



EURO AREA POLICIES

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July 2014

SELECTED ISSUES

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EURO AREA POLICIES

June 26, 2014

SELECTED ISSUES

Approved By
**The European
Department**

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YOUTH UNEMPLOYMENT IN EUROPE: OKUN'S LAW AND BEYOND¹

Youth unemployment rates increased sharply in the euro area after the crisis. Much of these increases can be explained by output dynamics and the greater sensitivity of youth unemployment to economic activity compared to adult unemployment. Labor market institutions also play an important role, especially the tax wedge, minimum wages, and spending on active labor market policies. Policies to address youth unemployment should be comprehensive and country specific, focused on reviving growth and implementing structural reforms.

A. Context

1. **Youth unemployment has increased sharply in Europe in the aftermath of the global crisis in 2008 and remains at historic highs in the current weak recovery.** Youth unemployment has moved up the policy agenda in Europe, and policies to deal with this issue have been formulated at both the EU (European Commission, 2012 and 2013a) and national levels.
2. **This paper assesses the youth unemployment problem in advanced European countries, especially the euro area.** It documents the main trends in youth and adult unemployment before and after the crisis (Section B), identifies the cyclical and structural drivers of youth and adult unemployment (Section C, D and E) and outlines elements of a comprehensive strategy to address the problem (Section F).

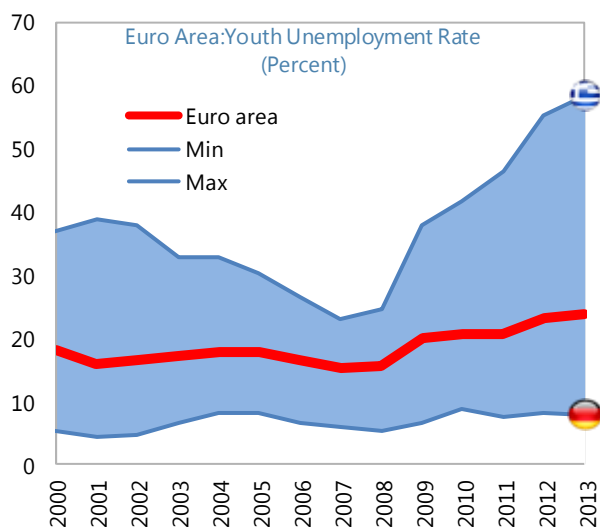
B. Stylized Facts

3. **Historically high rates.** Youth unemployment rates are currently at unprecedented levels in the euro area.² The global crisis has reversed a decade-long trend of modest declines in youth unemployment; the youth unemployment rate in the euro area in 2013 (some 28 percent) is almost double the pre-crisis level (15 percent in 2007).
4. **Larger than adult unemployment.** Adult unemployment has also ticked up after the crisis, but less so than youth unemployment. While unemployment rates typically tend to be

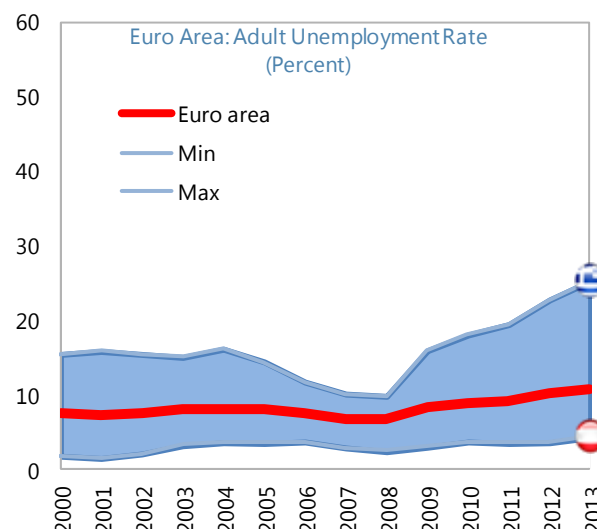
¹ Prepared by Angana Banerji, Huidan Lin, Sergejs Saksonovs (all EUR) and Rodolphe Blavy (EUO). We thank Xiaobo Shao for excellent research assistance and Katherine Cincotta for general assistance. We also thank Ana Lamo (ECB) and Alessandro Turrini (European Commission), the participants of seminars at the ECB and European Commission, as well as EUR country teams for helpful feedback and comments.

