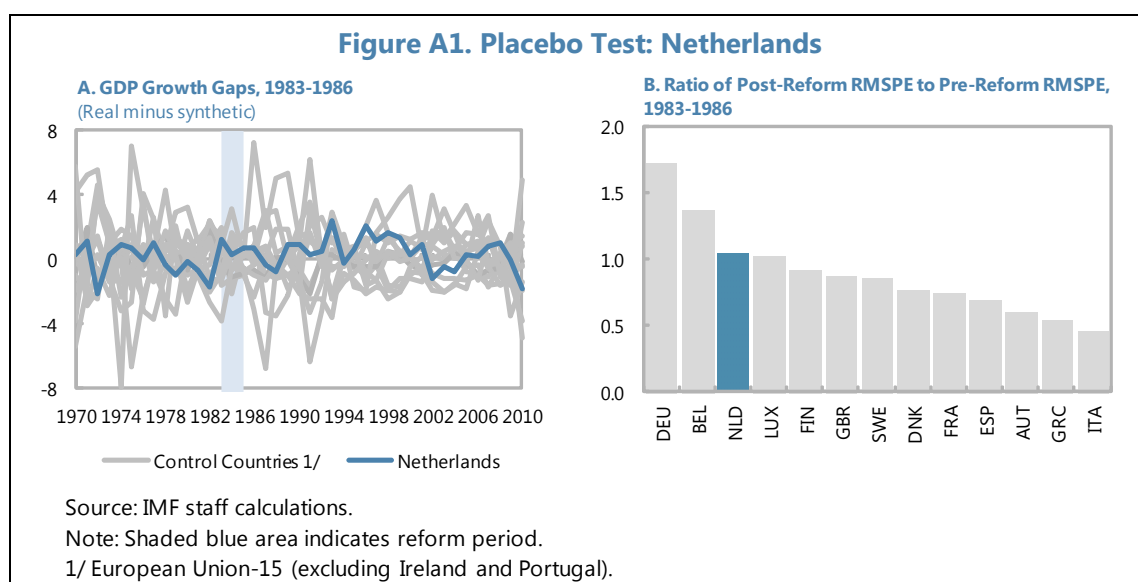
7/ SWIID reports data in centered five year moving averages. For intervals above that are not five years long, an average of the two middle values is reported.

8/ Proportion of the population falling below the poverty line, which is defined as half the median household income after taxes/transfers.

## Appendix. Robustness Tests for Netherlands

### A. Placebo Tests

1. **Each country in the group of the input group used<sup>1</sup> was alternatively chosen as the tested country when in fact no fiscal reform took place in that country<sup>2</sup>** (Figure A1). If the estimated effect for the Netherlands is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in the Netherlands was higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of both the size of growth gaps and ratios of post-reform and pre-reform RMSPEs. This indicates that the fiscal reform likely has made a positive difference in the growth performance in the Netherlands.

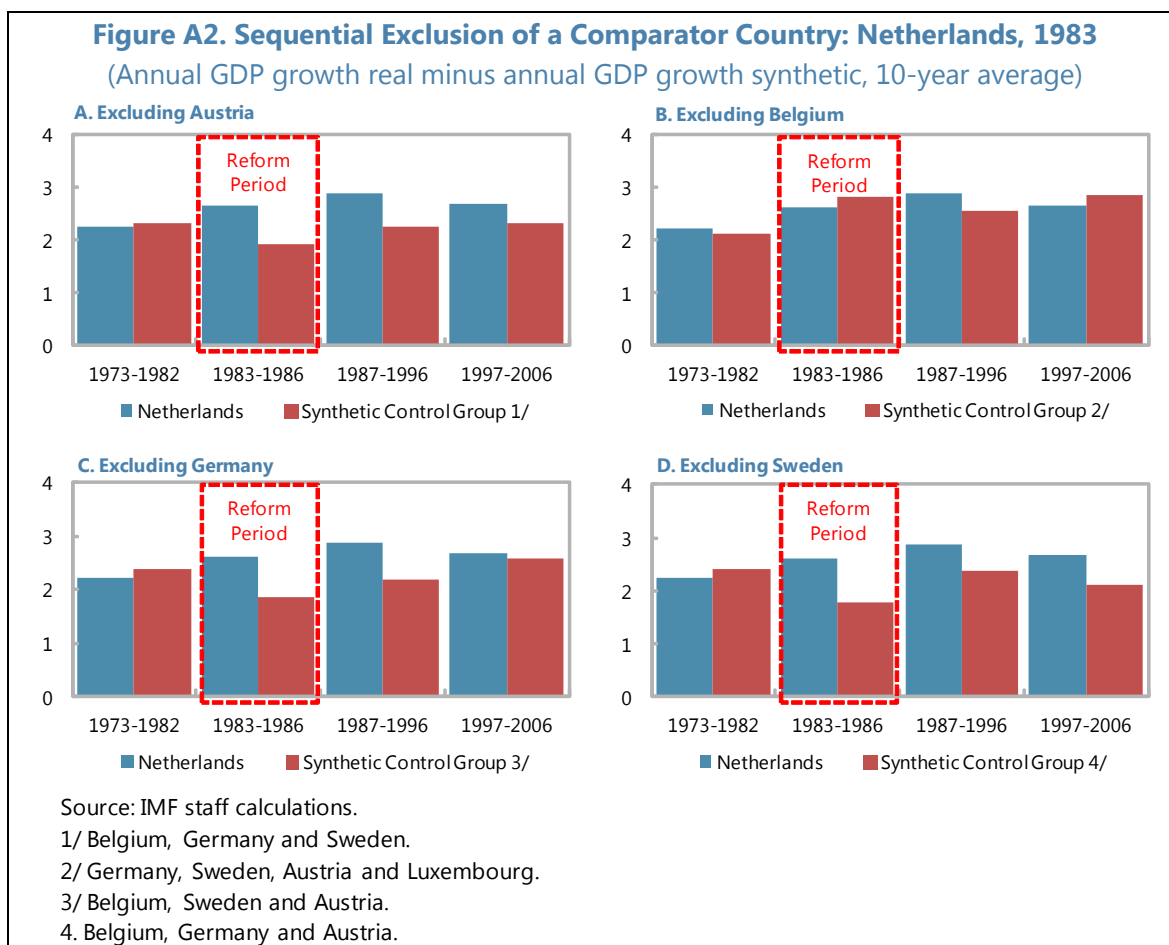


### B. Sequential Exclusion of a Comparator Country

2. **The sensitivity of the baseline results was tested by sequentially excluding each of the countries that contributed to the synthetic control group that received a positive weight and re-estimating the model** (Figure A2). This implied the sequential exclusion of the following countries: Austria, Belgium, Germany and Sweden. The post-reform growth gap is higher than the pre-reform growth gap in all cases, confirming the baseline.

<sup>1</sup>European Union-15 (excluding Ireland and Portugal).

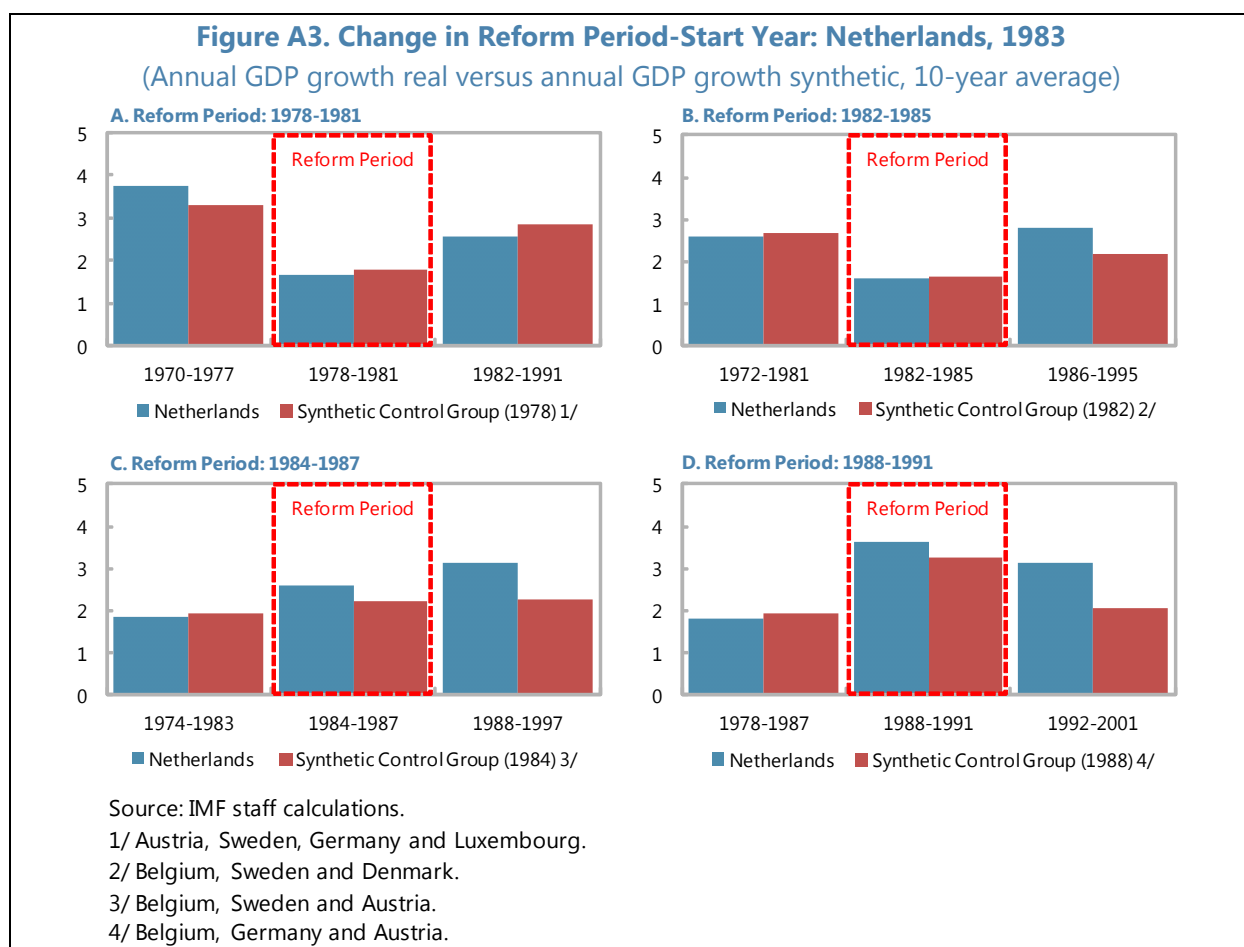
<sup>2</sup> Countries were not used in the placebo test due to the existence of missing values in the pre-intervention period at least in one variable.



## C. Changes in the Reform Timing

### Changes in the start year of reform

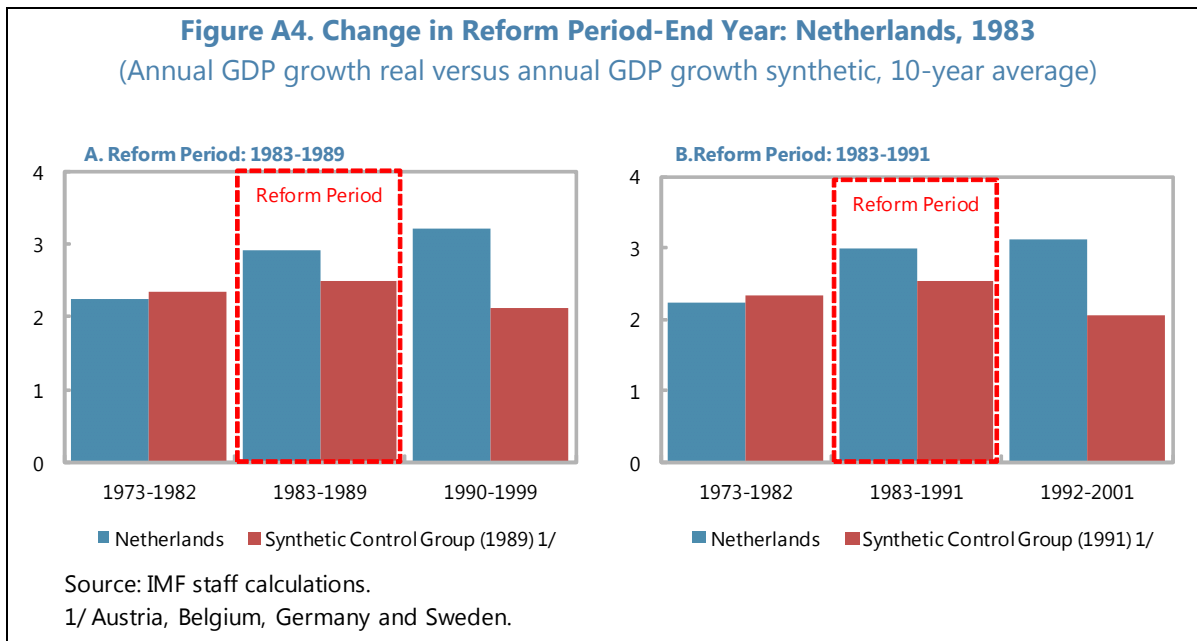
3. **The synthetic series was re-estimated for the years 1978, 1982, 1984 and 1988. If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap** (Figure A3). If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (1982 and 1984), but setting the start of reform in 1978 results in disappearance of the growth effects. These results confirm that the fiscal reform is the likely reason for the positive growth effect in the baseline. The growth effects are observed when the start of reform is set in 1988. This may reflect the continuation of structural reforms in the 1990s, including in the product market.



### Changes in the end year of reform

4. **The difference in average growth rates was recalculated by setting the end of the fiscal reform period to 1989 and 1991, respectively** (Figure A4). The purpose of this exercise is to examine whether our conclusion in the baseline is sensitive to the timing of the end of the reform, given its uncertainty. Results confirm that the conclusion holds when the end of the fiscal reform period changes.

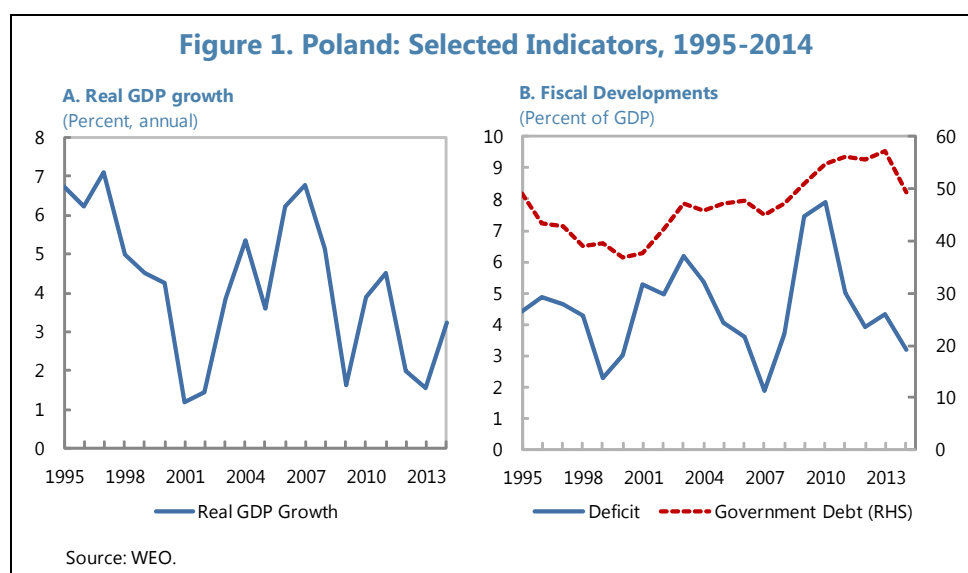




## POLAND: FISCAL POLICY AND LONG-TERM GROWTH

### A. Background

1. **Poland was an early mover in the transition to a market economy among its Central and Eastern European (CEE) peers and reform of public finances has been at the center of the transition process.** Prior to transition, the fiscal system of Poland was cast in a socialist central planning regime and was characterized by a subsidized provision of goods and services through state-owned enterprises operating under a soft budget constraint and highly opaque and non-parametric levies determined by price and wage controls. During the transition, a series of fiscal reforms were launched to encourage an efficient resource allocation in the product; capital and labor markets; ensure sustainability of social security programs; and improve efficiency of budgeting process and public governance in line with EU standards.



2. **The pace of public finance reforms accelerated in the late 1990s following a sharp slowdown in growth** (Kopits, 2008). There were important impediments to the reform in the initial stage of transition started in 1990: (i) dependency syndrome with households feeling reliant on the state, mainly through employment in state-owned enterprises, blunting personal initiative and responsibility; (ii) common-pool problem with major interest groups (i.e., teacher unions, health care employees, farmers, etc.) mobilizing public opinion to block initiatives to dismantle existing privileges despite budget constraints; and (iii) resistance to change, which was particularly strong among a risk-adverse and ageing population with an interest in preserving the traditional defined-benefit pension system. The output growth rate, initially boosted by convergence effects, declined from an average of 5 percent in 1992–99 to slightly more than 1 percent in 2001–02 (Figure 1), owing in part to a wave of enterprise restructuring and investment collapse triggered by spillovers from the Russian crisis, the cyclical downturn in Germany, and sharp monetary policy tightening

amplifying the adverse effect of external factors (IMF, 2001 and 2002). The authorities accelerated reforms in the late 1990s to lay the foundation for a faster growth.

## FISCAL POLICY REFORMS: PENSION AND TAX SYSTEMS

### A. Overview

3. **Poland implemented a number of fiscal reforms during the transition, but pension and tax system reforms were key measures targeting improved growth performance.** Inadequate political will resulted in several waves of reform attempts, with each wave ending with resignation of the finance minister when efforts to incorporate reforms into the budget were met with political resistance (Box 1). Against this backdrop, key pension and tax system reforms were initiated in 1999 (Table 1).<sup>1</sup> Lehmann (2012) confirms that these were the most significant fiscal reforms implemented following the “big bang” reforms of 1990 that provided foundation for transition to a market economy, including price liberalization, establishment of an independent monetary policy, privatization, reduction of subsidies and tax expenditures.

**Table 1. Poland: Major Fiscal Reform**

Reform Areas	Year	Reform Steps
1. Pension Reform	1999-	Transition from defined benefit to defined contribution, three-pillar pension system.
2. Tax System Reform	1999-2004	Modernization of the tax system; reduction of marginal tax rates; expansion of the tax base; and shift in revenue composition away from direct to indirect taxation.

Source: IMF staff reports.

4. **Fiscal reforms in Poland were part of a broader reform package and were accompanied by a number of structural reforms.** Three structural reforms with important fiscal implications were launched as part of the 1999 reform package. First, the health care reform aimed at modernizing healthcare provision and putting it on a sound financial footing. This was achieved through setting up regional health insurance companies financed through the national health insurance surcharge and private payments of patients, decentralizing health services to provincial level, and ensuring independence of health care providers. Second, the administrative reform aimed at improving efficiency of public service provision. It introduced three levels of state administration at regional, provincial, and community levels. The number of regions has been reduced to create economically more viable sub-national governments and within the new larger regions the self-administration bodies received more power with the intention of bringing more democracy to the

<sup>1</sup> The selected reform years reflect the application of the selection criteria discussed in the methodological annex and does not necessarily include all significant fiscal reforms in the country in question over the sample period, or cover the most recent years.

regions. Finally, the education reform aimed at modernizing the educational system and enhancing its efficiency. A new pre-tertiary education was established, which resulted in a substantial improvement of PISA test scores<sup>2</sup> above OECD average in 2009.

### **Box 1. Political-Economy of Major Fiscal Reform Attempts in Poland**

During the transition period, several attempts were made to undertake major fiscal reforms to enhance Poland's growth potential and fully benefit from EU accession (OECD, 2006). The roots of the fiscal problem were diagnosed to be: (i) excessive current expenditure (mainly social); and (ii) a complex tax system that was lacking transparency, efficiency, and business incentives. The IMF supported reform efforts and provided technical assistance to help design them (IMF, 2004). As outlined below, reform progress was mixed with ministers of finance often resigning when their efforts to incorporate reforms in the budget were meeting political resistance.

**Balcerowicz Strategy.** The goals were to reduce the general government deficit below 1 percent of GDP and public debt below 30 percent of GDP by 2003. The strategy proposed a combination of restraining current spending (social expenditure cuts of 1.3 percent of GDP, and increased control of extra-budgetary expenditure) and tax reforms aiming at introducing a flat tax of 22 percent on all revenues, while suppressing most exemptions. Large reform of the social security system was also proposed to split more equally the burden of contributions between employer and employee. The proposal also included changes in generous social assistance programs with the aim of improving targeting. As growth slowed at end-1990s, fiscal slippages emerged, political support for reforms faded, and the ruling coalition lost its majority. Despite coming to a standstill, the proposed reforms raised public awareness of the serious fiscal situation.

**Belka Rule.** In 2001, an expenditure rule was suggested to limit growth of central government real expenditure to 1 percent (i.e., so-called Belka rule, named after the Minister of Finance at the time). To make this rule sustainable, the Ministry of Finance prepared a package of fiscal reforms to reduce social spending. The IMF supported the plan, but the rule never came into force. In 2013, parliament approved an alternative expenditure rule, which will become operational starting in 2015. The new rule links public expenditure growth to average GDP growth and requires additional expenditure consolidation when the debt-to-GDP ratio surpasses pre-established thresholds. The success of the new expenditure rule implementation hinges on its simplicity, flexibility to deal with adverse economic shocks, and direct link to the medium-term fiscal objective (1 percent structural deficit).

**Hausner Plan.** The most comprehensive expenditure reform was proposed in 2003. It aimed at reducing public expenditure on social protection, public administration, and state aid. In particular, the plan would have streamlined indexation rules for pensions and social benefits and strengthened their economic justification. The budgetary impact of the initial plan was expected to be 4.7 percent of GDP over 2004–07. After extensive public consultations, the plan gained public support, but this support started declining in the course of implementation, resulting in only half of the measures being adopted by May 2005 with 2.8 percent of GDP in savings.

<sup>2</sup> OECD (2011).

## B. Reform Area 1: Pension System

### Issues and growth impediments

5. **In the late 1990s, it was widely recognized that the Polish pension system was unsustainable.** Population aging pressures emerged driven by falling fertility rates, increased life expectancy, and the post-war demographic boom. The pay-as-you-go system inherited from socialist times was susceptible to political pressures and influence groups. It was also characterized by generous early retirement provisions, lax legislation on disability eligibility, and generous pensions and indexation rules. At the same time, the decline in employment following the fall of the socialist regime led to a rising economic dependency ratio (i.e., number of pensioners divided by the number of contributors) relative to the demographic dependency ratio (i.e., pension age population divided by the working age population).