² Henceforth, youth refers to individuals aged 15–24 years, and adults refers to individuals aged 25–64 years. Unemployment refers to the unemployment rate.

higher for the youth than for adults because of a smaller youth labor force,³ these differences have increased sharply after the global crisis.



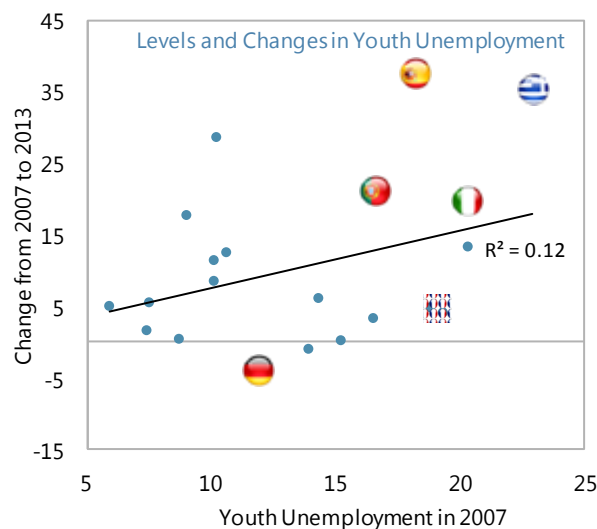
Source: Eurostat



Source: Eurostat

5. **Wide divergence across countries.**

Youth unemployment rates vary widely across the euro area in magnitude as well as in trajectory. These cross-country differences have been exacerbated during the crisis. The hardest hit euro area countries have had unprecedented increases in youth unemployment rates, ranging from 25 percent in Ireland to 43 percent in Spain on average during 2007–13. In countries that fared better, youth unemployment rates increased only marginally (Austria, Netherlands) or even fell (Germany). Pre-crisis youth unemployment rates, however, have little bearing on the youth unemployment dynamics after the crisis.



Source: Eurostat, Staff estimates

6. **Significant consequences.** Large and persistent youth and adult unemployment rates lower potential output due to hysteresis effects (skill attrition and depreciated human capital) or the outward migration of skilled labor. Youth

³ The youth labor force tends to be smaller than the labor force for other age cohorts because young individuals may choose to pursue full-time education, although participation in education does not necessarily exclude participation in the labor force (e.g., part-time work or apprenticeships). The youth labor market is also characterized by frequent search and matching as individuals look for better jobs, using intermediate stages for accumulating experience (and perhaps, occasionally, dropping out of the labor force).

unemployment erodes social cohesion and institutions. For individuals it may lead to scarring—a lower probability of future employment and lower wages.

C. Determinants

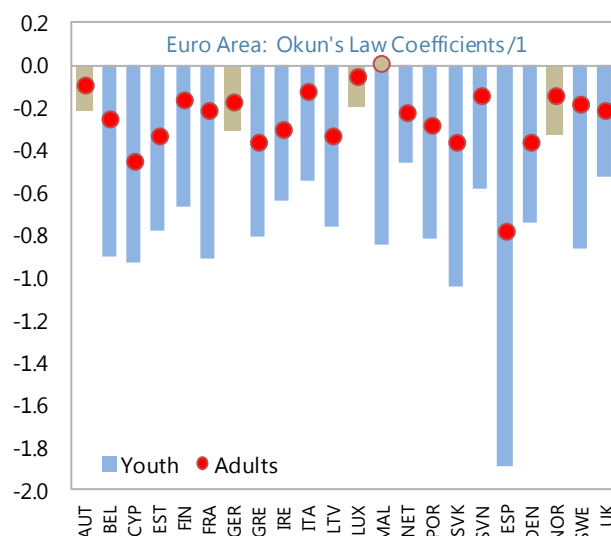
7. **Framework.** This paper analyzes the relative significance of two main drivers of youth unemployment—business cycle fluctuations and the institutional setup and features of the labor market. It contrasts the impact of these factors on youth versus the adult labor market.
8. **Coverage.** The analysis covers 22 advanced European countries—18 in the euro area, as well as Denmark, Sweden, Norway and the United Kingdom. It is based on annual data from 1980 to 2012, although the actual size of the sample varies depending on data availability, especially for labor market characteristics.
9. **Labor market features.** Labor market features are grouped into several interrelated categories: the opportunity cost of working; hiring costs; the role of collective bargaining; measures of labor market duality; education and training; and spending on active labor market policies. A number of different measures are used in each category. Labor market features vary widely across countries but change slowly over time (see Annex 1 for definitions).
10. **Addressing data limitations.** Data on labor market characteristics is usually not available for the full sample period, and is especially limited for new entrants to the euro area. Data gaps make it infeasible to produce country-by-country estimations to determine the country-specific effects of institutional variables and the business cycle. As a workaround for the data limitations, a two-pronged approach was adopted. One approach was to restrict the impact of labor market features to be the same, while allowing the impact of the business cycle to vary across countries. This approach was implemented using one labor market factor at a time as well as a combination of factors. The second approach also assumes common effects of labor market factors across countries, *but* it allows the impact of labor market institutions to vary across countries via its interaction with the business cycle. However, to ensure robustness, only one institutional variable was considered at a time (see Annex 2 for more details).

D. The Business Cycle

11. **Okun's Law.** The Okun's Law, proposed by Arthur Okun in 1962, is the empirical regularity that changes in unemployment rates and output growth are negatively related.⁴ Many studies confirm this for overall unemployment but research on youth is less common. Some authors highlight the sensitivity of youth unemployment to the business cycle (OECD (2006), Scarpetta (1996), Scarpetta et.al. (2010), European Commission (2013b)).

⁴ See Ball, Leigh, Loungani, 2013 for an extensive discussion on this topic.

12. **Okun's law holds...** Empirical analysis unambiguously confirms that the Okun's law holds. This is true regardless of how the business cycle is measured—by real GDP growth or the output gap (i.e., the difference between the actual output and its potential). Cyclical factors explain around 50 percent of the changes in youth unemployment rates (and 70 percent of the increase in unemployment rates in stressed euro area countries) and around 60 percent of changes in adult unemployment rates across all advanced European countries.

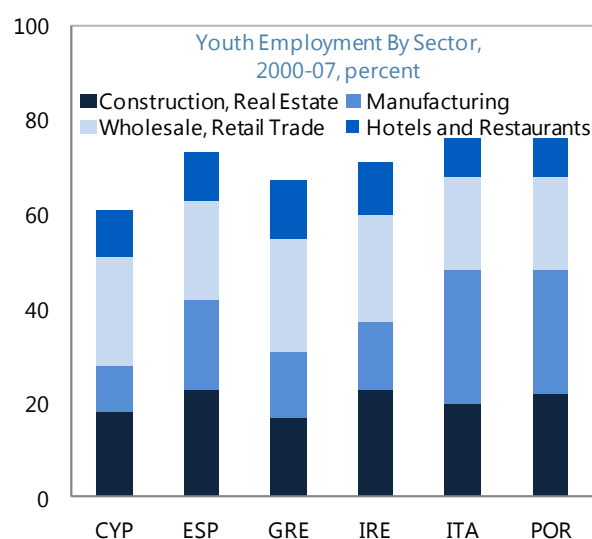


13. **...with wide variation across countries.** The sensitivity of unemployment rates to the business cycle (Okun's coefficient) varies across countries. Estimates range from not significantly different from zero (e.g., Austria⁵) to -1.9 in Spain, i.e., a one percent decline in growth increases youth unemployment rates by almost 2 percentage points. Countries with the biggest increases in youth unemployment rates since the crisis tend to be those that are most affected by the business cycle (i.e., they have the largest Okun's coefficients).

/1 Shaded bars and dots indicate insignificant results
Source: Eurostat, Staff estimates

14. **Much more sensitive to the cycle.**

In every country the estimated Okun's coefficient is higher for the youth than for adults, on average almost three times as large. This may be due to both the nature of youth labor force (described above) and special features of youth employment: concentration in cyclically sensitive industries and in small and medium-sized enterprises (SMEs).