6. **Pension system issues were creating serious impediments to long-run growth through various channels** (IMF, 2011). First, the mismatch between generous pension benefits, disability provisions and deteriorating demographics were inflicting fiscal sustainability concerns and contributing to business uncertainty. Second, public management of the pension system was subject to political influence leading to changes of minimum pensions as an instrument of poverty reduction and redistribution (Chlon-Dominczak and Strzelecki, 2013). These changes were frequently resulting in generous short-run benefits while passing the costs to future generations. Third, weak links between contributions and benefits, as well as, strong incentives for early retirement through the defined benefit characteristics of the system, were having unfavorable effects on the labor supply. Finally, the defined benefit system was not encouraging higher savings to pre-fund future pension needs and was not contributing to the development of local capital markets.

### Reform Design Features

7. **The 1999 pension reform entailed a move from a financially unsustainable defined benefit system to a defined contribution system to protect its actuarial solvency** (IMF, 2005). The main objective was to restore long-run sustainability of the pension system, which would ensure macroeconomic stability and improve investment climate. The reform led to the creation of a three-pillar system: (i) the notional defined contribution pay-as-you-go system operated by the state social security administration, (ii) the system of individual accounts managed by private pension funds, and (iii) the voluntary individual accounts. The first pillar was universally compulsory. The second pillar was compulsory for individuals under the age of 30 at the time of reform, while those aged 30–49 were allowed to contribute on a voluntary basis, and those aged 50 or more at the time of the reform were not allowed to open private second pillar accounts. The reform was complemented by social protection policies aimed at alleviating the impact of reforms on income inequality (Pietka, 2007). These policies resulted in introduction of a more targeted means-testing for social assistance benefits, notably through changes in sickness and disability programs, as well as, expansion of active labor market policies in response to the rapid increase in unemployment rate peaking close to 20 percent during the reform period. For instance, starting in 2004 a broad range

of social benefits covering similar functions were consolidated into two groups: (i) social assistance benefits with minimum amount equal to 30 percent of poverty gap, and (ii) family benefits introducing a single income criterion to child, housing, disability, and other benefits. The responsibility for allocation of benefits was transferred from central to local governments to improve targeting. The flat unemployment benefit system was changed to a differentiated one depending on the service period, with average benefits being linked to the minimum wage and duration of benefits linked to the local labor market conditions relative to the country average.

8. **The creation of the defined contribution second pillar led to a substantial improvement in the long-run solvency of the system, but also involved sizeable transition costs.** Fiscal costs associated with pre-funding of future pension liabilities were 1–2 percent of GDP over the last decade. Pension contributions were maintained at 19.52 percent of the wage bill to avoid adverse effects on labor supply with 7.3 percentage points transferred to the second pillar and the remainder to the first pillar. Despite the original intention to use privatization receipts and other fiscal measures to finance transition costs, it was mainly financed through the issuance of public debt. As a result, net private savings growth was partly offset by public borrowing. Nevertheless, the benefits of introducing the privately funded defined contribution second pillar were expected to outweigh the costs in the long-run through improved long-run sustainability of the pension system, higher national savings rates, and increased labor participation.

9. **Most recently, large fiscal costs associated with the pre-funding of future pension liabilities amid the global financial crisis led to a reversal of some reform components** (IMF, 2014b and 2014c). The overall deficit rose by 1.5–2 percent of GDP per year, contributing to a weakening of public finances during the economic downturn. Consequently, the debt levels started approaching Maastricht limits and the fiscal costs associated with the transition were perceived as an unduly high burden to bear. As a result, starting from May 2011, contributions to the second pillar were reduced from 7.3 to 2.3 percent of the wage bill<sup>3</sup> with the remaining 5 percentage points redirected to the first pillar. In 2014, following an official review, the second pillar was scaled back with the transfer of about half of the pension fund assets and corresponding liabilities to the first pillar. It was followed by a redirection of contributions to the first pillar. In the short-run, this led to a sharp one-off decline in public debt and improvement in the government deficit. In the long-run, growth gains achieved through previous reform efforts could be protected as reversals did not affect the defined contribution characteristic of the pension system and its long-run sustainability.

## C. Reform Area 2: Tax System

### Issues and Growth Impediments

10. **Poland inherited a complex and inefficient tax system following the collapse of the socialist regime** (Kemme and Rapacki, 2000). Before the transition, Poland had two parallel tax

<sup>3</sup> The plan was to raise it back to 3.5 percent of the wage bill by 2017.

systems: one for public bodies and cooperatives and another for the private sector and individuals. In addition, a large share of taxes was made up of lump-sum payments. The system lacked incentives for investment and employment, and was characterized by generous exemptions and loopholes. Some taxes—such as the turnover tax as the predecessor of the value-added tax—were outdated by modern standards of international best practice. Top marginal tax rates were also high: the corporate (introduced in 1989) and personal income (introduced in 1992) tax rates stood at 40 percent, and social insurance contribution rates were 43 percent with the burden falling largely on employers.

11. **The deficiencies of the tax system were hampering long-run growth prospects through various channels** (Lenain and Bartoszek, 2000). First, high labor taxes were harmful for employment. The combined impact of social security contributions and personal income taxes (42 percent average and 45 percent marginal tax rates, respectively) was creating a large wedge between labor costs and workers' disposable income, discouraging hiring in the official economy, and increasing the unemployment. Second, the complexity of the tax code, which contained a large number of small taxes, numerous exemptions, and requirements to fill out a tax return even for small tax liabilities was discouraging entrepreneurial activity. Moreover, the preferential tax regimes for private investment were not well-targeted and were having only a limited impact on economic activity, while giving rise to large-scale tax avoidance. Finally, the system was heavily tilted towards distortionary direct taxation, discouraging labor and capital factor accumulation.

### Reform design features

12. **Following the transition, several reforms have radically transformed the Polish tax system.** The new tax system was designed with traditional objectives in mind—efficiency, transparency, and preserving incentives. More specific objectives included constructing a system with consumption taxes as the major source of revenue,<sup>4</sup> reforming social security to ensure future fiscal autonomy, unifying the taxation of income into a single income tax, and harmonization of the tax system with those of the EU members. The tax rates were initially set at quite high levels, but subsequent modifications have lowered the rates and widened the base.

13. **The speed of tax reforms picked up in September 1998, when the Polish Ministry of Finance issued a white book on taxes, calling for fundamental changes in the tax system.** Consequently, the corporate tax rate was progressively reduced from 40 to 19 percent between 1998-2004, while the personal income tax system remained progressive with three brackets at 19, 30, and 40 percent, respectively.<sup>5</sup> As envisaged by the white book, the 1999 reform of corporate taxation was accompanied inter alia by the abolition of several investment allowances and change in depreciation allowances. Tightening the possibilities for companies to shift profit abroad, Poland introduced thin capitalization rules in the same year to disallow the deductibility of interest

<sup>4</sup> The turnover tax was repealed in July 1993 and replaced by a modern VAT system.

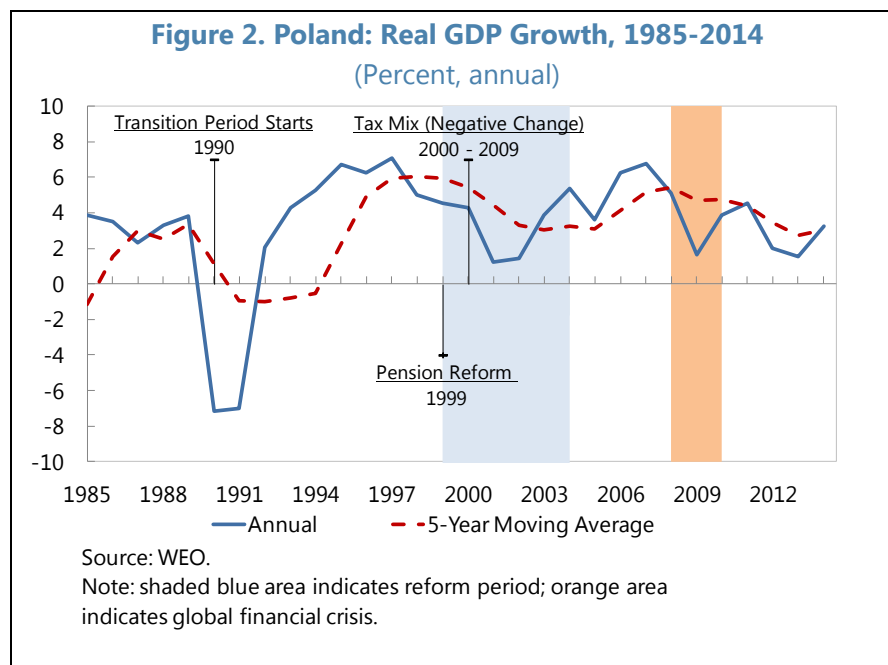
<sup>5</sup> The rates were subsequently changed to a two-year brackets schedule of 18 and 32 percent in 2009.

payments on debt exceeding three times the size of equity. Following the social security reform in 1999, the burden of social contributions was more equally split between employers and employees. This had a major contribution to a shift in the composition of tax receipts.

14. **Following the reforms, Polish taxpayers have seen their overall tax to GDP ratio decrease from 37 percent in 1995 to 31 percent in 2004 with improved composition effects** (Eurostat, 2014). Such a result was achieved via a substantial decrease of direct taxation (i.e., personal income and corporate income taxes), with partial compensation through a parallel increase in employees' social contributions and in VAT receipts (Figure 5). Social security contributions and indirect taxes are now the two main sources of revenues. Indirect taxes comprise 40 percent of total tax receipts, which is more favorable composition compared to the EU average of 33 percent. The successive cuts in the statutory corporate tax rate to 19 percent have brought Poland into the club of EU states with low statutory taxes on corporate profit. It remains well below the German and most other European Member States' rates. Similarly, Poland has a top marginal personal income tax rate that is close to the European mean and its current system can be characterized as close to flat with only two tax brackets with marginal tax rates of 18 and 32 percent and 97.5 percent of taxpayers falling into the first bracket.

## IMPACT ON LONG-TERM GROWTH

### A. Long-Term Growth Dissected



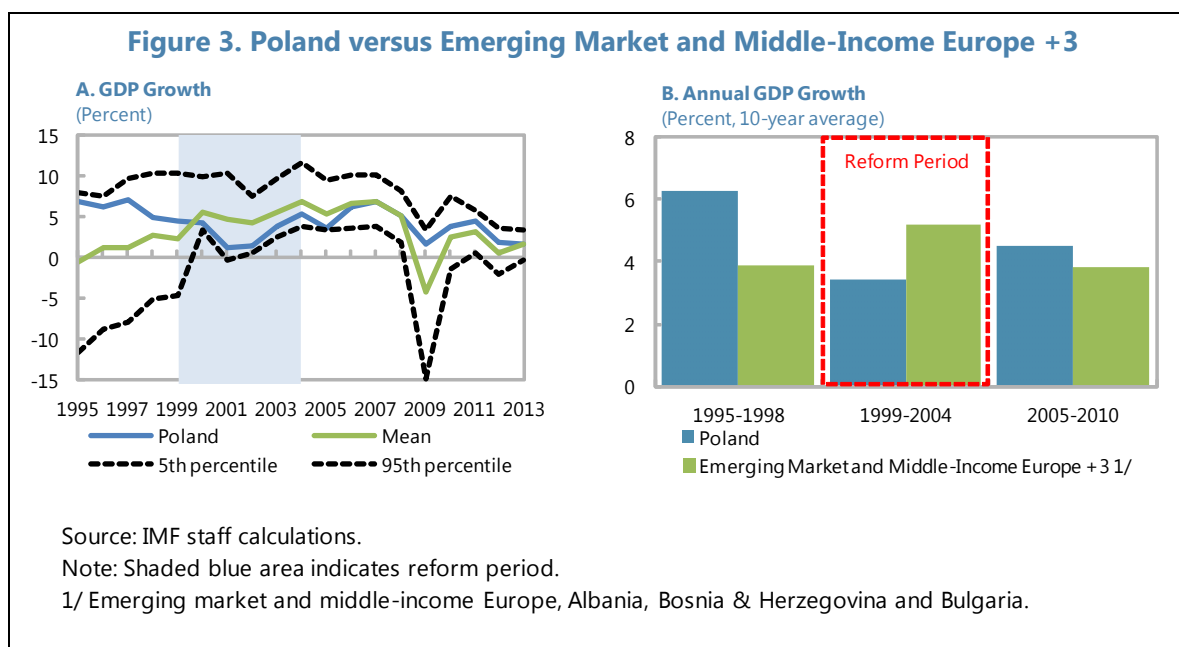
15. **Similar to other CEEs, output growth in Poland during the transition period was quite volatile with a strong output rebound following the reform period** (Table 3). After a large drop following the collapse of the socialist regime, output growth picked up rapidly in the late 1990s



driven in part by convergence effects with the 5-year moving average growth rate at 6 percent (Figure 2). In the late 1990s, growth decelerated to slightly above 1 percent following a wave of enterprise restructuring and investment collapse triggered by spillovers from the Russian crisis, the cyclical downturn in Germany, and sharp monetary policy tightening (IMF, 2001 and 2002). The rapid slowdown in growth catalyzed major reforms in the pension and tax systems. Following the reforms, the moving average growth rate rebounded to 5 percent and remained robust during the global financial crisis.

16. **In order to establish whether growth would have still been higher in the absence of fiscal reforms, we compare growth rates in Poland with those of comparator CEE countries.**

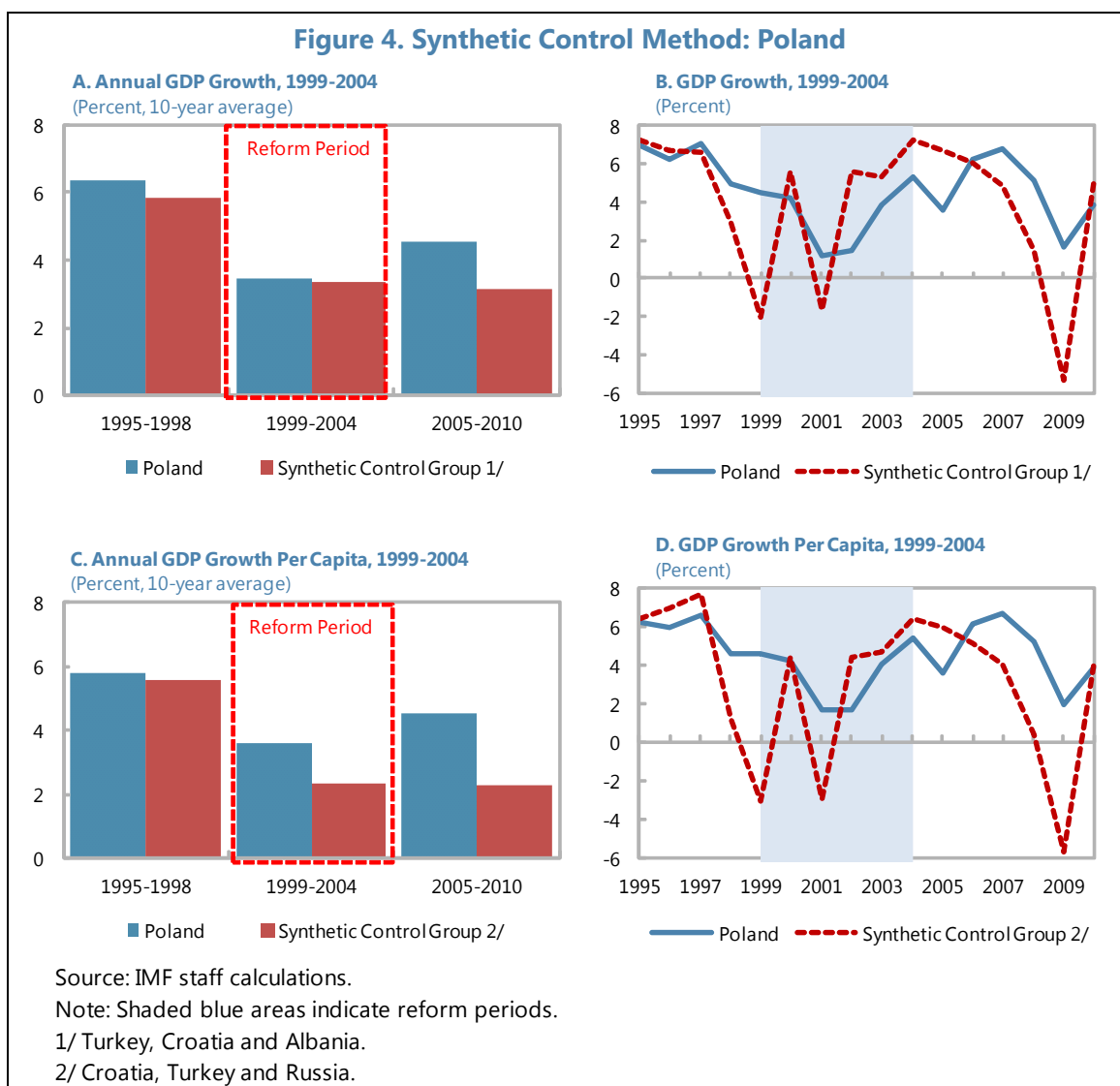
The comparison confirms that the growth rebound in the immediate aftermath of reforms was strong. Polish growth rates have rapidly converged from below the CEE average in the beginning of the 2000s to the average level in the aftermath of reforms.<sup>6</sup> During the global financial crisis, output growth in Poland outperformed the CEE average by 1 percentage point and approached the highest 5th quantile of the CEE distribution (Figure 3).



17. **The results based on a simple comparison with CEE peers was also confirmed by comparing the post-reform growth in Poland with that of a counterfactual created using the synthetic control method.** The counterfactual analysis is performed on the same sample of CEE countries except those that implemented major fiscal reforms around the same time. The methodology then assigns weights to a counterfactual comparator group. Estimation results suggest

<sup>6</sup> The post-reform period coincided with the EU accession in 2004, with larger EU-supported capital inflows contributing to a growth rebound.

that fiscal reforms helped to boost GDP growth by about 1.4 percentage points. In other words, in the absence of pension and tax reforms, the growth in Poland would have been 1.4 percentage points lower than what was actually observed in the second half of 2000s (Figure 4 and Table 2).



18. **The results of the synthetic control method are robust to the choice of the dependent variable, the length of the pre-reform period, and the selection of comparator countries.** The exercise was repeated using real GDP per capita growth, with no fundamental change in results (Figure 4 and Table 2). Real GDP per capita growth in Poland exceeded growth in the synthetic control group by 2¼ percentage points during the 5-year post-reform period. We broadly validated baseline results by a series of robustness checks in the appendix.

**Table 2. Poland: Economic Growth Predictor Means before Fiscal Reform**

Variable	Reform Period 1999 1/	
	Real	Synthetic
<b>GDP Growth</b>		
GDP Growth (Percent)	7.0	6.9
GDP Per Capita (2005 I\$/Person)	9580.5	8506.7
Trade Openness (Percent)	49.6	49.6
Terms of Trade (Percent)	91.3	81.0
Inflation Rate (Percent)	18.6	51.8
Human Capital Index	2.8	2.3
<b>GDP Growth Per Capita</b>		
GDP Growth Per Capita (Percent)	6.4	7.6
GDP Per Capita (2005 I\$/Person)	9580.5	9507.7
Trade Openness (Percent)	49.6	63.8
Terms of Trade (Percent)	91.3	82.3
Inflation Rate (Percent)	18.6	26.5
Human Capital Index	2.8	2.5

Source: IMF staff calculations.

1/ All variables except GDP growth and GDP growth per capita are averaged for the 1995-1998 period. The average for GDP growth and GDP growth per capita is calculated using the years 1995 and 1998.

## B. Fiscal Reform: A Game Changer?

19. **Decomposition of long-run growth into its determinants shows increased contribution of labor, capital, and TFP following the reforms** (Figure 5). In the aftermath of the reform period, the average growth has rebounded to 5 percent from 1 percent lows in the beginning of the 2000s. A growth accounting exercise indicates that the post-reform pick-up in the average growth rate was initially driven by a rebound in the TFP contribution (also triggered by positive spillovers from the EU accession in 2004), followed by increased capital accumulation and labor activity. The contribution of all three factors remained robustly positive during the global financial crisis, suggesting a broad base impact of pension and tax reforms on key drivers of long-run growth.

20. **The substantial reduction of unemployment may have been supported by the reforms of social insurance and tax systems.** On the supply side, moving away from the defined benefit pension system, reduction of early retirement privileges and stricter fiscal discipline contributed to increased work incentives. On the demand side, reduction of the labor tax wedge and cuts in capital income taxation as part of a more growth-friendly tax mix strategy contributed to increased hiring by the private sector. It is also notable that a substantial reduction in the unemployment rate (from 20 to 7 percent) went hand in hand with a reduction in income inequality (i.e., the Gini coefficient

has declined from 38 to 30 percent), supported by progressive income taxation amid the shift to indirect taxation and reduction of social benefits.

21. **The increased capital accumulation and productivity improvements may have been boosted by greater macroeconomic stability supported by the reforms.** Introduction of the second pillar reduced residual risks associated with the sustainability of the pension system and public finances in general, despite short-term costs associated with the transition to the second pillar. Coupled with convergence trends common to most CEEs, enhanced macroeconomic stability improved borrowing conditions and contributed to a reduction of the government's long-run borrowing costs from 12 to 4 percent. A reduction in government size from 50 to 44 percent of GDP created room for a reduced tax burden from 25 to 20 percent of GDP and a reduction of the share of direct taxes in overall tax revenues from 45 to 36 percent, leading to increased investment incentives and, combined with the positive impetus to foreign investment following the EU accession in 2004, fostering a rapid increase in research and development (R&D) spending. Growth in real R&D spending accelerated from 32 percent in the pre-reform period (1994–99) to 63 percent in the post-reform period (2005–10). In a survey conducted by Deloitte (2014), 77 percent of Polish companies responded that simplified tax regime and introduction of the tax credit for R&D activities were instrumental in their decision to expand R&D spending. Change in expenditure composition away from current spending (the share of current spending in total expenditure declined from 93 to 91.5 percent) together with the expansion of EU-funded public investment projects also contributed to the increased capital accumulation.

## LESSONS

22. **The buildup of political consensus and the external anchor in the form of EU accession prospects were essential for the success of reforms.** At the initial stage, the reforms were catalyzed by the regime change from central planning to a market economy, but were progressively hindered by the impediments from dependency syndrome, common-pool problems and resistance to change. Declining growth performance in the late 1990s intensified fiscal reform efforts with EU accession prospects serving as important external anchor. The steady reduction of income inequality supported through satellite social protection reforms (expansion of active labor market policies and means-testing for social assistance benefits) also contributed to the political success.