Source: Eurostat, Staff estimates

15. **Concentration in cyclically sensitive sectors.** Youth employment is concentrated in sectors which tend to be more sensitive to the business cycle: manufacturing, construction and real estate, wholesale and retail trade, and hotels and restaurants. Together these sectors

⁵ Even in those cases, some studies have found that the Okun's law holds for measures of hours worked.

comprise between 65–75 percent of youth employment in countries where youth unemployment increased the most after the global crisis.

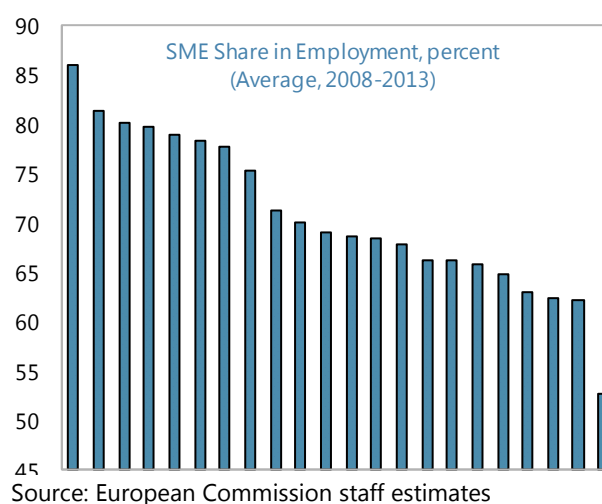
16. **Concentration in SMEs.** SMEs⁶ employ the majority of the labor force, with the average employment share especially high in some Southern European countries—more than 75 percent for Spain, Italy and Portugal, for example. SMEs face unique financial constraints in the current environment of financial fragmentation and private sector deleveraging. This appears to increase the extent to which youth unemployment rates respond to growth (Box 1).

Box 1. SMEs. The Role of Financing Constraints and Youth Unemployment

Methodology. The Okun's law framework is augmented with the interaction of GDP growth and the average share of SMEs, or with financial constraints. Financing constraints are measured as the percentage of firms in industry and services sectors which report in surveys financial constraints as a factor limiting production. The surveys do not separate SMEs as a separate category, but it is reasonable to assume that they are more affected by financial constraints than larger firms.¹

Results.

- Greater financial constraints are associated with higher youth unemployment. Controlling for country-specific fixed effects and output gap, an additional percentage point of firms reporting financial constraints raises youth unemployment rates by 0.3–0.4 percentage points (industrial and services sector respectively). The effect on adult unemployment rates is smaller (0.2 percentage points).
- A percentage point increase in the average employment share in SMEs (or the SME share of value added) lowers the Okun's coefficient by 0.01, making unemployment more pro-cyclical.

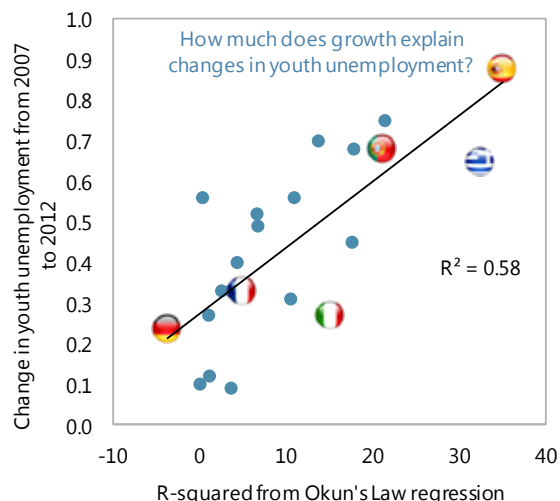


¹ There are data limitations. The average share of SME is used because the data is available only from 2008 and stays broadly constant. The percentage of firms reporting financial constraints is small (often zero) and relatively unchanged, e.g., before the financial crisis only 2 percent of industrial firms reported financial constraints, on average, compared to 2012-2013 when the average was 9.3 percent.

⁶ SMEs are defined as firms with less than 250 employees, turnover of less than 50 million euro or a balance sheet less than 43 million euro.

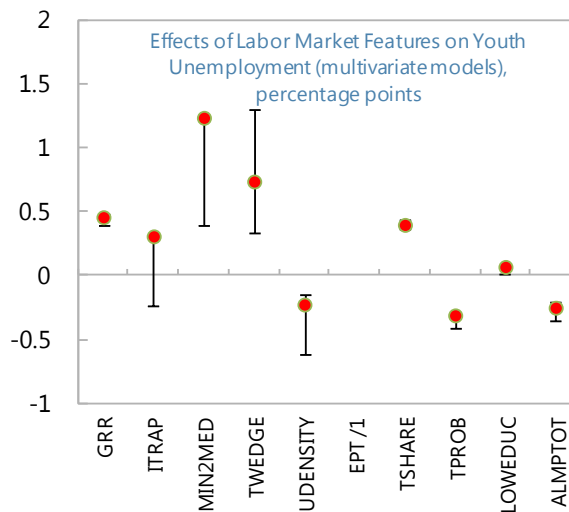
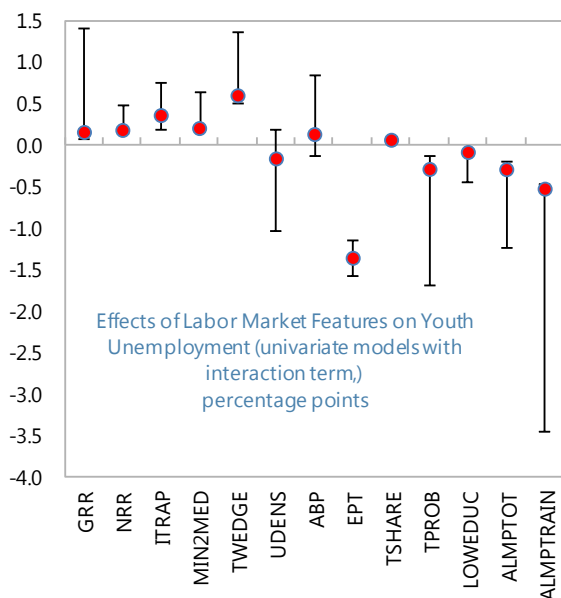
E. Labor Market Features

17. **Not only the business cycle.** Output changes on average explain much of the increase in youth unemployment, but not in every country in Europe. Excluding countries worst affected by the crisis—Greece, Portugal, Spain, Latvia, and Ireland—cyclical factors explain on average about 35 percent of the changes in youth unemployment rates across advanced European countries (e.g., 33 and 27 percent in France and Italy, both of whom have high youth unemployment rates). What are the other explanatory factors? In particular, to what extent do labor market institutions and skills play a role in explaining labor market outcomes across advanced European economies as well as within individual countries?



Source: Eurostat, Staff estimates

18. **Role of labor markets.** There is a large body of literature on the role of labor market characteristics in determining aggregate unemployment in Europe (most prominently, the much cited 1994 OECD Jobs Strategy). Some of the labor market characteristics considered in the literature to have an impact on youth unemployment include unionization (Bertola, 2007), hiring and firing regulations, minimum wages and hiring costs (Bernal-Verdugo, 2012), and labor market flexibility (OECD, 2006, Choudhury et.al. (2012)).



/1 Impact of EPL for temporary contracts not shown due to scale. Estimate range from -2.5 to -5.2.

Source: Eurostat, OECD, WEO, Staff Estimates

Notes: GRR – gross replacement rate, NRR – net replacement rate, ITRAP – inactivity trap, MIN2MED – ratio of minimum to median wage, TWEDGE – tax wedge, UDENS – union density, ABP – adjusted bargaining power, EPT – OECD temporary employment protection index, TSHARE – share of temporary employees for a given age group, TPROB – share of temporary employees on probation in total temporary employees for a given age group, ALMPTOT – total spending on ALMP (thousands euro per unemployed), ALMPTRAIN – spending on ALMP training policies. See Annex 1 for model details. Only significant results shown for univariate model.

19. **Labor markets explain size of unemployment, not changes.** Labor market features have significant effects on the levels of youth and adult employment and unemployment, but not on changes.⁷ Put simply, the rapid divergence of youth unemployment rates in the aftermath of the crisis has not been accompanied by dramatic changes in labor market features.