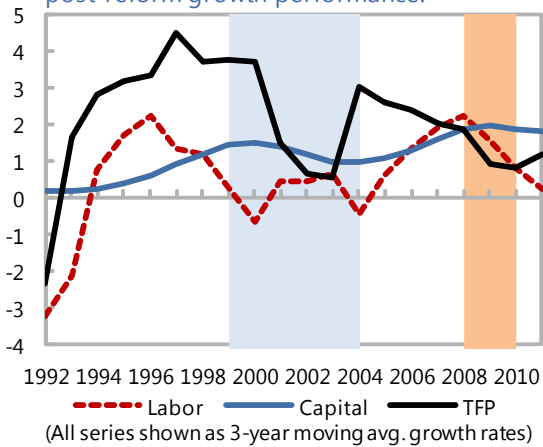
23. **Concentration of major changes in pension and tax systems around a short time period contributed to durability of reform impact.** A reduction in inefficient current expenditure created space for expanding productive capital projects and reducing the tax burden. The composition of revenues has become more growth-friendly, with the share of direct taxes in total revenues declining to a substantially lower level compared to the pre-reform period. The reduction of the tax burden and the need to pre-finance future spending liabilities prevented the fiscal position from improving markedly following the reform, but the level of debt was maintained at a sustainable level below 60 percent of GDP. All of these factors contributed to the broad expansion of capital accumulation, employment, and total factor productivity and strong performance during

the global financial crisis (Table 3), with Poland being the only EU country that did not experience negative growth rates despite large common shocks.

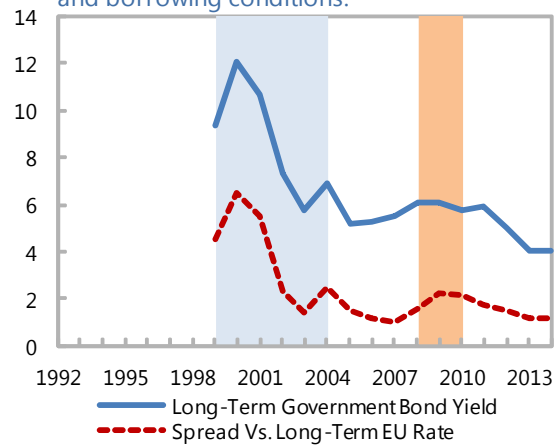
24. **Nevertheless, one needs to be careful in drawing strong causality between fiscal reforms and long-run growth in Poland.** It is important to acknowledge difficulties associated with separation of the impact of fiscal reforms from that of other policies (labor market, governance, property rights, etc.) taking place around the same time during the transition. In addition, EU accession in 2004 coincided with the latter stage of major fiscal reforms and also contributed to improved growth performance in the second half of 2000s. Also, causality may run in the other direction, with the rebound in growth providing Poland with more room to reduce spending and taxes, improve their mix, enhance labor conditions, and reduce inequality.

**Figure 5. Poland: Fiscal Policy and Growth, 1992-2014**

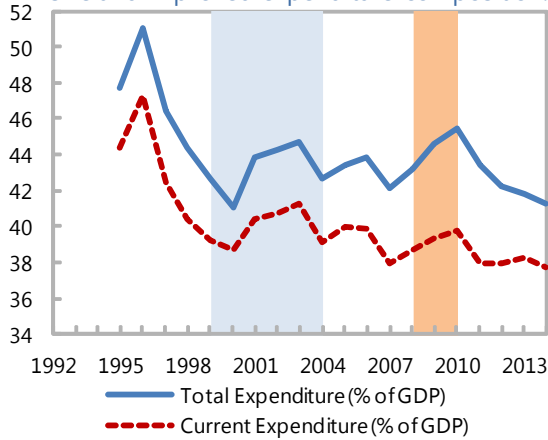
Labor, capital, and TFP all contributed to post-reform growth performance.



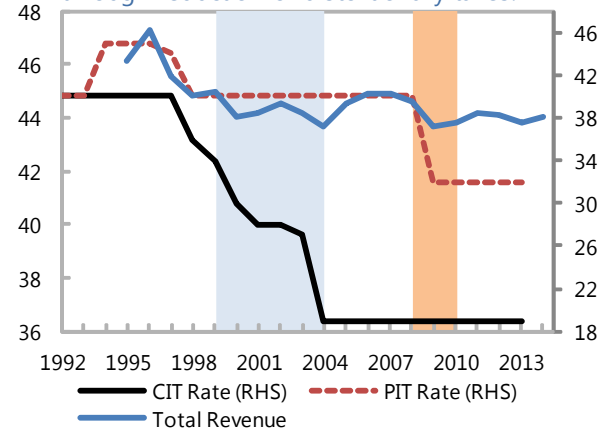
Fiscal reforms improved policy credibility and borrowing conditions.



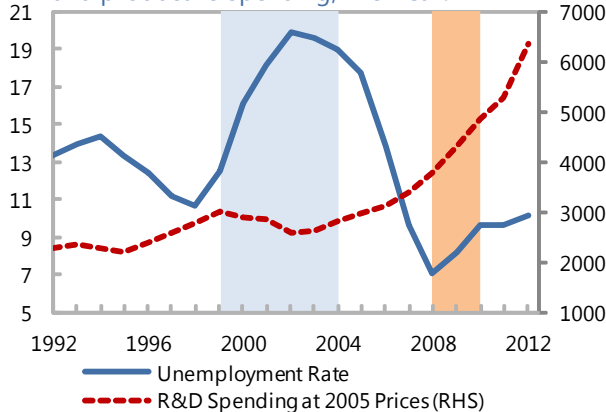
Pension reform helped reduce government's size and improved expenditure composition...



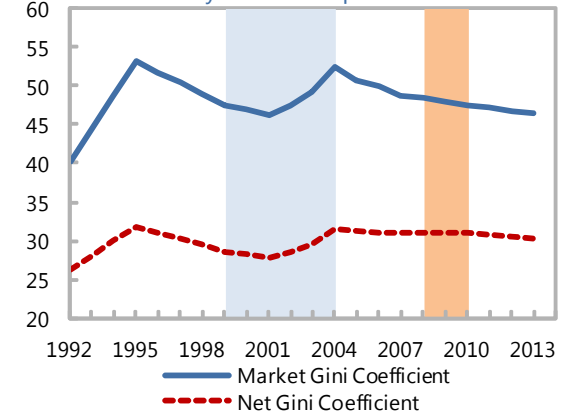
...creating space for lowering the tax burden through reduction of distortionary taxes.



These factors helped increase employment and productive spending, like R&D.



The income distribution initially worsened, but ultimately settled at pre-reform levels.



Source: IMF staff calculations, OECD, Penn World Table, and WEO.

Note: Shaded blue areas indicate reform period; orange areas indicate global financial crisis.

**Table 3. Poland: Selected Indicators**  
(Period averages)

	<b>Reform Episode</b>				
	<b>1989-1993</b>	<b>1994-98</b>	<b>1999-2003</b>	<b>2004-08</b>	<b>2009-2013</b>
<b>Real Economy</b>	(Percentage change, unless otherwise indicated)				
Real GDP	-2.4	6.1	3.1	5.4	3.3
Contributions to Growth (Percent) 1/					
Capital	0.2	0.7	1.3	1.4	1.9
Labor	-2.7	1.4	0.2	1.1	0.9
Total Factor Productivity	-0.3	3.5	2.0	2.4	1.0
CPI Inflation (Average)	197.1	21.3	5.13	2.7	3.0
<b>General Government</b>	(Percent of GDP, unless otherwise indicated)				
Total Revenue	...	42.8	39.0	39.3	37.8
<i>Of which</i> Tax Revenue	...	25.1	19.9	21.5	20.3
Total Expenditure	...	47.4	43.3	43.1	43.5
<i>Of which</i> Current Expenditure	...	44.0	40.0	39.0	39.0
<i>Of which</i> Capital Expenditure	...	3.7	3.2	3.9	4.9
Fiscal Balance	...	-4.6	-4.4	-3.7	-5.7
Gross Debt	...	43.6	40.6	46.5	54.9
Long Term Bond Yield (Percent)	...	...	9.1	5.8	5.4
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)				
Employment Ratio	...	0.6	-2.0	3.0	-0.3
Unemployment Rate	...	11.8	17.6	13.5	9.6
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)				
Corporate Income Tax Top Rate (Percent)	...	40.0	31.2	20.6	19.0
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)				
Market Gini Coefficient 2/	40.0	50.6	47.5	50.1	47.2
Net Gini Coefficient	26.3	30.6	28.5	31.1	30.7

Source: Haver Analytics, IFS, Penn World Table, SWIID 5.0, WEO, and WDI.

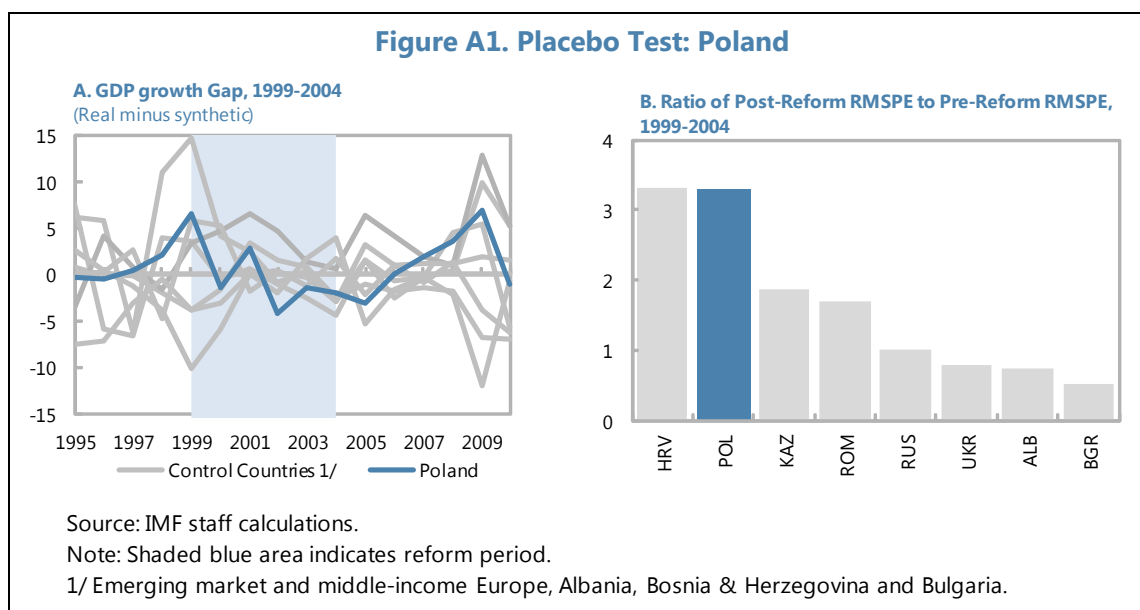
1/ Growth accounting estimates are calculated using Penn World Table 8.0.

2/ Market Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

## Appendix. Robustness Tests for Poland

### A. Placebo Tests

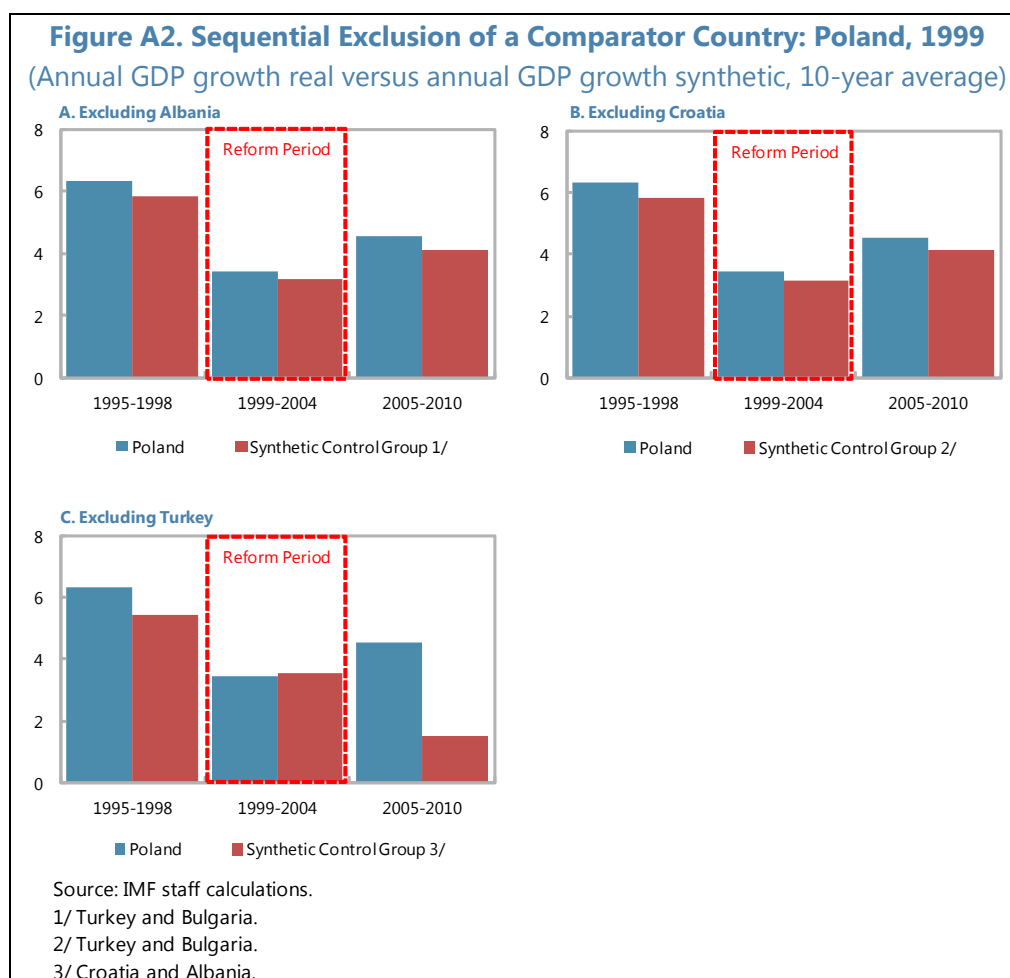
1. **Each country in the group of the input group used was alternatively chosen as the tested country when in fact no fiscal reform took place in that country** (Figure A1). If the estimated effect for Poland is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in Poland was higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of both the size of growth gaps and ratios of post-reform and pre-reform RMSPEs. This indicates that the fiscal reform likely has made a positive difference in the growth performance in Poland. Results of this placebo test should be interpreted cautiously, however, because pre-reform match was poor in application to some comparator countries.



### B. Sequential Exclusion of a Comparator Country

2. **The sensitivity of the baseline results was tested by sequentially excluding each of the countries that contributed to the synthetic control group that received a positive weight and re-estimating the model** (Figure A2). This implied the sequential exclusion of the following countries: Albania, Croatia and Turkey. Results show sensitivity to the exclusion of particular countries, as the post-reform growth gap is similar the pre-reform growth gap when Albania and Croatia are excluded.

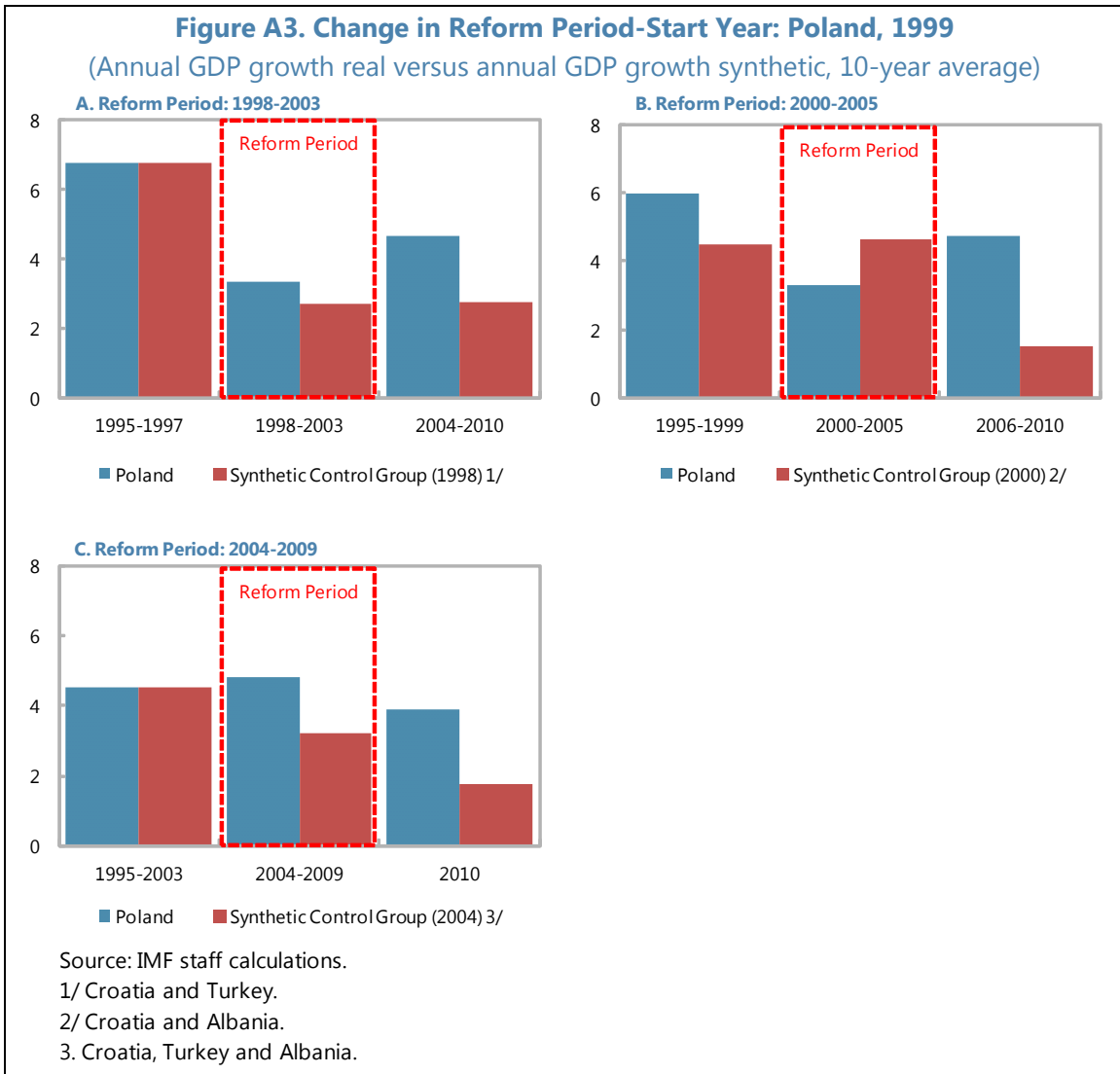




## C. Change in the reform period

### Changes in the start year of reform

3. **The synthetic series was re-estimated for the years 1998, 2000 and 2004** (Figure A3). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (1998 and 2000). However, setting the start of reform in 2004 results in sizeable growth effects.



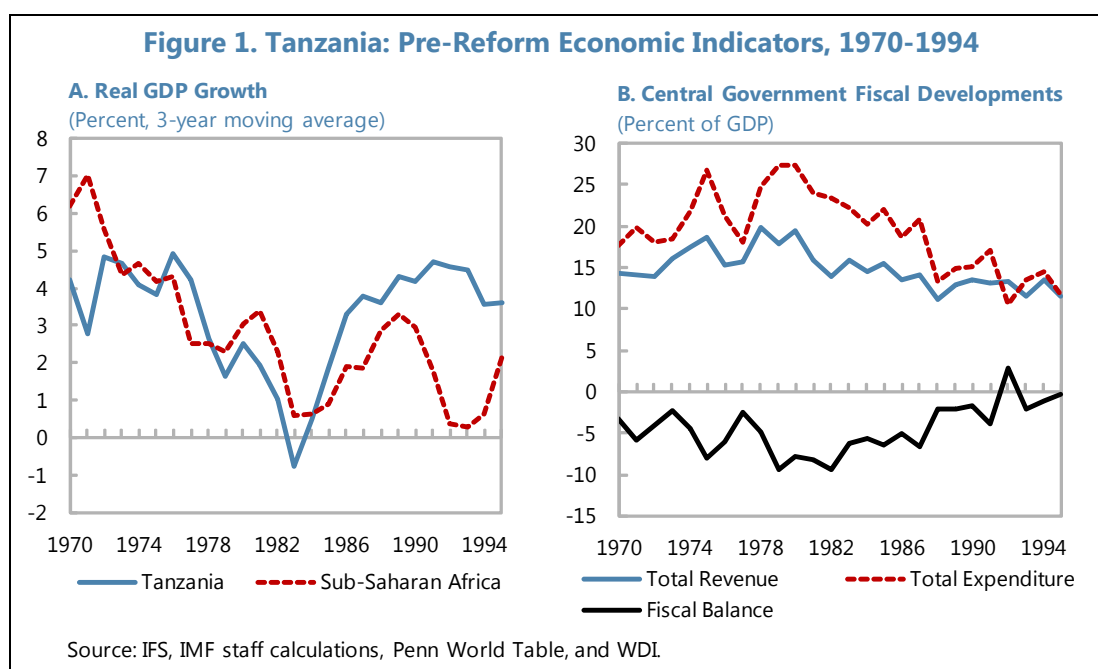
**Changes in end year of reform**

- 4. **Omitted as there are not enough post-reform observations.**

# TANZANIA: FISCAL POLICY AND LONG-TERM GROWTH

## A. Background

1. **During the 1970s and 1980s, unsustainable fiscal policies were accompanied by low and volatile growth rates** (Figure 1). While markets operated relatively freely after independence in 1961, the period of Ujamaa socialism from 1970 to 1985 was marked by pervasive interventionism and state ownership. Centrally determined prices and inefficient public marketing boards for export crops lead to a drop in agricultural production. The oversized and inefficient public sector ran large deficits, which were financed by money creation. Ultimately, this led to an economic decline, with inflation rates of over 30 percent and shortages in foreign exchange, restraining payment of foreign creditors and suppliers.



2. **As the economic decline deepened, in the mid-1980s Tanzania initiated a comprehensive package of reforms aimed at restoring economic stability and promoting rapid growth.** The 1986 Economic Recovery Program comprised a first round of important adjustments in the exchange rate and trade regimes, agricultural markets, and domestic prices. While these steps contributed to a temporary growth spurt, in 1988, 20 percent of GDP was still generated by around 400 SOEs, which assumedly provided about two-thirds of total employment. At the same time, budget management remained weak and the accumulation of arrears and monetization of fiscal deficits continued. Against this backdrop, it became clear that deeper reforms were needed to enhance macroeconomic stability and attract additional official donor assistance.