20. **Several features matter.** A number of labor market features have an impact on youth unemployment rates, in particular, lower hiring costs (tax wedge, minimum wages relative to the median wage), and higher spending on active labor market policies per unemployed person (ALMP), especially on training, reduce unemployment. The opportunity costs of working (e.g., benefit replacement rates) and low skill levels tend to raise unemployment, whereas collective bargaining (e.g., union density), labor market duality (e.g., protection of workers), have mixed effects. These effects remain significant after controlling for several labor market features at a time.

21. **Variable effects across countries.** Allowing for interactions between labor market features and the business cycle reveals significant cross-country differences in the impact of labor market features on labor market outcomes. For instance, a 1 percentage point increase in the tax wedge increases youth unemployment rates by between 0.6–1.4 percentage points in univariate models with the interaction term.⁸

High Hiring Costs, High Unemployment

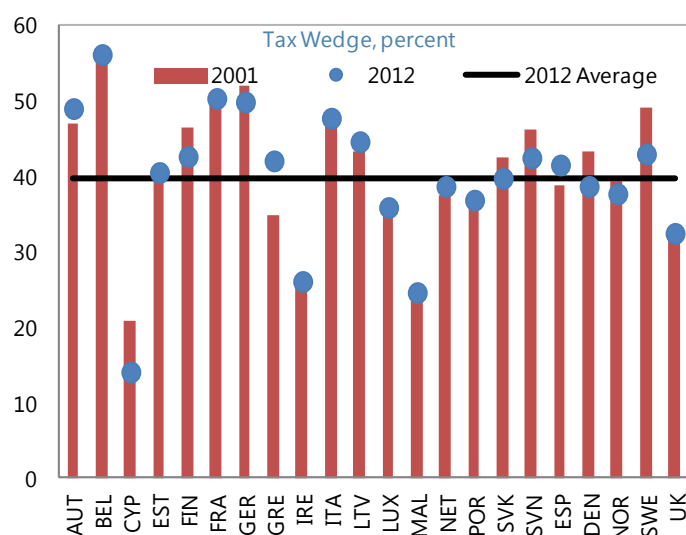
22. **Theory.** Taxes on employers and employees, in combination with statutory minimum wage rates, affect both the supply and demand for labor. High tax rates on labor income depress the supply of labor and drive a wedge between marginal productivity and the reward for work. If higher taxes translate into higher wages, then the increase in labor costs can reduce labor demand and increase unemployment. High payroll taxes and employers' social security contributions are even more likely to raise labor costs in the presence of wage floors generated by statutory minimum wages. If employers succeed in shifting the tax burden to the employees in the form of lower wages, this could reduce labor supply, especially for low-wage earners (which would conceivably include the youth). OECD (2012) shows that since 2007 young people have on average been at a big disadvantage in countries in which the minimum wage is relatively high as a percentage of median pay.

23. **Recent developments.** Hiring costs remain above average for several countries. The tax wedge declined in the Scandinavian countries and Germany, while either remaining unchanged or even increasing in other European countries (in particular, Greece and Spain). The minimum wage to median wage ratio has remained unchanged for the vast majority of advanced European countries while marginally increasing in France, Greece, Portugal and Spain.⁹

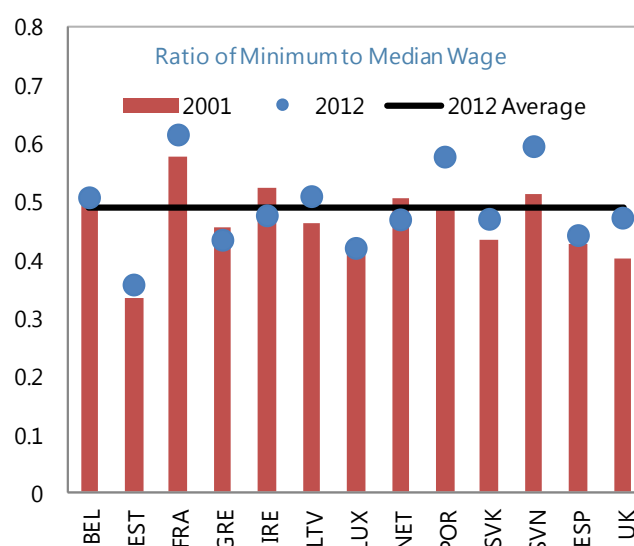
⁷ These results are robust to changes in specification. Results for changes in unemployment rates are available upon request. Results discussed in the text refer to the multivariate model unless otherwise specified.