# FISCAL POLICY REFORMS: FROM FISCAL DOMINANCE TO A STRONG FISCAL FRAMEWORK

## A. Overview

3. **Major fiscal reforms were initiated in the mid-1990s<sup>1</sup>** (Table 1). In 1996, the introduction of a cash budget system as well as the start of the Tanzania Revenue Authority (TRA) set off a broad package of aggressive fiscal reforms, which comprehensively overhauled Tanzania's public sector. During the subsequent five years until 2000, key reform initiatives included the introduction of a modern tax system; a push for privatization of a large share of SOEs; and a redirection of public spending towards high-priority areas such as infrastructure and education. The reform period was accompanied by IMF support.<sup>2</sup>

**Table 1. Tanzania: Major Fiscal Reforms**

Reform Areas	Year	Reform Steps
1. Tax Reform		
VAT	1998-	Introduction of the VAT.
Mining Act	1998-	Introduction of a new fiscal regime for natural resources.
2. Fiscal Institutional Frameworks		
PFM	1996-	Introduction of a cash budget system.
Revenue Administration	1996-	Tanzania Revenue Authority (TRA).
PFM	1998-	Public Financial Management Reform Program (PFMRP).
Revenue Administration	1998-	Strategic plan to outline orientation of the TRA.
3. SOEs		
Privatization	1996-	Privatization and reform of parastatals.
4. Expenditure Reform		
Expenditure Planning/Priority Sectors	1998-	Introduction of a Medium Term Expenditure Framework (MTEF).
Priority Sectors	2000-	Poverty Reduction Strategy Paper.
Public Salaries	2000-	Public Services Reform Program (PSRP).

Source: Nord and others (2009), Utz (2008).

4. **Reforms aimed at strengthening the fiscal institutional framework.** The introduction of a cash budget system along with a single treasury account enhanced the effectiveness of controls on payments. Cash releases to line ministries were now limited to availability and centrally controlled by the Ministry of Finance, which could redirect resources to priority sectors. In addition, the Public Financial Management Reform Program (PFMRP) encompassed improvements in the budget

<sup>1</sup> The selected period reflects the application of the selection criteria discussed in the methodological annex and does not necessarily include all significant fiscal reforms in the country in question over the sample period, or cover the most recent years.

<sup>2</sup> The ESAF/PRGF-supported program lasted from November 1996 to February 2000. The IMF has provided program support to Tanzania almost continuously since 1975. Relations between the Fund and Tanzania were frosty in the early 1980s.

process and the introduction of the computerized Integrated Financial Management System (IFMS) in 1998. At the same time, the TRA consolidated the three separate Income Tax, Sales Tax, and Customs departments, and was guided by a five-year strategic plan to improve revenue collection. Overall, these measures helped curtail leakage, strengthened financial control, and enhanced accountability.

5. **Public service delivery was further improved through expenditure reforms.** Reforms aimed at both directing spending towards high-priority areas, and increasing their effectiveness. The identification of priority spending areas, including education, health, and infrastructure, was supported by the introduction of a medium-term expenditure framework (MTEF) in 1998 and the formulation of a Poverty Reduction Strategy Paper in 2000. In particular, the introduction of the MTEF helped implement a more rigorous budget planning process and entailed public annual expenditure reviews to evaluate the efficiency of spending. In addition, a Public Services Reform Program (PSRP) initiated in 2000 focused on improving public service delivery, including through the adjustment of salary scales to attract and retain qualified staff.

6. **With regard to tax policy, distortionary taxes were replaced by a modern VAT, and the Mining Act set forth a transparent fiscal regime for natural resources.** In 1998, Tanzania replaced the sales tax (which had multiple rates ranging from 5 to 30 percent), the hotel levy, and the stamp duty with a VAT. The VAT was intended to become the single most important revenue source. Also, the tax/royalty regime for the mining sector adopted in the same year helped improve transparency and allowed the government to benefit from the rents generated from natural resources.

7. **Reforms also tackled the fiscal burden caused by the numerous SOEs.** The Parastatal Sector Reform Commission (PSRC) was established in 1993; however, privatization efforts only gained momentum during the second half of the 1990s. By 2000, the vast majority of manufacturing and commercial parastatals were privatized, liquidated, or put under direct budgetary control.

8. **Reform efforts benefited from extensive donor support, including in the form of comprehensive debt relief.** In 2001, in recognition of the substantial progress made in improving macroeconomic stability and reducing poverty, Tanzania was granted external debt service relief of about US\$3 billion (US\$2 billion in net present value terms) under the Heavily Indebted Poor Countries (HIPC) initiative. In 2006, the country also benefited from cancellation of debt under the Multilateral Debt Reduction Initiative (MDRI). As a result of these two initiatives, external debt service declined as a percentage of GDP from about 2.4 percent in 2001 (before HIPC assistance) to about 1.3 percent in 2008 after HIPC and MDRI relief (Nord and others, 2009). This created substantial fiscal space to finance additional growth-enhancing and poverty-reducing programs.

## B. Notable Design Features

9. **Reforms were part of a comprehensive and aggressive reform package comprising broader macroeconomic reforms.** While PFM reforms supported the shift in expenditure policy and contributed to better public service delivery, reforms in other areas helped support macroeconomic stability, create a favorable environment for private sector development, and attract foreign capital. These included liberalizing the current account; opening up the economy to foreign competition; liberalizing the financial sector, including by allowing foreign banks to operate in the country; reforming the monetary policy framework; and establishing a modern central bank. The interaction among these policies and their mutually reinforcing impact were key elements for the overall effectiveness of the reform package, while their swift implementation buttressed reputational credibility.

## C. Outcomes

10. **During the second half of the 1990s, economic growth increased significantly** (Table 3). Real GDP growth increased from 4 percent in the ten years before the reform period, to 4.3 percent during the reform period, and reached about 7 percent in the subsequent ten years. Moreover, the high volatility of GDP growth which was a characteristic of the pre-reform period largely disappeared. Finally, inflation declined drastically, from about 29 percent in the ten years before the reform period, to 7 percent, on average, during the ten years following the reforms.

11. **Expenditure policy reforms resulted in a shift of public spending toward high-priority areas.** Higher domestic revenue collection and increased budget support from donors permitted an overall increase in spending, as its composition shifted. For example, public education expenditure almost doubled, from 1.8 percent of GDP in 1998 to 3.5 percent of GDP in 2005. Similarly, public health spending increased almost threefold, from 1.1 percent of GDP in 1998, to a peak of 3 percent of GDP in 2006. Also, after the privatization of most parastatal enterprises, public investment moved under the direct control of the central government, which contributed to refocusing investment activities to priority areas such as infrastructure, health, and education. Despite this progress, Tanzania continued to face important challenges in strengthening investment planning, and PFM systems more generally, which ultimately have resulted in the accumulation of domestic payment arrears.

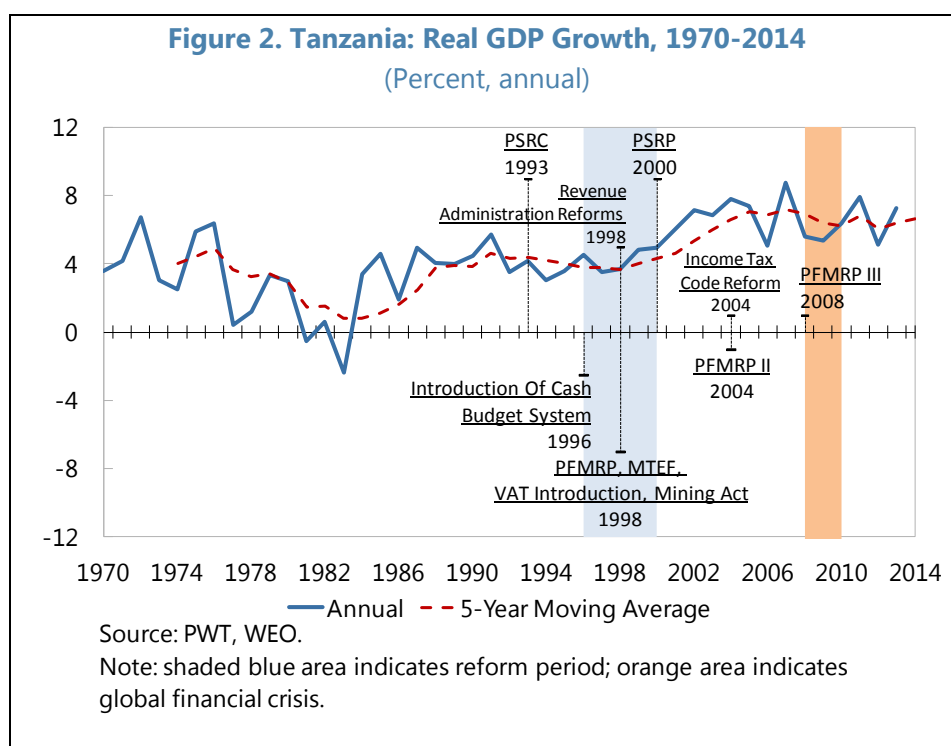
12. **Initially, tax revenue collection was affected negatively by the comprehensive changes in tax policy and administration, but it rebounded strongly thereafter.** Tax revenue declined from 9.1 percent in 1996 to 7.2 percent in 1999, as it took several years before the improvements in tax administration and the tax system rendered positive results. Revenues rebounded strongly thereafter, however, as the VAT became the most important revenue source for Tanzania. By 2006, it accounted for almost 40 percent of total revenue collected. Against this backdrop, Tanzania's tax revenues remain low by regional and international standards, and the VAT regime has over time been undermined by the introduction of numerous exemptions and reliefs—including zero-rating of domestic supplies—as well as by a weak refund system.

13. **Fiscal sustainability improved on the back of higher domestic tax revenues and debt relief, and FDI inflows accelerated.** Fiscal imbalances were reduced by increased tax revenue, resulting from the revamping of the tax system as well as increased budget support. At the same time, Tanzania was granted sizeable debt relief, which permitted a further shift of resources toward more productive spending. Reform efforts like the introduction of a fiscal regime for natural resources further helped in attracting FDI (initially concentrated in gold mining). On average, net FDI inflows increased from 0.5 percent of GDP in the ten years prior to the reform period, to 4 percent of GDP in the ten years after the reforms.

14. **Higher spending on priority areas favored a reduction in the poverty rate, which however failed to translate in lower income inequality** (Figure 6). In Tanzania, the poverty rate fell from about 39 percent in 1991-95 to about 34 percent in 2006-10; at the same time, inequality (as measured by the net Gini coefficient) increased modestly. These divergent trends may stem from the fact that growth in agriculture—the dominant income source for most of the poor—was outpaced by growth in the industrial and service sectors.

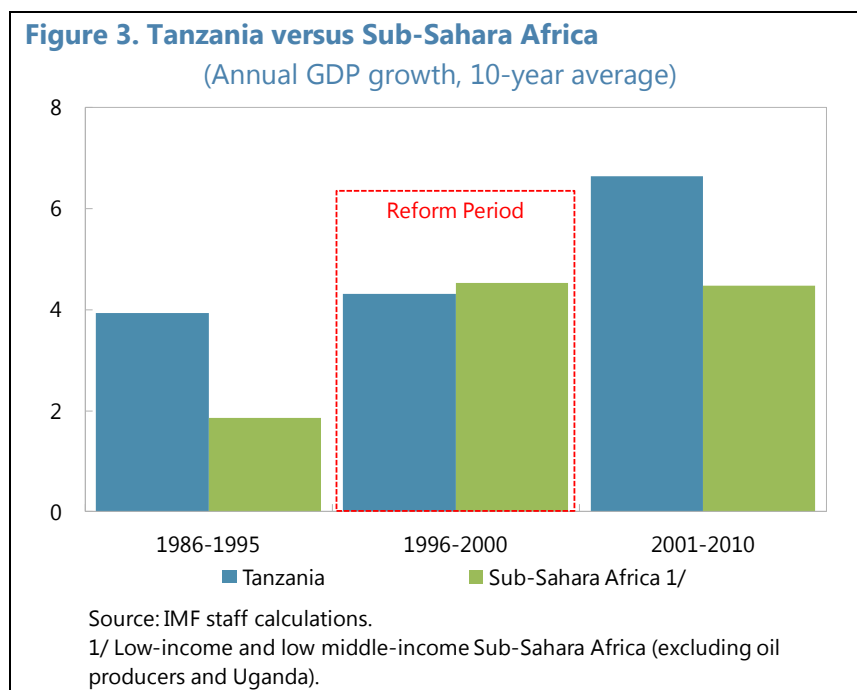
## IMPACT ON LONG-TERM GROWTH

### A. Long-Term Growth Dissected



15. **An assessment of Tanzania's growth experience over time and across peers suggests a positive effect of the reforms** (Figure 2). GDP growth in the period following the reform period, during 2001 to 2010, was about 3 percentage points higher than average growth in the 10 years

preceding the reform period. A simple comparison of growth patterns within the region shows that Tanzania's average growth after the reforms until the onset of the Great Recession was about 2½ percentage points higher than that of its Sub-Saharan peers (Figure 3).

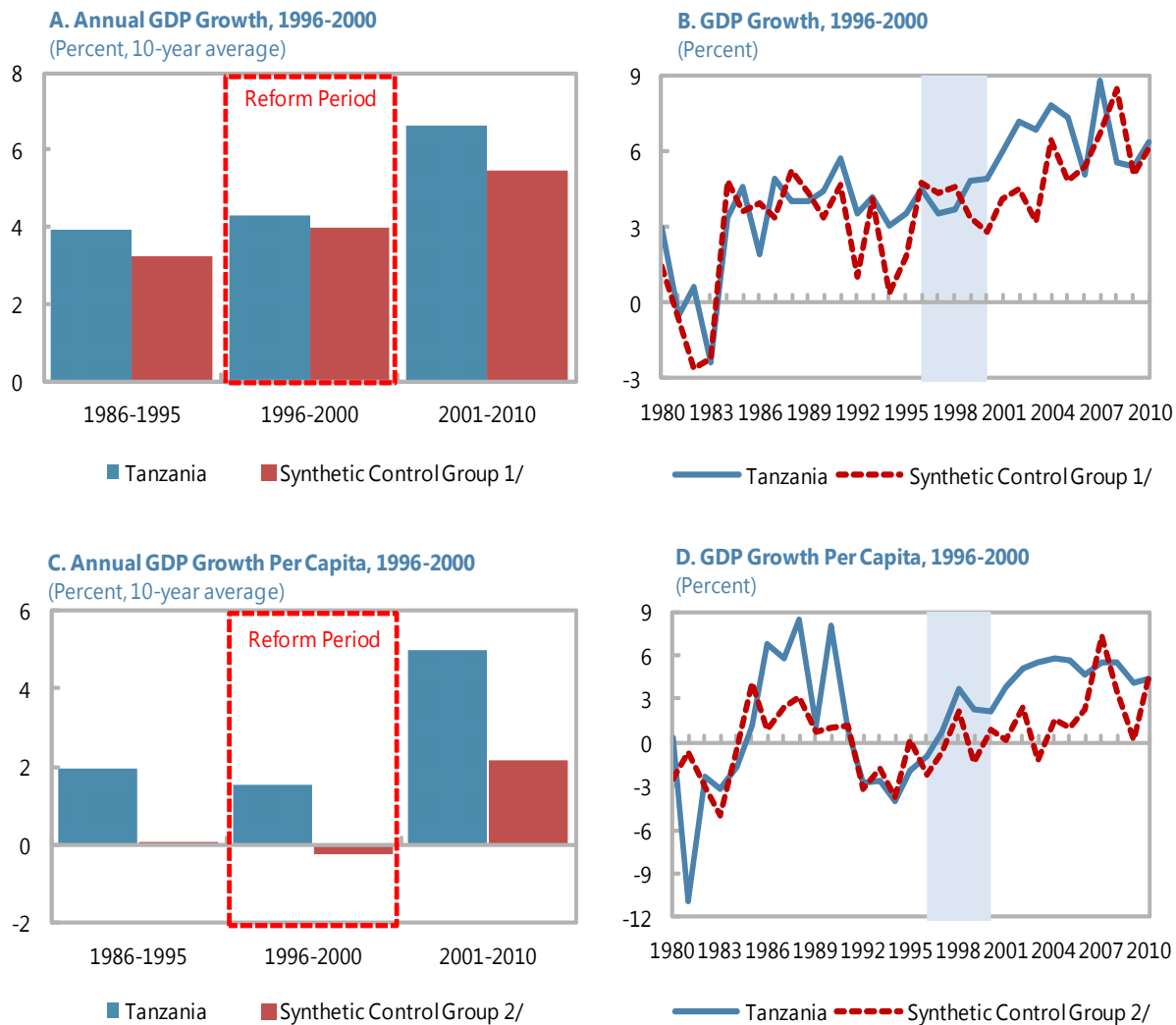


16. **Tanzania's growth after the reform period also exceeded that of a synthetic control group** (Figure 4 and Table 2). The synthetic control approach identifies a counterfactual or "synthetic" GDP growth series for Tanzania, based on standard growth predictors for peer countries.<sup>3</sup>The results of the synthetic approach indicate that, following the reform period until 2008, actual growth was about 1.7 percentage points higher than that of the "synthetic" Tanzania, on average. On a per-capita basis, the corresponding growth differential is even higher, at about 2.8 percentage points. The divergence in the two growth paths is largest immediately after the reform period; the two series converge again from the mid-2000s.

<sup>3</sup> See the methodological annex for more information on the synthetic approach.



**Figure 4. Synthetic Control Method: Tanzania**



Source: IMF staff calculations.

Note: Shaded blue areas indicate reform periods.

1/ Ghana, Burundi, Mozambique, Lesotho, Malawi and Zambia.

2/ Burundi, Ghana, Zambia and Kenya.

**Table 2. Tanzania: Economic Growth Predictor Means before Fiscal Reform**

Variable	Reform Period 1996 1/	
	Real	Synthetic
<b>GDP Growth</b>		
GDP Growth (Percent)	3.8	2.2
GDP Per Capita (2005 I\$/Person)	649.2	842.5
Trade Openness (Percent)	17.8	51.2
Terms of Trade (Percent)	58.3	58.3
Inflation Rate (Percent)	29.3	32.5
Human Capital Index	1.7	1.7
<b>GDP Growth Per Capita</b>		
GDP Growth Per Capita (Percent)	1.4	0.0
GDP Per Capita (2005 I\$/Person)	649.2	899.5
Trade Openness (Percent)	17.8	30.5
Terms of Trade (Percent)	58.3	67.5
Inflation Rate (Percent)	29.3	29.3
Human Capital Index	1.7	1.7

Source: IMF staff calculations.

1/ All variables except GDP growth and GDP growth per capita are averaged for the 1980-1995 period. The average for GDP growth and GDP growth per capita is calculated using the years 1980, 1987 and 1995.

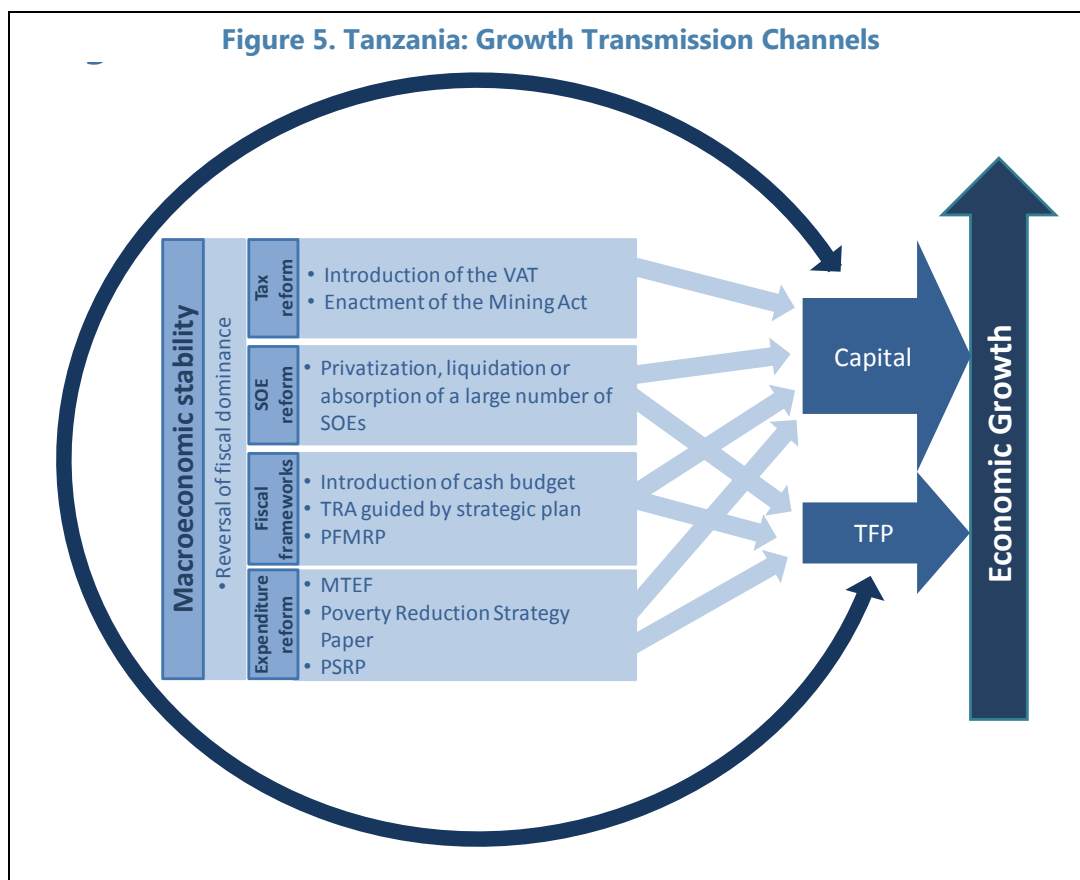
## B. Fiscal Reform: A Game Changer?

17. **The breadth and depth of Tanzania's reform package suggests several transmission channels through which long-term growth may have been affected.** A growth accounting exercise, which decomposes overall GDP growth into the contributions of capital, labor, and total factor productivity (TFP), suggests that the main drivers of GDP growth were TFP in the earlier years after the reform period and capital accumulation in the later years, respectively. In contrast, the contribution of labor does not exhibit major changes over time and declined somewhat during the reform period.

18. **Figure 5 displays potential transmission channels from fiscal policy to growth.**<sup>4</sup> All components of the overall reform package may have positively influenced capital accumulation; either directly, by stimulating capital investments, or indirectly, by creating an environment of macroeconomic stability more conducive to capital accumulation. Likewise, most of the structural reforms contributed to enhancements in efficiency and thus toward aggregate TFP growth.

<sup>4</sup> The analysis in this section draws on the theoretical framework developed in the main paper (SM/15/XX).

However, the effects of fiscal policies on growth are intrinsically difficult to disentangle from those related to other factors, including external shocks and changes in other domestic policies. As a result, it is very difficult to draw definitive conclusions on the policy-growth nexus and any result from this analysis should be interpreted with caution.<sup>5</sup>



19. **Capital accumulation may have been influenced by the whole breadth of the reform package.** Overall, the comprehensiveness of the structural reforms signaled a move towards fiscal sustainability and transparency, which potentially contributed to an environment more conducive to private investment. Other measures specifically facilitating private investment include fiscal institutional reforms; the introduction of the VAT that removed relative price distortions on business inputs; and the privatization of poorly performing SOEs. Also, the reform package helped increase and redirect public investment from low to high priority areas. This may have helped crowd in private investment, specifically in the form of FDI. Notably, the introduction of the fiscal regime for

<sup>5</sup> In the case of Tanzania, this exercise faces the additional challenge given by the very poor quality of labor statistics and data on the capital stock.

natural resources in 1998 increased transparency and predictability for investors and thus may also have positively impacted FDI inflows into this sector.<sup>6</sup>

20. **Similarly, TFP may have been influenced by an increase in efficiency brought forward by a number of the implemented reforms.** Improvements in the fiscal institutional framework, such as PFM and revenue administration reforms, may have positively impacted TFP by reducing allocative distortions. As the growth dividend of public capital spending critically hinges on the quality of the processes that govern public investment selection and management, SOE reform and privatization potentially increased overall productivity through much improved governance and incentive structures. Also, the public spending shift towards education may have helped boost the quality of workers' productive skills and stimulated the creation of new technologies, with ensuing benefits for TFP. Finally, reforms may have contributed to a more FDI-friendly environment with potential benefits in terms of international technology transfers.

21. **On balance, the analysis suggests that fiscal policy may have contributed to Tanzania's strong growth performance after the reform period.** Following the reforms, Tanzania's growth was higher than that of its peers and that of a synthetic control group. The main drivers of GDP growth were TFP and capital accumulation, and there are several possible channels through which these two growth components may have been affected. At the same time, it needs to be emphasized that other macroeconomic reforms, such as financial sector liberalization and trade reforms, as well as external factors, also contributed significantly to the overall growth performance.

## LESSONS

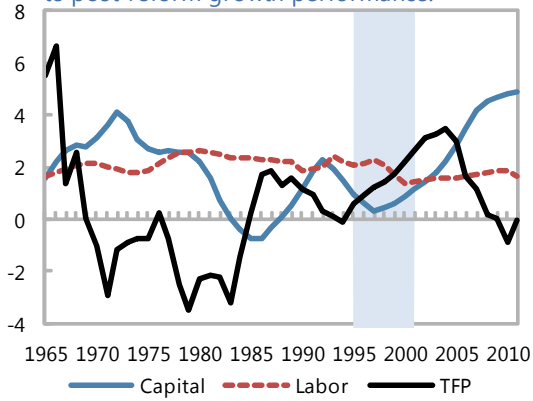
22. **Swift implementation of a wide range of reform measures has the potential to yield strong outcomes.** The comprehensiveness of the reform package and the interaction of key policies signaled a strong commitment, which ultimately led to a buy-in of donors and the private sector. Close coordination and continued engagement with the international community promoted large aid inflows that further supported growth and continuation of reform efforts, eventually leading to comprehensive debt relief under the HIPC and MDRI initiatives.

23. **Growth cannot be seen as the sole driver to reduce poverty or inequality.** Higher long-term growth can make a key contribution to lowering poverty, but it is not sufficient in itself. This underscores the potential role that fiscal policies can play in supporting inclusive growth.

<sup>6</sup> Reforming revenue administrations can help reduce corruption and lead to higher tax collection and investment (Fuest and others, 2013). Weak institutions lower incentives to invest in human and physical capital and in technology (Sala-i-Martin, 2002). An increase in public capital spending can enhance firms' productivity, lower production costs, and thus crowd-in private investment (Romp and de Haan, 2007).

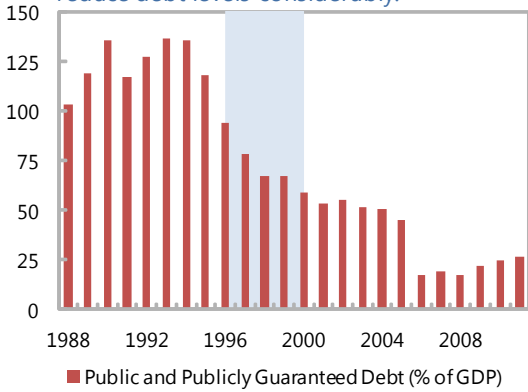
**Figure 6. Tanzania: Fiscal Policy and Growth, 1980-2012**

TFP and capital made the main contribution to post-reform growth performance.

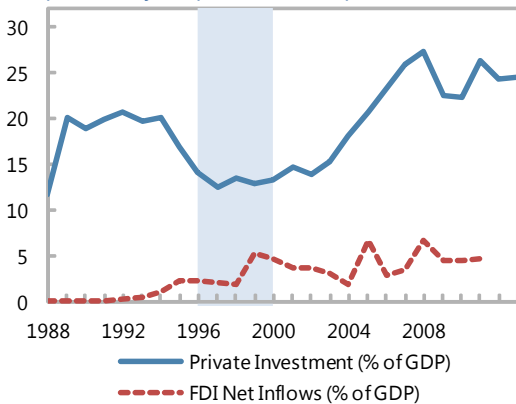


(All series shown as 3-year moving avg. growth contributions)

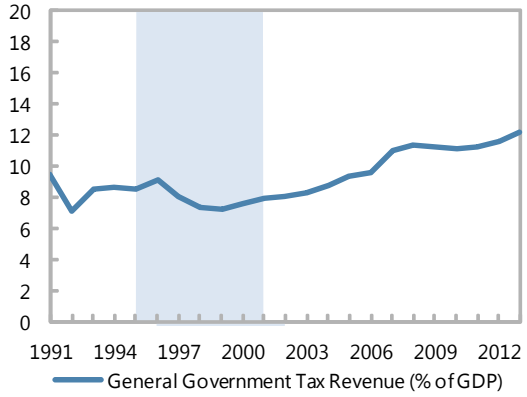
...which together with external support helped reduce debt levels considerably.



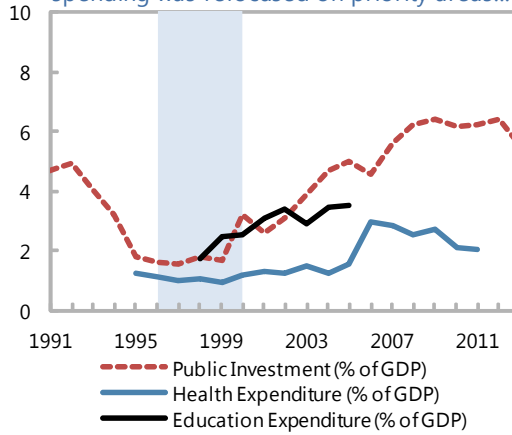
...which together with better fiscal institutions potentially helped crowd in private investment.



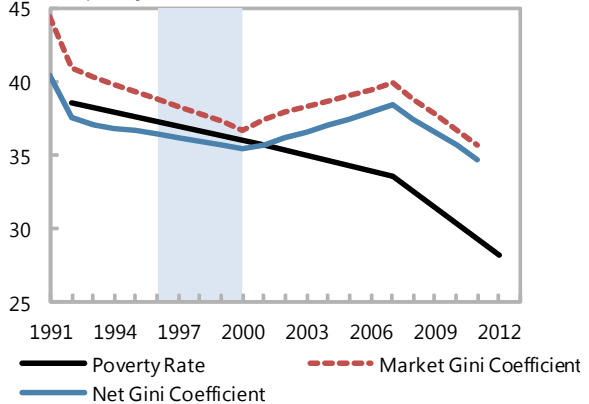
Modernization of the tax system helped raise revenue and reduce distortions...



Public investment increased and overall spending was refocused on priority areas...



While absolute poverty declined, income inequality increased to some extent.



Source: IMF staff calculations, Penn World Table, SWIID 5.0, Tanzania Socioeconomic Database, WDI, and WEO.

Note: Shaded blue areas indicate reform period.

**Table 3. Tanzania: Selected Indicators**  
(Period averages)

	<b>Reform Episode</b>				
	<b>1986-1990</b>	<b>1991-95</b>	<b>1996-2000</b>	<b>2001-05</b>	<b>2006-10</b>
<b>Real Economy</b>	(Percent change, unless otherwise indicated)				
Real GDP	3.9	4.0	4.3	7.0	6.2
Contributions to Growth (Percent) 1/					
Capital	0.7	1.5	0.6	2.3	4.7
Labor	2.0	2.2	1.8	1.6	1.8
Total Factor Productivity	1.2	0.3	1.9	3.1	-0.3
CPI Inflation (Average)	31.3	26.9	12.5	4.5	8.8
<b>General Government 2/</b>	(Percent of GDP, unless otherwise indicated)				
Total Revenue	13.0	12.0	11.8	13.6	15.8
Total Expenditure	16.5	14.2	11.8	15.3	19.0
Fiscal Balance	-3.5	-2.2	-0.1	-1.7	-3.2
Gross Debt 3/	119.3	126.8	73.2	51.3	20.0
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)				
Employment Ratio 4/	49.2	49.4	50.2	49.7	49.6
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)				
Private Investment	16.6	19.4	13.2	16.5	24.2
Foreign Direct Investment (Net Inflows)	0.1	0.8	3.2	3.8	4.4
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)				
Market Gini Coefficient 5/	...	40.3	37.8	38.3	38.8
Net Gini Coefficient	...	37.1	35.9	36.6	37.5
Poverty Rate (Percent) 6/	...	38.6	...	35.7	33.6

Source: IFS, Tanzania Socioeconomic Database, Penn World Table, SWIID 5.0, WEO, and WDI.

1/ Growth accounting estimates are calculated using Penn World Table 8.0.

2/ The revenue, expenditure, and balance figures for 1986-1990 reflect central government.

3/ Includes publicly guaranteed debt.

4/ Percent of the total population that is employed.

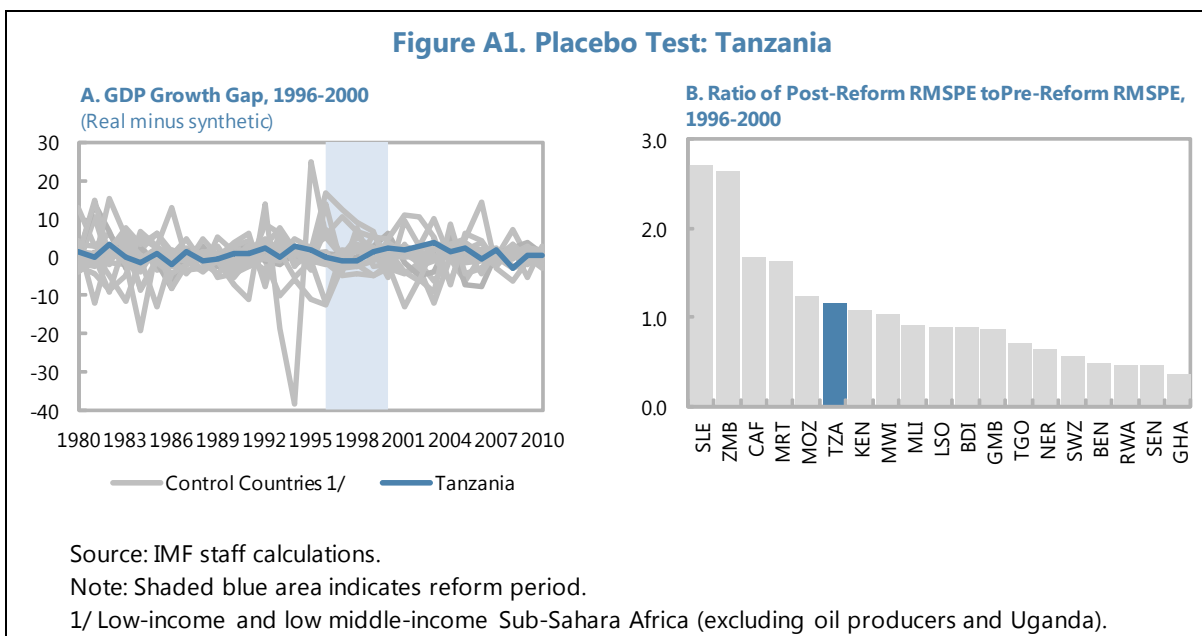
5/ "Market" Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

6/ Percent of the population falling below the nationally defined "basic needs poverty line".

## Appendix. Robustness Tests for Tanzania

1. To test the sensitivity of the baseline results for Tanzania, the following robustness tests, broadly in line with Abadie (2014) were performed: (i) placebo tests; (ii) sequential exclusion of each comparator country from the synthetic series; and (iii) changes in the reform period.

### A. Placebo Tests

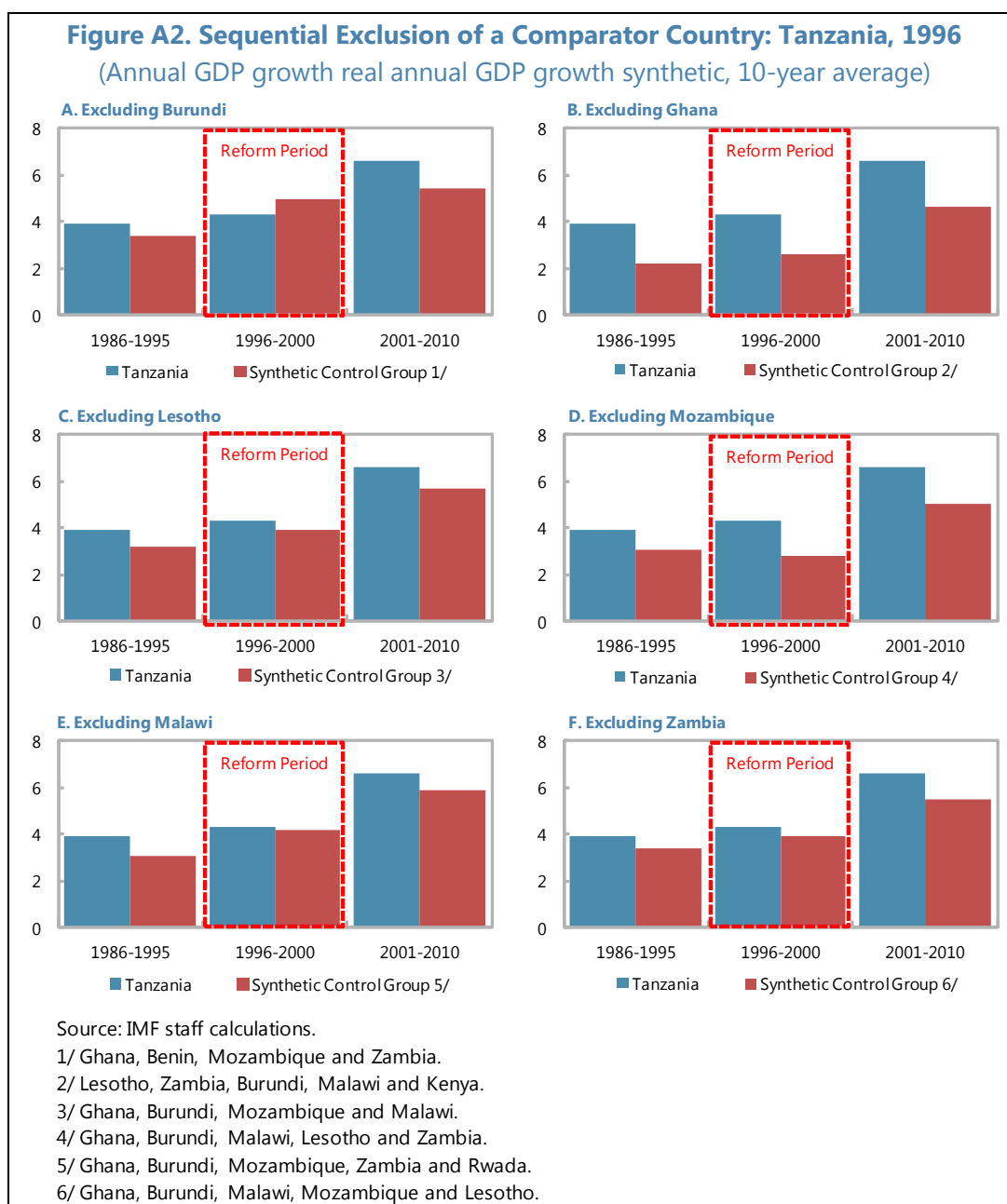


2. Each country in the group of the input group used<sup>1</sup> was alternatively chosen as the tested country when in fact no fiscal reform took place in that country (Figure A1). If the estimated effect for Tanzania is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in Tanzania was not demonstratively higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of either the size of growth gaps and ratios of post-reform and pre-reform RMSPEs. Results should be interpreted with caution, however, because pre-reform match was poor in application to some comparator countries.

<sup>1</sup> Low Income and Low Middle Income Sub-Saharan Africa (excluding oil producers and Uganda)

## B. Sequential Exclusion of a Comparator Country

3. The sensitivity of the baseline results was tested by sequentially excluding each of the countries that contributed to the synthetic control group with a positive weight, and re-estimating the model (Figure A2). This implied the sequential exclusion of the following countries: Ghana, Burundi, Mozambique, Lesotho, Malawi and Zambia. The post-reform growth gap is higher than the pre-reform growth gap in most cases, indicating that the baseline results are broadly robust.

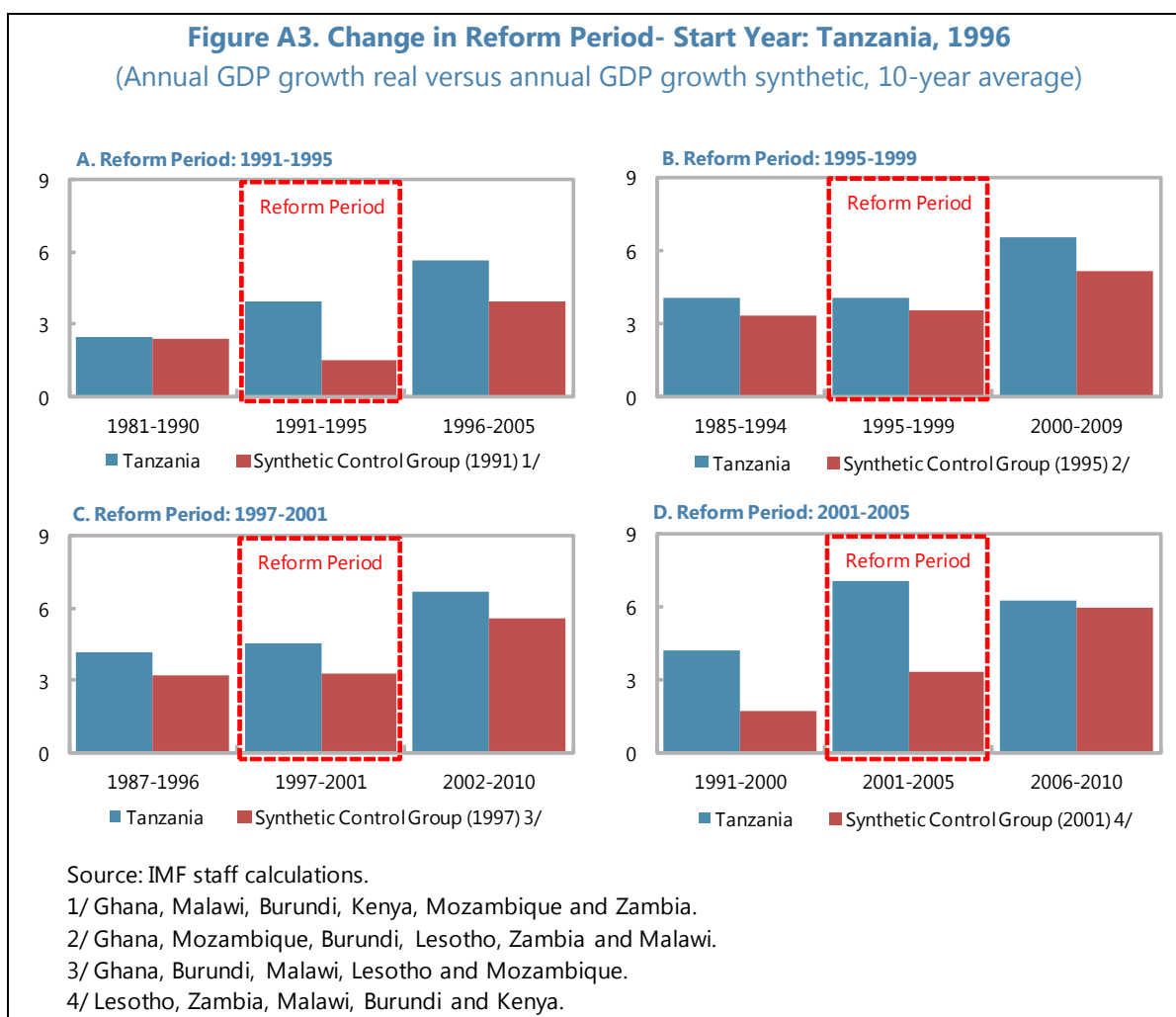




### C. Changes in the Reform Timing

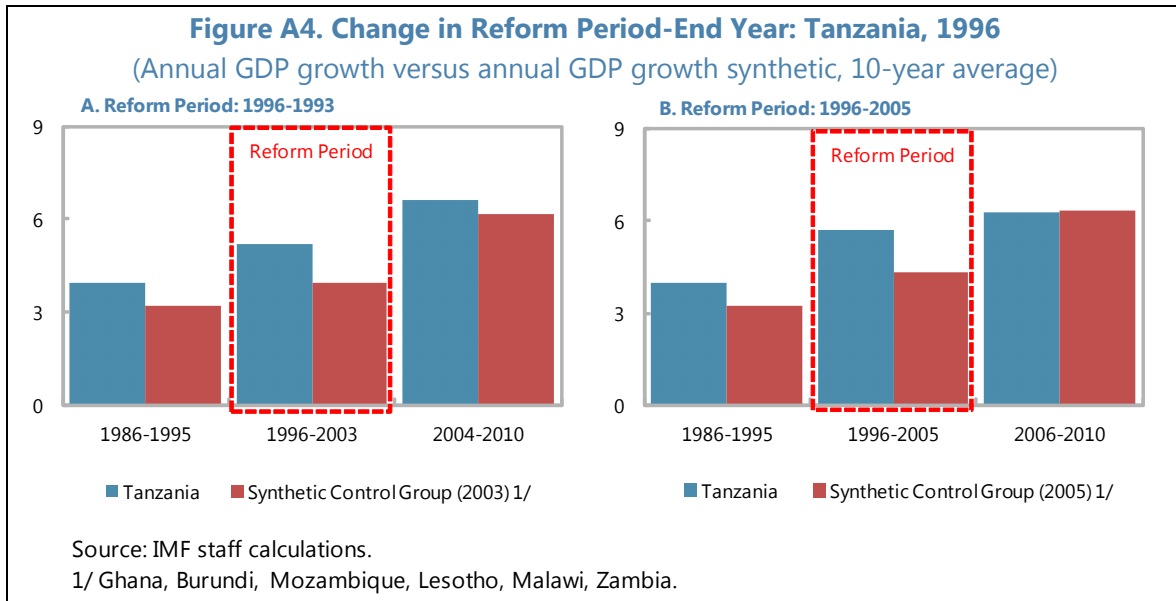
#### Changes in the start year of reform

4. **The synthetic series was re-estimated for the years 1991, 1995, 1997 and 2001** (Figure A3). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (1995 and 1997), but setting the start of reform in 2001 results in disappearance of the growth effects. These results confirm that the fiscal reform is the likely reason for the positive growth effect in the baseline.