⁸ Several studies find that higher labor tax wedge raise unemployment and the impact of the tax wedge is strengthened when combined with the impact of the minimum wages and the strength of collective bargaining.

⁹ The minimum wage was frozen in Portugal in the second half of 2011 and cut in Greece in the second half of 2012 under the financial assistance programs.



Source: European Commission. Note: latest data for Cyprus is for 2007.



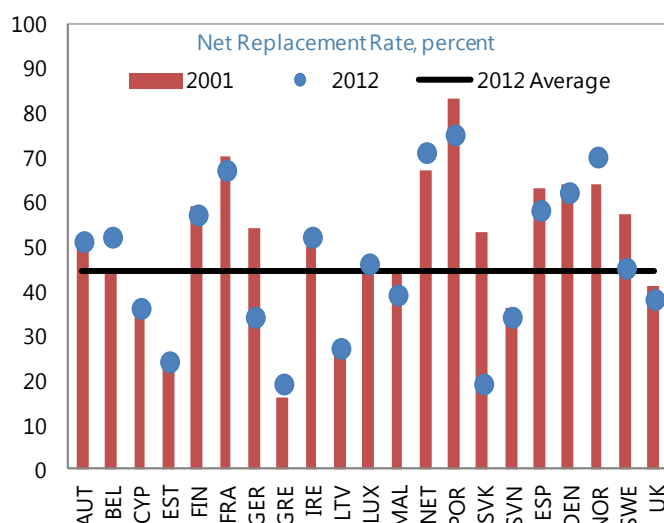
Source: OECD

24. **Empirical results.** The empirical analysis indicates that greater hiring costs—larger tax wedge and/or minimum wages relative to the median wage—are associated with higher youth and adult unemployment rates and lower employment rates for both youth and adults. A 1 percentage point increase in the tax wedge raises youth unemployment rates by between 0.3-1.3 percentage points. The effect on adult unemployment is smaller (around 0.4-0.5 percentage points). Higher minimum wages (relative to median wages) raise youth unemployment by 0.4–1.2 percentage points. Because many young people are hired at minimum wage jobs, they may be particularly vulnerable to increases in the cost of hiring.

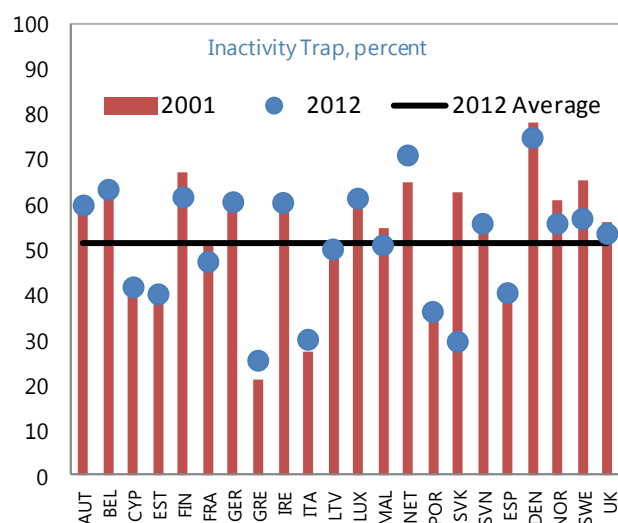
High Opportunity Cost of Working, High Unemployment

25. **Theory.** High unemployment benefits raise unemployment by reducing the willingness to search intensively for jobs and/or to accept job offers (lower labor supply), and by increasing the reservation wage, i.e., the salary at which the unemployed would be willing to work instead of receiving unemployment benefits (lower labor demand). Moreover, tax and benefit systems can interact to create an unemployment or inactivity trap which arises when individuals who qualify for social protection benefits have little financial incentive to work because the combined effects of increased tax payments and withdrawn income-tested benefits offset the potential gain in disposable incomes from increased earnings.

26. **Recent developments.** Overall, the picture remains largely unchanged over 2001–12, regardless of which indicators are used to capture the incentives of the unemployed to seek work (the net benefit replacement rate or the “inactivity trap”). There are a few exceptions, e.g., Germany and some Scandinavian countries which have reduced the benefit replacement rates and measures of the “inactivity trap.” In contrast, these indicators have remained unchanged for the vast majority of advanced European countries while marginally increasing in the euro area countries under stress.