**Changes in the end year of reform**

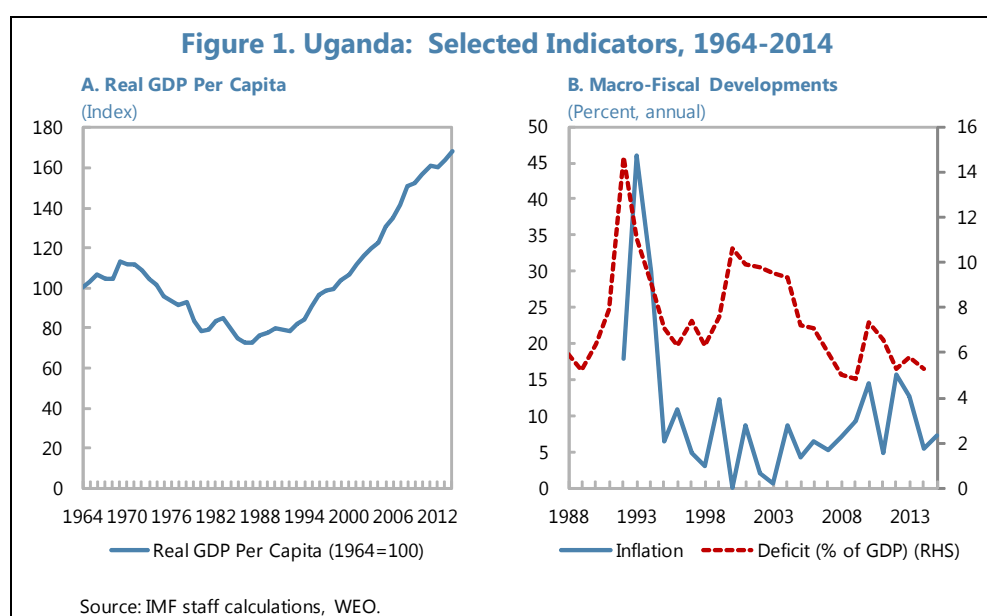
5. **The difference in average growth rates was recalculated by setting the end of the fiscal reform period to 2003 and 2005, respectively** (Figure A4). The purpose of this exercise is to examine whether our conclusion in the baseline is sensitive to the timing of the end of the reform, given its uncertainty. Results confirm that the conclusion holds when the end of the fiscal reform period changes.



## UGANDA: FISCAL POLICY AND LONG-TERM GROWTH

### A. Background

1. **Fiscal policy played an active role in Uganda's economic development especially after peace was established in 1986.** A sequenced reform package focused first on establishing macroeconomic stability and fiscal discipline, then tax and expenditure reform. The impact on growth was remarkable making Uganda one of the fastest growing economies in sub-Saharan Africa in the 20 years after the reforms began, although some of the momentum has been lost recently as growth has slowed. It is the aim of this case study to show that fiscal policy was one factor that contributed to economic prosperity in Uganda and that it has the potential to do so again.



2. **Between independence in 1963 and 1986, Uganda experienced periods of relative prosperity followed by years of war and strife** (Figure 1). Real GDP per capita growth averaged 1.8 percent between 1964 and Idi Amin's coup in 1971. The Amin regime lasted until he was deposed in 1980, only to be followed by years of further conflict under Obote, which did not end until 1986. During this period, real GDP per capita declined by 35 percent, or an average of 2.6 percent per year. Inflation averaged 50 percent caused mainly by the central bank financing of the government's persistent deficits. By FY1987/88, revenues were only about 5 percent of GDP.

3. **When the National Resistance Movement (NRM), led by Yoweri Museveni, took over in 1986, a period of stability began that enabled a series of fiscal reforms** (Table 1)<sup>1</sup>.

Macroeconomic stability was achieved through two main channels that involved changes to both fiscal and monetary policy. First, the exchange rate was allowed to fully float in 1990 and the depreciation that occurred thereafter, in conjunction with less distortionary trade taxes, allowed exports to recover. Second, strict expenditure controls and improved institutional arrangements were used to reduce budget deficits and prevent their monetization, which lowered inflation dramatically. Once stabilization had been achieved, a VAT was introduced, the income tax system was reformed, and spending was targeted towards the alleviation of poverty. The commitment to macroeconomic stability, sound fiscal management, and concrete action towards the reduction of poverty, allowed Uganda to be one of the first countries to receive debt relief under the Highly Indebted Poor Country (HIPC) Program.

4. **More recently, GDP growth appears to be moderating, suggesting a new series of reforms may be warranted.** GDP growth over the period 2009–2014 averaged 5.2 percent compared to 7 percent over the 1991–2008 period. A tax GDP ratio that has remained essentially flat around 12 percent since 2008, with a VAT compliance gap of an estimated 60 percent, and public investment in infrastructure that has not kept pace with that of other sub-Saharan countries are potential contributing factors.<sup>2,3</sup> Conflicts in major trading partners and a food price shock have also weighed on growth in recent years. The passage of a public finance management bill, tax policy reform in the latest budget, and commencement of two large hydro-power projects are hopeful signs that fiscal policy may be contributing positively to Uganda’s long-run growth potential.

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<sup>1</sup> The period reflected in Table 1 is based on the selection criteria discussed in the methodological annex and does not necessarily include all significant fiscal reforms in the country in question over the sample period, or cover the most recent years.

<sup>2</sup> The most recent budget eliminated a significant number of VAT exemptions and zero rates, which should improve the efficiency of the VAT system, although many taxpayer-specific exemptions remain.

<sup>3</sup> Public investment in Uganda has essentially been flat, as a share of GDP, over the last 20 years and significantly below that of its Sub-Saharan peers (IMF, 2014b). While the benefits of public investment are clear, it is important that the project management capacity exists to implement large infrastructure projects. The extent to which public investment could overheat the economy, crowd out private-sector investment or threaten debt sustainability should also be taken into consideration. The government of Uganda recently created a Public Private Partnership unit within the Finance Ministry and well as a separate department whose sole purpose is to strengthen public investment management (IMF, 2014a).

## FISCAL POLICY REFORMS

### A. Overview

5. **A sequence of fiscal reforms that took place over the 1990s began with macroeconomic stabilization and ended with expenditure prioritization.** The first wave of fiscal reforms was aimed at achieving macroeconomic stability by reigning in deficits, reducing inflation, and encouraging exports. This was achieved by liberalizing the coffee market, moving towards a floating exchange rate, and large expenditure cuts made possible by strengthened fiscal institutions and improved public financial management. Tax reform and the prioritization of expenditures towards the alleviation of poverty followed.

**Table 1. Uganda: Major Fiscal Reforms**

Reform Areas	Year	Reform Steps
1. Trade Reform		
Floating Exchange Rate	1990-	Gradual move to floating exchange rate.
Privitization of SOEs	1991-	Coffee Marketing Board monopoly ended.
Non-Tariff Barriers	1991-95	Non-tariff barriers reduced.
2. Expenditure Reform		
Spending Reductions	1992-	Large reduction in deficits through cuts in expenditures.
Budget Planning	1997/98	Medium term expenditure framework.
Expenditure Prioritization	1997-	PEAP and PAF created.
3. Fiscal Institutional Frameworks		
Revenue Administration	1991-	Uganda Revenue Authority (URA) created.
PFM	1992-	Cash management begins.
PFM	1992-	Merger of Ministry of Finance and Ministry of Economic Development.
4. Tax Reform		
Trade Taxes	1991-	Export taxes eliminated and import duties reduced.
VAT	1996-	VAT replaced distortionary Commercial Transaction Levy (CTL) and Sales Tax.
PIT	1997-	Exemptions removed and base widened.

Source: IMF staff reports, Kuteesa and others (2010).

#### Reform Area 1: Trade Reform

6. **Trade was encouraged through a change in exchange rate policy, liberalization of state owned marketing boards, and reduction of distortionary trade taxes and non-tariff barriers.** Export duty, mainly on coffee, was phased out in the early 1990s after contributing as much as 50 percent to government revenues in the 1980s. Import duties, which were as high as 350 percent in the early 1990s, were reduced to a maximum of 20 percent by 2000. In addition, outright tax reductions, import bans, and other trade barriers were reduced and the duty rate was simplified. The unification of the parallel and official exchange rates put the Ugandan shilling on the path to a fully floating rate, further reducing distortions and encouraging trade. Finally, the Coffee Marketing Board's monopoly on coffee exports was terminated in 1991 when it was turned into a limited liability company, and the market was opened up to private-sector participants.

## Reform Area 2: Expenditure Reductions and Institutional Reform

7. **Strengthened public service institutions and improved public financial management reduced deficits and kept inflation low.** The Ministry of Planning and Economic Development (MoPED) was merged with the Ministry of Finance (MoF) creating one institution in 1992 whose key task would be to rein in deficits and maintain budget discipline.<sup>4</sup> Cash management was introduced as the main tool for ensuring adherence to planned spending targets. Tax revenues, donor contributions, and inflation were tracked by a Cash Management Committee on a monthly basis and cash releases to departments were adjusted accordingly.

8. **The Uganda Revenue Authority (URA) was created in 1991, the second of its kind in sub-Saharan Africa.** It consolidated operations and management of tax and customs collection that were previously carried out in two different departments of the Ministry of Finance. The URA was able to set salaries at rates that were competitive with the private sector and was given a clear objective of increasing the tax-to-GDP ratio by 1 percent per year in order to achieve fiscal sustainability and reduce dependence on aid.

## Reform Area 3: Tax Reforms

9. **A distortionary Sales Tax and Commercial Transactions Levy was replaced by a VAT in 1996 and a new Income Tax Act was introduced in 1997.** The new VAT was set at 17 percent to keep the new tax revenue neutral in the short-term and ease transition into the new tax regime. The overhaul of the Income Tax Act clarified many of the existing laws and greatly expanded the income tax base. In the 1980s, the income tax base was extremely narrow and consequently, generated very little revenue. Salaries of public servants, police, army, and prison personnel were all exempt from tax as were activities of donor-funded operation, and parastatal organizations. The law also provided for a significant number of non-taxable allowances that led employers to construct pay packages that favored this type of remuneration over salaries. Key provisions in the new income tax act included the repeal of non-taxable allowances, redefining gross income to worldwide concept, and the elimination of tax holidays granted under the Investment Code. Public-sector incomes became taxable and the discretionary powers given to the Minister of Finance to grant exemptions were eliminated.

## Reform Area 4: Expenditure Prioritization

10. **Macroeconomic stability and increased revenues allowed the government to focus its efforts on the reduction of poverty.** There was a real concern in Ugandan society that the increase in economic growth was not benefitting the most vulnerable. In response to this, the government began targeting high-priority spending areas including education, health, agriculture, and water

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<sup>4</sup> The Uganda Parliament has recently passed a PFM bill that requires the Minister of Finance to create a Charter of Fiscal Responsibility that should improve formulation and implementation of fiscal policy. The bill also established the basis for a fiscal regime to manage new-found oil and mineral deposits in a responsible and transparent manner, with the fundamental principle that oil revenues are invested in infrastructure.

quality through the creation of the Poverty Eradication Action Plan (PEAP) and Poverty Alleviation Fund (PAF). This process was fully incorporated into the Medium-Term Economic Framework (MTEF), which increased the efficiency of spending and allowed for closer monitoring of its effectiveness.

## B. Notable Design Features

11. **The PEAP and PAF helped demonstrate to the donor community that Uganda was serious about reducing poverty.** While it is true that a portion of the expenditure budget would have been spent on sectors aimed at alleviating poverty, by making an explicit plan and creating a dedicated fund for this purpose, the Ugandan government was able to demonstrate its level of commitment to the donor community. This helped reassure them, that should debt relief be granted, the savings from reduced interest payments would be spent appropriately and could be tracked in a transparent manner.
12. **Some elements of the VAT law have hindered its effectiveness.** When the VAT law was first enacted, the threshold levels were set so low that the number of traders included in the VAT register was more than the URA could effectively handle. Also, some of the traders captured by the threshold level were so small that they were unable to cope with the accounting requirements of the new system. Another design flaw is a cap on the VAT refunds, which was originally put in place as part of the cash rationing system, and still exists today. Uncertainty related to legitimate refunds, strains the cash flow of the private sector and undermines the credibility of the system as a whole. It also has the potential to increase corruption as taxpayers are tempted to influence officials to receive their refunds quicker.

## C. Outcomes

13. **Beginning in the early 1990s, economic growth increased significantly, budget balances improved, and the government became less reliant on deficit monetization, reducing inflation.** Real GDP growth averaged 6.5 percent from 1991 to 2013. Real GDP per capita growth averaged 3.2 percent over the same period. The overall budget deficit, excluding grants, peaked in FY1991/92 at 14.7 percent of GDP; however, by FY1995/96, the deficit was just over 6 percent of GDP and since that time it has averaged to about 7 percent. In the most recent fiscal year (FY2013/14), it was 5.4 percent of GDP (Table 3). Inflation, as measured by the GDP deflator, was nearly 200 percent in 1987 and 1988. Over the period 1964 to 1986, it averaged 38 percent per year and since 1989, it has averaged around 16 percent. Since 1999, inflation has averaged 7.1 percent (Figure 7).
14. **A reduction of distortionary taxes, non-tariff barriers, and lower real effective exchange rates increased trade.** The real effective exchange rate, as published in the Regional Economic Outlook, declined by about a third over the period from 1982 to 2010. Over the same period, trade, defined as the sum of exports and imports, increased from around 10 percent to around 60 percent of GDP.

15. **An improvement in the tax mix away from trade taxes towards VAT, and a more comprehensive income tax system, increased the tax-to-GDP ratio.** The total tax-to-GDP ratio increased from 5 percent in FY1997/98 to 12.5 percent in FY 2012/13. The majority of this 7.5 percent increase has come from income taxes (4 percent) followed by VAT (2.7 percent), and excises taxes (2 percent). Trade taxes declined as a share of GDP by 1.1 percent. Recent tax revenue has been flat, with total tax revenue in FY2013/14 being the same, in percent of GDP, as it was in 2007/08.<sup>5</sup>

16. **Spending on education, health, water quality, and agriculture increased significantly throughout the 1990s and helped to reduce poverty.** Spending as a share of GDP on these four categories increased from 1.6 percent of GDP in 1998 to 5.3 percent in 2011, before slowing to 4.3 percent of GDP in 2013. The proportion of Ugandans living below the poverty line has decreased from 56.4 percent in 1992 to 19.7 percent in 2013, allowing Uganda to meet a Millennium Development Goal of halving the number of people living in extreme poverty.<sup>6</sup>

17. **A commitment to poverty reduction and strong macroeconomic management helped Uganda receive debt relief and lower its debt levels.** Over the period 1991–2014, external debt as a share of GDP declined from nearly 100 percent to less than 20 percent due to various debt relief initiatives. Between 2004 and 2007 alone, the external debt-to-GDP ratio was reduced by 50 percent of GDP. Over the period from FY1995/96 to FY2006/07, Uganda saved a total of around \$1 billion in external debt service payments (Kuteesa and others, 2010).

## IMPACT ON LONG-TERM GROWTH

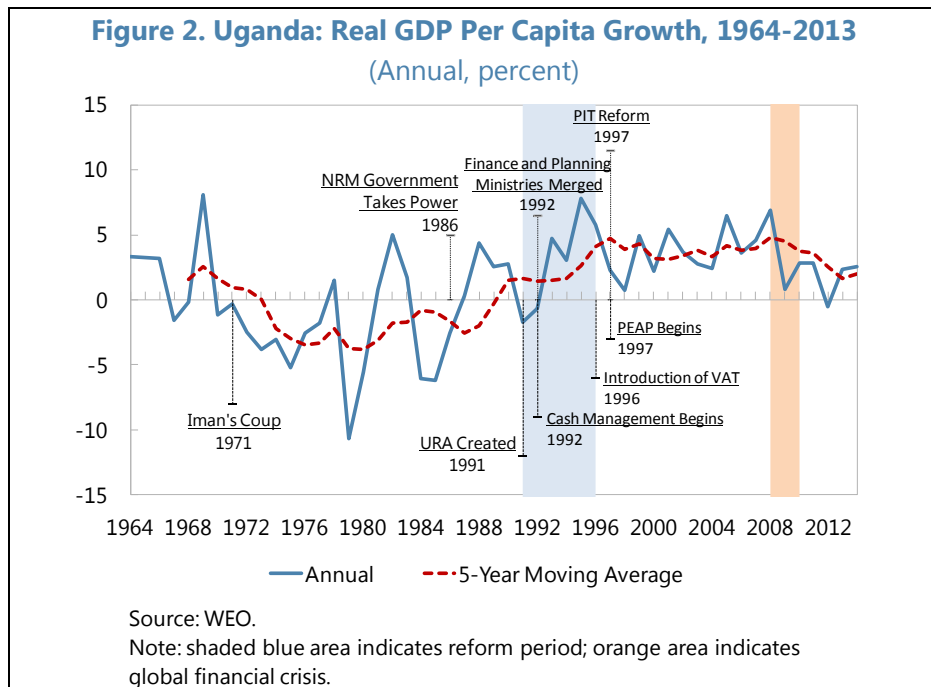
### A. Long-Term Growth Dissected

18. **The increase in growth during the 1990s can be put in context by evaluating it against a set of appropriate comparators** (Figure 2). As shown below, real GDP per capital growth exhibited a clear turnaround beginning in 1987 after slowing sharply during the Amin and Obote II regimes. Growth increased steadily over the next two decades before moderating in the last five years. In order to assess whether the growth performance in Uganda was stronger than it would have been in the absence of fiscal reforms, it must be evaluated against a set of appropriate comparator countries.

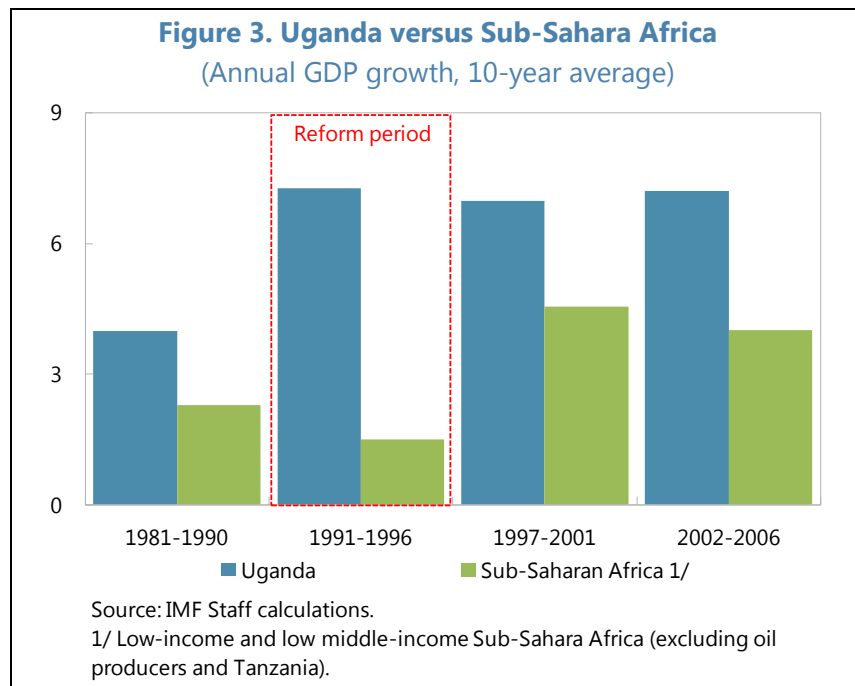
<sup>5</sup> Uganda has recently undergone a GDP rebasing exercise resulting in a 17 percent increase in the level of GDP and a reduction in the tax-to-GDP ratio. Over the period FY2009/10 to FY2013/14 the tax-to-GDP ratio was 10.6 percent compared to 12.3 percent prior to rebasing.

<sup>6</sup> Of course the number of people living in extreme poverty remains high despite the reduction in the ratio.





19. **A simple comparison between Uganda’s post-reform real GDP growth and the growth of its sub-Saharan peers indicates that growth was substantially higher in Uganda** (Figure 3 and Table 2).<sup>7</sup> Real GDP growth in Uganda averaged 4.2 percent in the ten years leading up to the reform period<sup>8</sup>, and averaged 7 percent over both five-year periods after the reforms. Average growth over the first five-year period (1997–2001) was 2.5 percentage points higher than the average

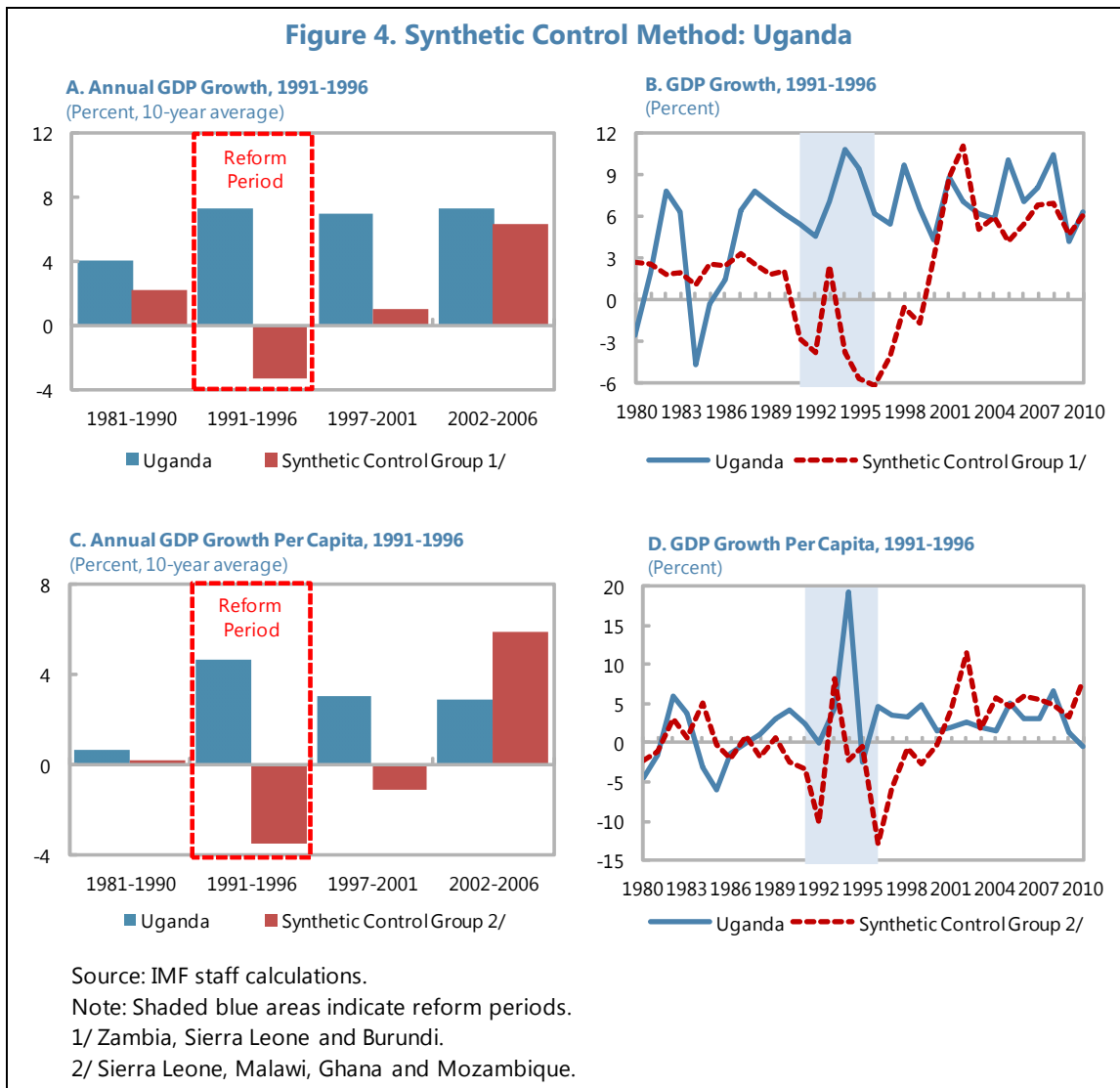


<sup>7</sup> The donor pool of countries includes low and middle income sub-Saharan countries that are not oil exporters.

<sup>8</sup> The reform period corresponds to the period during which the substantial fiscal reforms were taken place and purposely begins four years after conflict has ceased so as not to attribute any post-conflict boost in growth to fiscal policy.

growth in sub-Saharan Africa. The gap increased further to 2.9 percentage points over the 2002–2006 period.

20. **This result is supported by comparing post-reform growth with an estimated counterfactual growth series that would have prevailed in the absence of reforms based on the synthetic control method** (Figure 4). In order to further test the hypothesis that Uganda growth rates increased post-reforms, a counterfactual growth series was created using a synthetic control group and a set of common growth predictors.<sup>9</sup> The results show that average real GDP growth during the five-year period following the reform was about 5.2 percentage points higher than the average growth generated by the synthetic control group. The relatively superior performance narrowed over the second five-year period to 2.5 percentage points of GDP.



<sup>9</sup> See the methodological annex for details on the synthetic control method.

**Table 2. Uganda: Economic Growth Predictor Means before Fiscal Reform**

Variable	Reform Period 1991 1/	
	Real	Synthetic
<b>GDP Growth</b>		
GDP Growth (Percent)	1.1	2.5
GDP Per Capita (2005 I\$/Person)	544.3	906.4
Trade Openness (Percent)	29.4	29.4
Terms of Trade (Percent)	73.2	82.4
Inflation Rate (Percent)	115.3	47.1
Human Capital Index	1.5	1.5
<b>GDP Growth Per Capita</b>		
GDP Growth Per Capita (Percent)	-2.0	-1.6
GDP Per Capita (2005 I\$/Person)	544.3	807.1
Trade Openness (Percent)	29.4	45.4
Terms of Trade (Percent)	73.2	73.0
Inflation Rate (Percent)	115.3	47.3
Human Capital Index	1.5	1.4

Source: IMF staff calculations.

1/ All variables except GDP growth and GDP growth per capita are averaged for the 1980-1990 period. The average for GDP growth and GDP growth per capita is calculated using the years 1980, 1985 and 1990.

21. **To check the robustness of the results above, a placebo test was performed.** A placebo test checks whether the results for Uganda differ significantly from those obtained by choosing a country at random. Following Abadie (2014) each country in the group of sub-Saharan African countries was assumed to have had the identical event of interest (i.e., the fiscal reforms) as Uganda when, of course, it did not. The effect of the fiscal reform can then be deemed significant if the estimated effect for Uganda is considerably larger than the placebo effects. Figure A1 shows that the difference between the selected countries' GDP growth and synthetic countries' GDP growth is distinctly stronger for Uganda (blue line) than the placebo countries (grey lines).

22. **The results of the synthetic control method are also robust to the choice of the dependent variable and the selection of comparator countries.** The exercise was repeated using real GDP per capita growth. Real GDP per capita growth in Uganda exceeded growth in the synthetic control group by 4.3 percentage points during the first five-year post-reform period—similar to results found using real GDP growth. However, growth in Uganda during the second five-year period (2002–06), was actually lower than growth in synthetic Uganda by 1.8 percentage points. To test the sensitivity of the results to the selection of comparator countries, each country in the control group was systematically removed from the donor pool of 15 sub-Saharan Africa countries. Figure A2 shows that the result is not sensitive to the removal of the comparator countries.

## B. Fiscal Reform: A Game Changer?

23. **The comprehensive nature of Uganda's reform package suggests several possible transmissions channels through which long-term GDP per capita growth could have been affected.** A growth accounting exercise that decomposes real GDP per capita into the contributions of capital deepening, labor utilization, human capital, and total factor productivity (TFP) shows the main driver of growth in the years directly following the reform was TFP with human capital and capital deepening contributing a larger share in the latter period. Labor utilization has not contributed to GDP per capita growth over the reform period.

24. **Macroeconomic stability and a more favorable tax regime created an environment conducive to private investment and trade** (Figure 5). Sustained fiscal consolidation supported by positive external conditions enhanced fiscal sustainability, provided the space for large reductions in taxes and non-tariff barriers, which created an environment conducive to investment and trade. Productivity may have been enhanced through trade as countries with a high degree of trade openness have been shown to benefit more from productivity growth in partner countries (Helpman, 2006).

25. **Improved public-sector institutions and increased efficiency from the reform of state-owned enterprises contributed to TFP.** The public spending shift towards education in the mid-1990s may have helped increase the productivity of workers and stimulate technological advancement, further stimulating TFP. The positive impact human capital accumulation can have on output and TFP has been explored extensively in the endogenous growth literature. For example, Lucas (1988) emphasized that economies with high levels of human capital have higher instances of learning from others and these positive spillover effects can increase productivity.

26. **Labor utilization has not contributed to growth over the reform period due in large part to the demographic circumstances in Uganda.** The lack of contribution from labor utilization is likely linked to strong population growth and the fact that employment growth cannot keep pace with growth in the labor force. Indeed this is often cited as a headwind to increased living standards in Uganda (Selassie, 2008). On their path through the development cycle, other countries have realized a demographic dividend whereby life expectancy increases and fertility rates decline, slowing population growth and lowering the dependency ratio. However, this has not been the case for Uganda. Increased life expectancy has not been matched by reduced fertility rates and population growth remains one of the highest in the world.

## LESSONS

27. **Stability and confidence in government is a pre-condition for growth.** Although the NRM brought peace to a country that desperately needed it, this was only the first step in the revival of growth. The reform package in Uganda focused on achieving macroeconomic stability as its first priority. It was correctly recognized by the president and policymakers that meaningful structural reform and private-sector involvement could not happen in an environment of persistently high inflation and fiscal profligacy. Furthermore, eliminating long-standing policies of exchange rate, and export price controls allowed the private sector to become active participants in the economy.

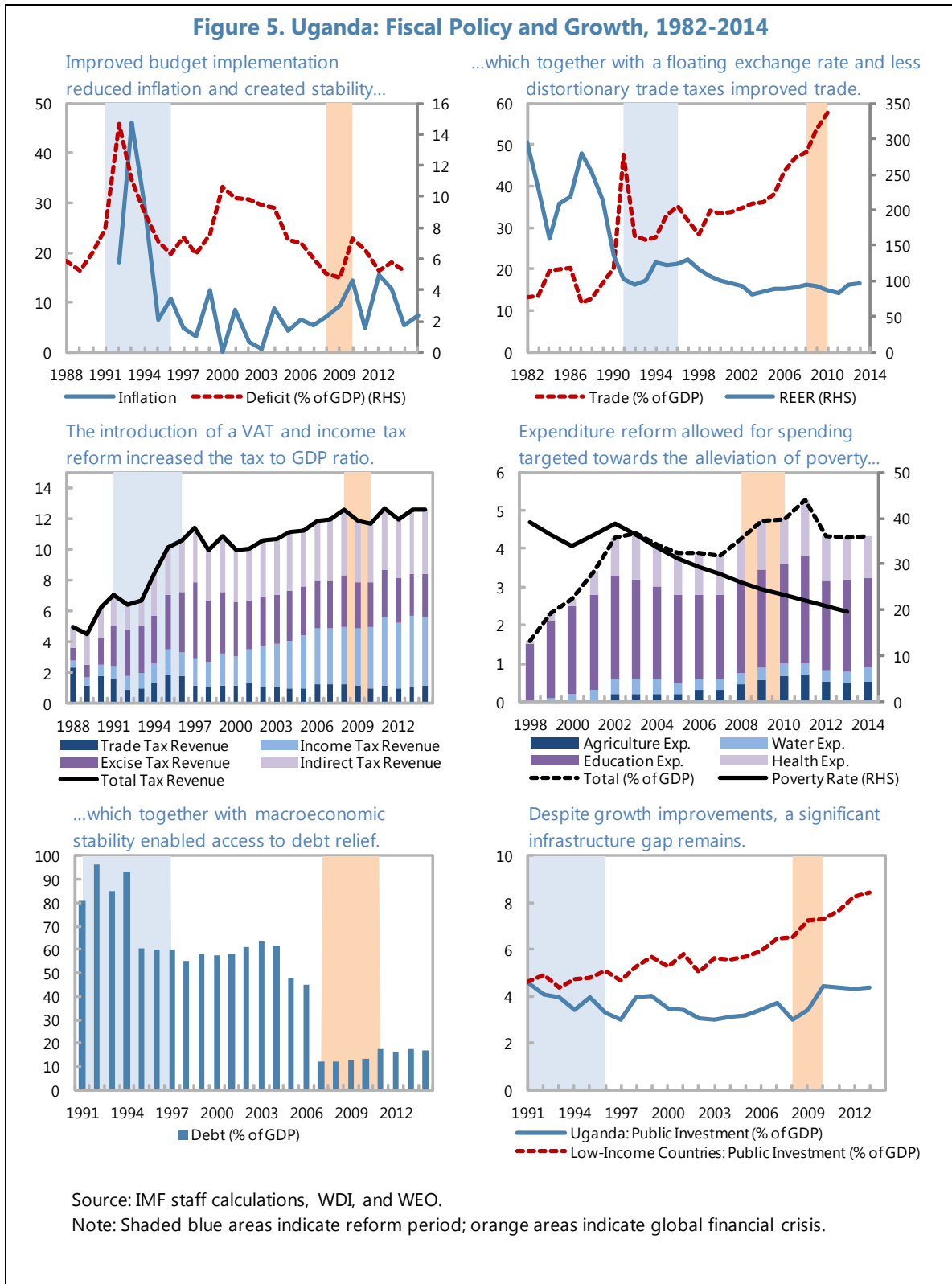
28. **Political will and buy-in from all participants was essential to enact strong reforms.** Neither the macroeconomic stabilization nor subsequent tax reforms would have been possible without the political will of the president and buy-in from all participants in the process.<sup>10</sup> Views of academics, politicians and policy makers were incorporated into policy decisions, and when weaknesses in the fiscal institutions were hindering reform the president acted decisively by restructuring the ministries.

29. **Creating an explicit link between priority spending and poverty reduction increased the involvement of the donor community, and ultimately led to debt relief.** The breadth of the policy changes signaled to the donor a strong level of commitment to fiscal responsibility. The creation of the PEAP and PAF provided a transparent way to track spending in priority areas and allowed donors to see the impact of their contributions. The commitment to spend the savings from debt service on poverty reduction in a transparent manner ultimately helped convince the international community that Uganda was a good candidate for debt relief. The PEAP became the blueprint for Poverty Reduction Strategic Plans (PRSPs) that were a condition of debt relief to all countries that received it. This could provide an important lesson to other low income countries seeking similar relief.

30. **Tax reform increased revenues, but weakness in design and poor implementation hindered a significant improvement in revenue mobilization.** The tariff pattern for raw materials remained volatile throughout the late 1980s and early 1990s, with import duties alternately abolished and reinstated at different rates from one year to the next (Kuteesa and others, 2010). This increased uncertainty across importers and prevented the tax authority from achieving a firm tax base. The VAT introduction was hampered by poor dissemination of the VAT objectives, tax thresholds that were too low and insufficient capacity of the revenue authority. Effective buy-in across ministries and better communication with stakeholders could have helped in this regard. Widespread tax exemptions granted on an ad-hoc basis were doubly harmful as they contributed directly to revenue losses, and indirectly through the effect on tax morale. After increasing in the

<sup>10</sup> One could argue that achieving difficult policy objectives is easier in a no-party political system like Uganda's in the late 1980s, but perhaps Uganda's past, and the risk of future conflict that it entails, makes buy-in from political opponents even more important.

early years of the reform period, the tax-to-GDP ratio has essentially been flat, at around 12 percent of GDP, over the last six years. This is significantly lower than Uganda's east African peers.



**Table 3. Uganda: Selected Indicators**  
(Period Averages)

	<b>Reform Episode</b>					
	<b>1981-85</b>	<b>1986-90</b>	<b>1991-96</b>	<b>1997-2001</b>	<b>2002-06</b>	<b>2007-2011</b>
<b>Real Economy</b>	(Percent change, unless otherwise indicated)					
Real GDP	2.2	5.8	7.3	7.0	7.2	6.6
Contributions to Growth (Percent) 1/	2.2	5.8	7.3	7.0	7.2	6.6
Capital	0.4	2.5	2.7	2.8	3.4	3.7
Labor	3.1	2.2	2.0	1.9	1.7	2.3
Total Factor Productivity	-1.3	1.1	2.6	2.3	2.2	0.5
CPI Inflation (Average)	93.3	140.4	21.8	4.0	5.6	10.8
<b>General Government</b>	(Percent of GDP, unless otherwise indicated)					
Total Revenue	...	...	...	18.3	18.5	15.6
<i>Of which</i> Tax Revenue	...	...	...	10.1	10.9	11.8
Total Expenditure	...	...	...	17.9	19.4	18.8
Current Expenditure	...	...	...	9.7	12.2	12.5
Capital Expenditure	...	...	...	8.8	7.2	6.3
Fiscal Balance	...	-5.8	-9.3	-8.4	-8.6	-6.0
External Debt	...	...	79.3	57.8	55.9	13.7
<b>Labor Market</b>	(Percentage points, unless otherwise indicated)					
Employment Ratio	...	...	80.1	79.5	77.7	75.2
<b>Corporate Sector</b>	(Percent of GDP, unless otherwise indicated)					
Private Investment	5.3	5.6	9.7	12.9	15.7	17.6
Foreign Direct Investment	0.0	0.0	1.4	2.7	4.1	5.3
<b>Income Distribution</b>	(Percentage points, unless otherwise indicated)					
Market Gini Coefficient 2/	...	45.6	39.3	44.1	43.8	45.8
Net Gini Coefficient	...	42.9	37.2	40.8	41.0	43.3
Poverty Rate	...	...	50.4	37.5	33.9	24.8

Source: Penn World Table, SWIID 5.0, WEO, and WDI.

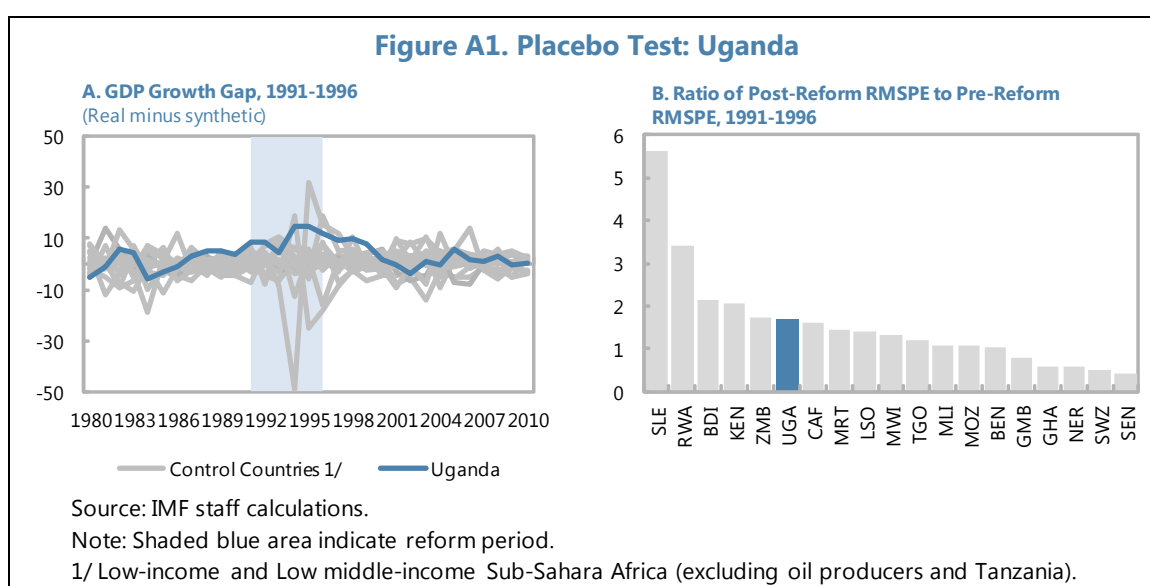
1/ Growth accounting estimates are calculated using Penn World Table 8.0.

2/ "Market" Gini measures the income distribution before taxes/transfers; "net" refers to after taxes/transfers.

## Appendix: Robustness Tests for Uganda

### A. Placebo Test

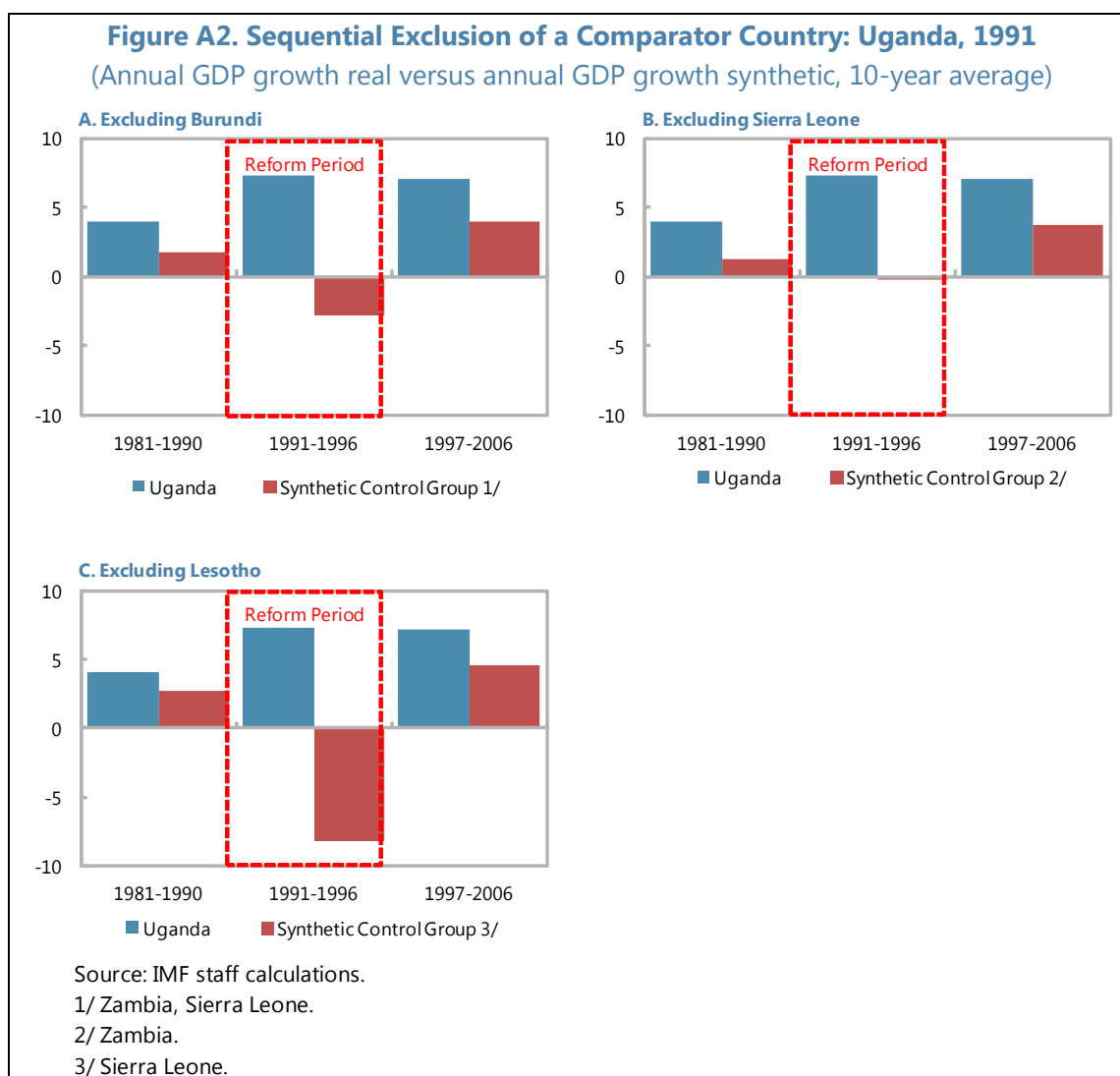
1. **Each country in the group of the input group used was alternatively chosen as the tested country when in fact no fiscal reform took place in that country** (Figure A1). If the estimated effect for Uganda is significantly larger than the placebo countries, it strengthens the case that the growth gap estimate in the baseline can indeed be attributed to the fiscal reform. Post-reform growth in Uganda was higher relative to the growth distribution of non-reformers (countries in the comparator group), in terms of both the size of growth gaps and ratios of post-reform and pre-reform RMSPEs. This indicates that the fiscal reform likely has made a positive difference in the growth performance of Uganda.



### B. Sequential Exclusion of a Comparator Country

2. **The sensitivity of the baseline results was tested by sequentially excluding each of the countries that contributed to the synthetic control group that received a positive weight and re-estimating the model** (Figure A2). This implied the sequential exclusion of the following countries: Zambia, Sierra Leone and Burundi. The post-reform growth gap is higher than the pre-reform growth gap in all cases, confirming the baseline.

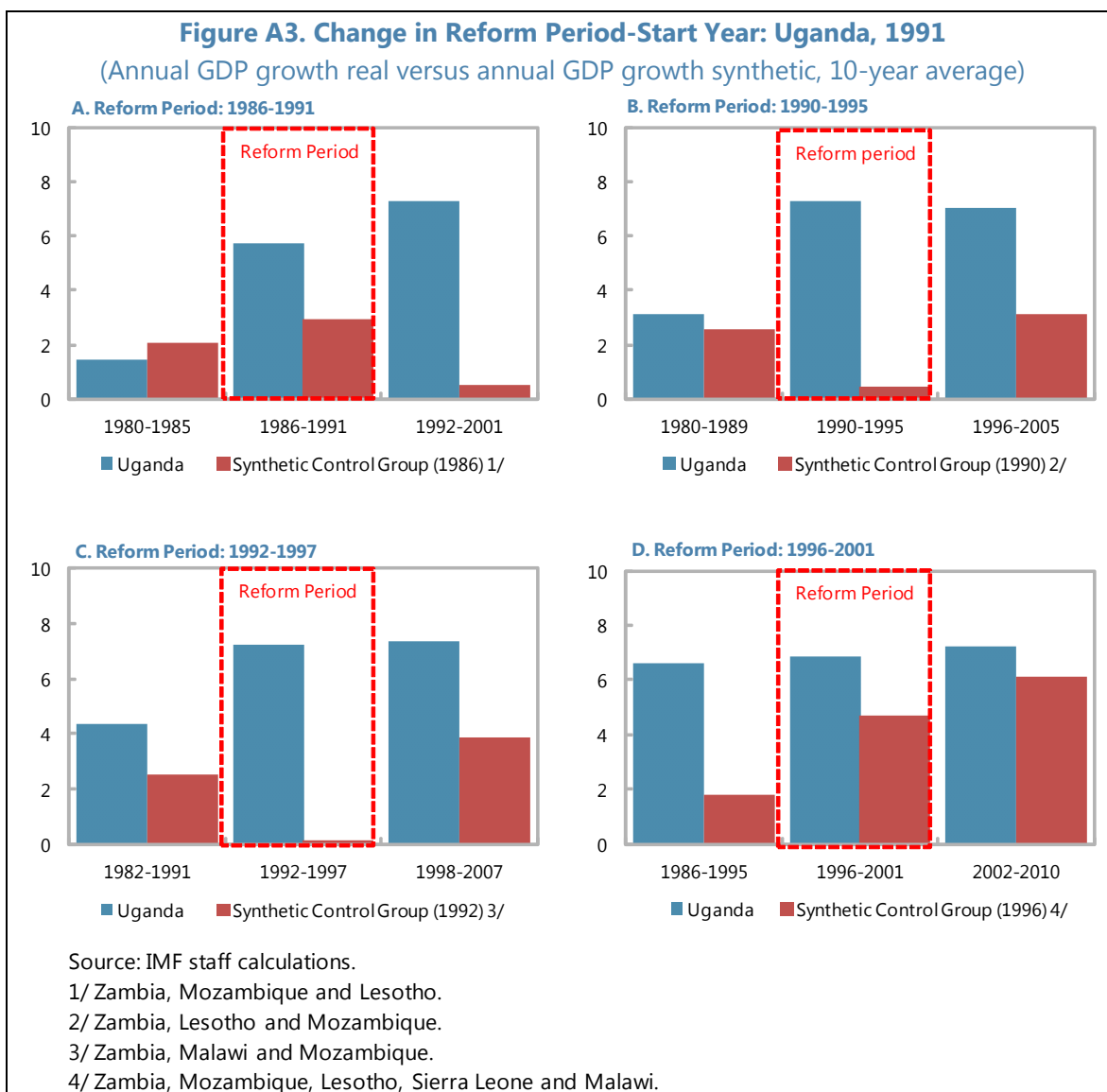




## C. Changes in the Reform Timing

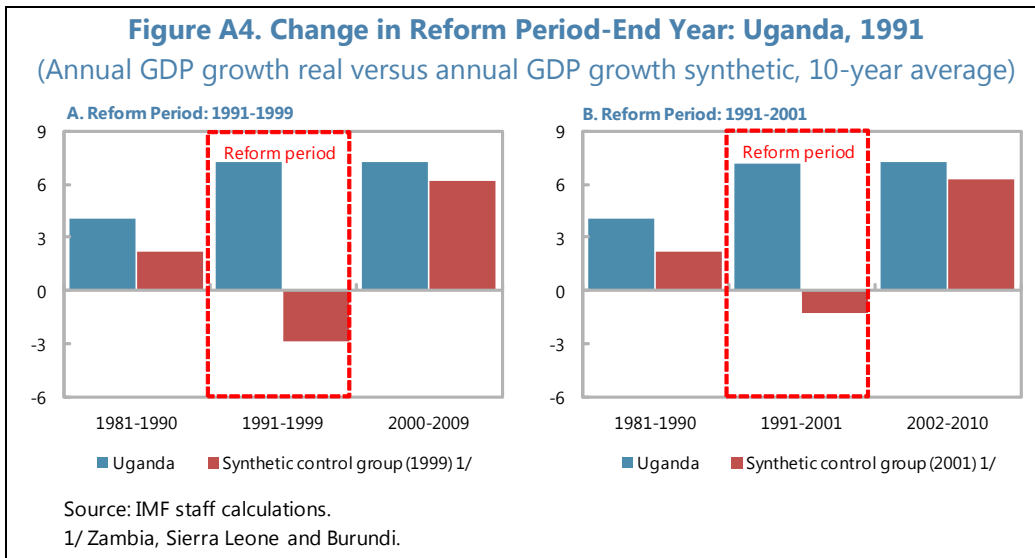
### Changes in the start year reform period

3. **The synthetic series was re-estimated for the years 1986, 1990, 1992 and 1996** (Figure A3). If the growth gap estimate in the baseline changes substantially in response to a slight variation of the starting year, it would cast doubt on the existence and the size of the positive growth gap. If the growth gap does not change substantially in response to a large variation in the starting year, it would undermine our confidence that the positive growth gap is indeed indicative of the effect of the fiscal reform. Results show that the growth effects in the baseline are not sensitive to small changes in starting periods (1990 and 1992), but setting the start of reform in 1996 results in disappearance of the growth effects. These results confirm that the fiscal reform is the likely reason for the positive growth effect in the baseline.



### Changes in end year reform period

4. **The difference in average growth rates was recalculated by setting the end of the fiscal reform period to 1999 and 2001, respectively** (Figure A4). The purpose of this exercise is to examine whether our conclusion in the baseline is sensitive to the timing of the end of the reform, given its uncertainty. Results confirm that the conclusion holds when the end of the fiscal reform period changes.



## Annex I. Sample Selection for Country Case Studies

1. **This annex summarizes the criteria used to select the nine country case studies considered in the FAD Board paper “Fiscal Policy and Long-term Growth.”**
2. **The country-case selection was based on a set of quantitative and qualitative indicators which identify ‘significant’ and ‘long-lasting’ fiscal reform episodes, as defined below.** Quantitative indicators cover changes in main tax and spending categories and the overall fiscal balance, whereas qualitative indicators summarize reforms that affect fiscal institutions, revenue administration, pension systems and the labor market. Countries were selected on the basis of the frequency of reform episodes (at least 4 reforms, with all of them having the same weight in the assessment), and on the basis of additional considerations to ensure income groups diversity (5 HICs; 2 MICs; and 2 LICs) and geographical diversity (4 EUR; 2 AFR; 2 APD; and 1 WHD)<sup>1</sup>.
3. **The initial pool of potential candidates comprised all IMF members excluding oil exporting countries.** Countries reporting less than 20 years of data for a relevant quantitative fiscal indicator were not considered for that particular reform area, in order to reduce the risk of selecting outliers from the sample. In addition, five-year non-overlapping averages are considered to correct for the effects of business-cycle fluctuations, starting in 1975 through the latest available observation. Since reforms that promote long-term growth need to be sustained over time, the durability of the reform effort was controlled for by considering the change in the relevant fiscal variable over at least two consecutive five-year periods.
4. **Quantitative indicators cover three fiscal reforms areas: the tax mix, the composition of public spending, and the overall fiscal position.** Shifts in the tax structure (e.g., from direct to indirect taxation) capture whether a country has re-balanced its tax mix through a widening of the tax base, an increase (decrease) of standard rates, or a combination of tax base and rate changes. Only shifts in the tax structure from direct to indirect taxation are considered as growth-promoting. The composition of spending evaluates whether a country has increased those public spending components that are more likely to foster growth, such as capital investment, education and health. Changes in the overall fiscal balance provide a measure of the potential impact of fiscal policy on macroeconomic stability, as fiscal reforms can be growth-promoting over the long run only in the context of healthy public finances. Qualitative indicators provide an assessment of the overall reform performance of fiscal institutions, tax administration, pension systems and the labor market. Detailed definitions of the indicators, including an explanation of the selection criteria underlying the qualitative indicators, are summarized below.

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<sup>1</sup> Countries are classified by income groups according to the World Bank classification, namely high-income countries (HICs), middle-income countries (MICs) and low-income countries (LICs). The MICs group bundles together both lower-middle-income and upper-middle-income countries. The regional classification is organized according to the IMF area departments’ country distribution. Regional characteristics for European countries are also incorporated according to the UN geographical sub-regions.

**Quantitative indicators****5. Tax policy area:**

- Change in tax mix (direct-to-indirect tax ratio): negative change over at least two consecutive five-year periods.
- Change in VAT standard rate (percent): positive change over at least two consecutive five-year periods.
- Change in top corporate income tax rate (percent): negative change over at least two consecutive five-year periods.
- Change in top individual income tax rate (percent): negative change over at least two consecutive five-year periods.

**6. Expenditure policy area:**

- Public capital spending (percent of GDP), unadjusted: positive change over at least two consecutive five-year periods.
- Public capital spending (percent of GDP), efficiency-adjusted: positive change over at least two consecutive five-year periods.
- Change in health spending (percent of GDP): positive change over at least two consecutive five-year periods.
- Change in public education spending (percent of GDP): positive change over at least two consecutive five-year periods.

**7. Macroeconomic stability area:**

- Change in overall fiscal balance (percent of GDP): positive change over at least two consecutive five-year periods.

**Qualitative indicators**

- Public finance management (PFM) reforms: improvements considered significant by IMF/WB staff, including introduction of medium-term fiscal frameworks and the creation of fiscal councils; and/or assessment of compliance to a fiscal rule for at least five consecutive years.
- Tax administration reforms: improvements in the enforcement of tax collection laws, streamlining of tax filing and payment procedures, and other related measures that strengthened tax administration according to IMF/WB experts.

- Pension reforms: takes into account measures that helped ensure the sustainability of pension systems, focusing on: (i) parametric reforms, such as increases in retirement age and reductions of pension benefits; (ii) systemic reforms, such as introductions of new pension systems or significant changes to existing ones; and (iii) regulatory reforms, which involve changes in investment regulations of pension funds.
- Labor market reforms: includes comprehensive fiscal packages that stimulated labor demand and/or supply through changes in the design of tax systems and/or the structure of social benefits, relying on different sources of information—such as IMF documents, OECD reports, and country publications.

### Country sample satisfying the quantitative and qualitative indicators

8. **Table 1 summarizes all countries that satisfy the quantitative and qualitative indicators outlined above, organized by income groups and regions.** Only HICs, MICs, and LICs that experienced at least 4 reform episodes, respectively, are presented in the table.

9. **The final selection of the nine country case studies followed a number of additional considerations.** First, it was decided to include a wide range of countries according to their levels of development. In this regard, the final sample includes 5 HICs, 2 MICs and 2 LICs. Second, to allow for a broader set of fiscal reforms, only cases complying with at least 1 qualitative fiscal reform were selected. Finally, data availability, the existence of country reports and regional diversity within each country income group were also key elements taken into consideration. Last but not least, the final selection also reflects the expert advice of area departments.

### Final country sample selected

10. **As a result, the final sample comprises 4 European countries (diversified to include Western, Northern, and Eastern Europe countries), 2 Asian-Pacific countries, 2 African countries and 1 Western Hemisphere country: Germany, Ireland, Netherlands, Poland, Australia, Malaysia, Tanzania, Uganda and Chile.**

**Table 1. Countries that Satisfy the Quantitative and Qualitative Criteria 1/**

Income Group	Country	Region 2/	Number of reform episodes		
			Quantitative	Qualitative	Total
HICs	Netherlands *	EUR: Western Europe	6	3	9
	Germany *	EUR: Western Europe	6	2	8
	Ireland *	EUR: Northern Europe	6	2	8
	Portugal	EUR: Southern Europe	6	2	8
	Denmark	EUR: Northern Europe	6	2	8
	Sweden	EUR: Northern Europe	5	3	8
	United Kingdom	EUR: Northern Europe	5	3	8
	Australia *	APD	4	3	7
	Poland *	EUR: Eastern Europe	5	2	7
	Belgium	EUR: Western Europe	6	1	7
	Finland	EUR: Northern Europe	5	2	7
	France	EUR: Western Europe	5	2	7
	Greece	EUR: Southern Europe	5	2	7
	New Zealand	APD	4	2	6
	Austria	EUR: Western Europe	4	2	6
	Italy	EUR: Southern Europe	4	2	6
	Spain	EUR: Southern Europe	5	1	6
	Norway	EUR: Northern Europe	5	1	6
	Canada	WHD	5	1	6
	Japan	APD	4	1	5
	Korea	APD	4	1	5
	Hungary	EUR: Eastern Europe	3	2	5
	Switzerland	EUR: Western Europe	4	1	5
	Singapore	APD	4	0	4
	United States	WHD	4	0	4
	Chile *	WHD	4	3	7
	Turkey	EUR: Eastern Europe	4	2	6
	Mexico	WHD	5	1	6
	Mauritius	AFR	4	0	4
	South Africa	AFR	3	1	4
Malaysia *	APD	2	2	4	
Argentina	WHD	4	0	4	
Colombia	WHD	4	0	4	
Panama	WHD	4	0	4	
Jordan	MCD	4	0	4	
Guatemala	WHD	4	0	4	
Honduras	WHD	4	0	4	
Paraguay	WHD	4	0	4	
Bangladesh	APD	6	0	6	
Ethiopia	AFR	4	0	4	
Lesotho	AFR	3	1	4	
Malawi	AFR	4	0	4	
Niger	AFR	4	0	4	
Tanzania *	AFR	2	2	4	
Sudan	MCD	4	0	4	
Bolivia	WHD	3	1	4	

\* Selected countries (excluding Uganda).

1/ Only includes countries with four or more reform episodes.

2/ Countries are classified by income groups according to the World Bank classification, namely high-income countries (HICs), middle-income countries (MICs) and low-income countries (LICs). The MICs group bundles together both lower-middle-income and upper-middle-income countries. The regional classification is organized according to the IMF area departments' country distribution. Regional characteristics for European countries are also incorporated according to the UN geographical sub-regions.

Source: IMF Staff calculations.

## Annex II. Methodology: The Synthetic Control Method

*This annex summarizes the methodology underlying the empirical analysis in the nine country case studies considered in the FAD Board paper “Fiscal Policy and Long-Term Growth.”*

### A. Brief Description

1. The synthetic control method (SCM) provides a data-driven method to quantify the effect of an event in comparative case studies or event study analysis. It creates an artificial counterfactual (or control group) that closely matches the economic characteristics of the unit of interest prior to an event, and compares the difference in outcomes between the unit of interest and the counterfactual after the event, which is interpreted as the quantitative estimate of the effect of the event. The method was first introduced in Abadie and Gardeazabal (2003), and has gained popularity in recent years. Notable applications include Abadie and others (2010), Abadie and others, (2014), Billmeier and Nannicini (2013), and Cavallo and others (2013).

2. More precisely, the method first uses data prior to an event to create a counterfactual unit as a weighted average of comparison units, using an iterative optimization algorithm that minimizes the distance between the unit of interest and its counterfactual in terms of both the outcome variable of interest and its predictors. The comparison units are chosen so that they are similar to the unit of interest but are unaffected by the event in question. Once the counterfactual is created, the post-event outcome in the unit of interest is compared to developments in the counterfactual. The estimated impact of the event is then represented by the difference between the two series of outcome variables.

3. The SCM establishes causal relationships between an event and its effect on the outcome variable of interest by controlling for both observable and unobservable predictors as long as the pre-event sample period is sufficiently long (Abadie and others (2010)). However, its estimate can still be biased by events that take place after the event and affect the unit of interest and its counterfactual differently. For example, Cavallo and others (2013) report that their estimate of the effect of catastrophic natural disasters on economic growth is biased by the radical political revolutions that followed the natural disaster only in the country of interest. In our case studies, reforms in the areas other than fiscal and heterogeneous effects of the global financial crisis are potential sources of biases.

### A. Robustness Checks

4. Rather than using standard statistical inference methods which rely on large sample properties, for the SCM method it is more appropriate to confirm the robustness of the point estimates with placebo analysis. In particular, the SCM is applied to alternative points in time when the event of interest did not take place (in-time placebo) or to each of the comparator units that did not experience the event by construction (in-space placebo). Relative sizes of the resulting estimates



are compared, and if the baseline estimate is substantially larger than estimates from the in-time and in-space placebos, this is a validation of the baseline estimate.

5. Intuitively, placebo analyses attempt to demonstrate that the SCM does not generate large differences in outcomes unless applied to units and times in which the event actually took place. This is conceptually similar to standard statistical testing, which measures the probability of observing the point estimate deviating from the null hypothesis given the conjectured relationship in the alternative hypothesis is not true. Additionally, the sensitivity of the point estimate can also be tested by repeatedly excluding one-by-one countries from the comparison units that received positive weights in the baseline (Abadie and others (2014)).

## B. Implementation Steps

### 6. Step 1: Choose potential comparator countries and explanatory variables.

- *Comparator countries* are those that are as similar as possible to the country of interest, but did not experience the same event within the sample period.
- *Predictor variables* are those that are considered as good predictors of the outcome variable of interest (economic growth in our case).

**Table 1. Model and Comparators**

**Variable of interest:** GDP, GDP per capita (percent change)

**Predictor variables:** GDP per capita, trade openness, inflation rate, terms of trade and Index of human capital per person

Country	Period	Initial input group
Australia	1971-2007	EU15 (excluding Ireland, Netherlands and Portugal), Canada, United States, and Japan
Chile	1960-2010	Emerging market and middle-income Latin America (excluding oil producers)
Germany	1990-2010	EU 15
Ireland	1971-2007	EU15 (excluding Netherlands and Portugal)
Malaysia	1970-2010	Emerging market and middle-income Asia
Netherlands	1970-2010	EU 15 (excluding Ireland and Portugal)
Poland	1995-2010	Emerging market and Middle income Europe
Tanzania	1980-2010	LIC and LMIC Sub-Sahara Africa (excluding oil producers and Uganda)
Uganda	1982-2007	LIC and LMIC Sub-Sahara Africa (excluding oil producers and Tanzania)

**Sources used**

World Economic Outlook, World Development Indicators and Penn World table (Versions 7.1 and 8.0).

7. In our case, we start with the country's respective country group (as defined in the Fiscal Monitor), and adjust as needed in light of economic similarity and availability of data. We also exclude countries that implemented substantial fiscal reforms in periods similar to the country of interest to the extent possible. As predictor variables we use standard variables chosen in long-term growth regressions: GDP per capita, trade openness, inflation rate, terms of trade and an index of human capital (Table 1).

8. **Step 2: Given the group of comparator countries and outcome and predictor variables, calculate a synthetic series.** Given country and variable selection, the procedure calculates weights of the predictor variables and comparator countries to reproduce as closely as possible the values of the outcome variable pre-event. Not all comparator countries have to receive a positive weight to create the synthetic comparator. The procedure is based on an iterative optimization algorithm as follows:

9. Start from some initial vector of weights of the predictor variables  $V$ , choose the vector  $W^*$  of country weights to minimize a distance  $\|X_1 - X_0 W\|_V$  where  $X_1$  and  $X_0$  are matrices of predictor variables for the unit of interest and its comparator units, respectively, subject to weight constraints (weights have to be between zero and one). In particular,  $W^*$  minimizes

$$\|X_1 - X_0 W\|_V = \sqrt{(X_1 - X_0 W)' V (X_1 - X_0 W)} \quad (1)$$

Once the country weights are chosen, variable weight  $V^*$  is chosen among all positive definite and diagonal matrices such that the mean square prediction error (MSPE) of the outcome variable is minimized over pre-event periods. In particular:

$$V^* = \arg \min_{V \in \mathcal{V}} (Z_1 - Z_0 W^*(V))' (Z_1 - Z_0 W^*(V)) \quad (2)$$

Where  $Z_1$  and  $Z_0$  are matrices of the outcome variable for the unit of interest and its comparator units, respectively. The resulting  $V^*$  is used as input to (1) for the next round of optimization. This iterative process continues until both  $V^*$  and  $W^*$  converge. In summary, the synthetic series is constructed by solving a nested optimization problem that minimizes (2) for given  $W^*(V)$  given by (1) (Abadie and others, 2011).

Using the weights thus obtained, we then use the synthetic comparator to create a counterfactual path of the outcome variable post-event.

10. **Step 3: Compare actual post-event outcome variable series with the synthetic comparator.** The difference between the two series is the estimated impact of the event (assuming that all other factors potentially affecting the variable of interest have been controlled for successfully).

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