Source: European Commission



Source: European Commission

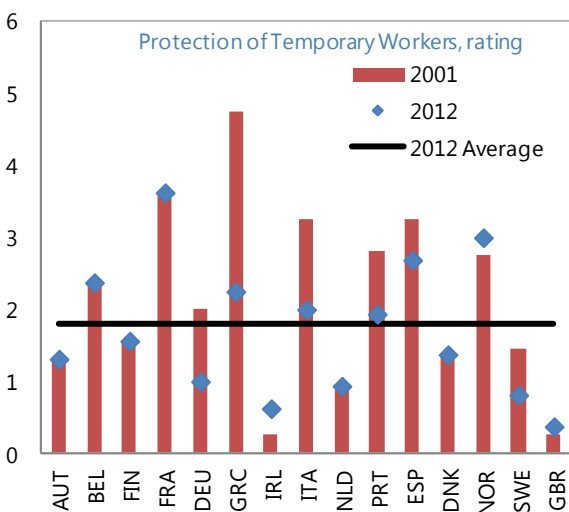
27. **Empirical results.** Higher opportunity costs of working are associated with higher youth and adult unemployment rates. In univariate models with the interaction term, a one percentage point increase in net replacement rates raises youth unemployment rate by 0.1–0.5 percentage points depending on the country, more than it does for adults (0.1–0.2 percentage points). Country-specific estimates find significant and positive effects of higher marginal tax rates on income (inactivity trap) on youth unemployment for most countries, with a stronger effect for youth unemployment than for adults. The young may be more sensitive to net replacement rates because unemployment benefits allow them time to find a more desirable job. However, an aggregate indicator may mask country-specific differences in eligibility for unemployment benefits, e.g. in some countries, people who never had a job may not be eligible for unemployment benefits.

Dual Labor Markets, Shifting Composition of Unemployment

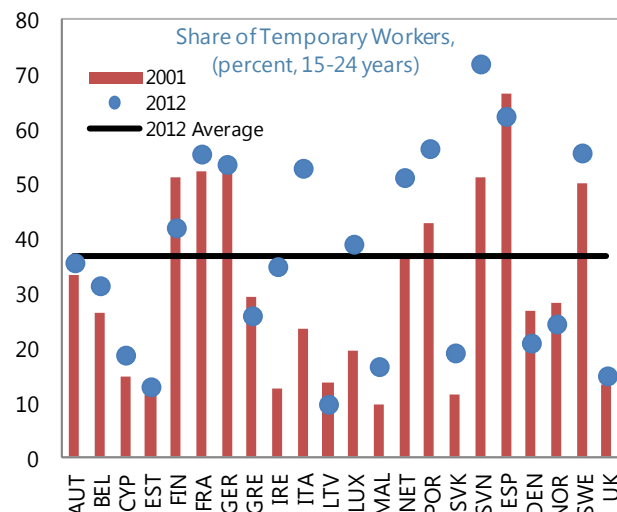
28. **Theory.** Dual labor markets feature a high share of temporary employment contracts with lower employment protection. Studies show that the impact of employment protection legislation (EPLs)—legislation governing the hiring and firing of employees—on labor market outcomes is small and ambiguous.¹⁰ It can lower job separation rates by increasing the cost of firing, but also the job finding rate by increasing the reluctance to hire workers in the first place. Labor market duality has been associated with lower youth employment rate in a sample of 17 OECD countries over 1960–1996 (Bertola et al., 2007).

¹⁰ Labor market duality is measured by the OECD's employment protection indicator (EPL) for temporary and permanent workers, and the share of temporary workers as a percent of total employees. In-sample variation in the data is larger for temporary employment protection indicators than permanent employment protection indicators.

29. **Recent developments.** Young workers tend to be employed on temporary contracts more so than adult workers. The disparity between the adults and youth in this regard is particularly large in Spain, Italy and Portugal, which have had some of the largest increases in youth unemployment. In Spain, labor market adjustments have focused on shedding workers on temporary contracts, i.e. mainly the youth.



Source: OECD



Source: Eurostat

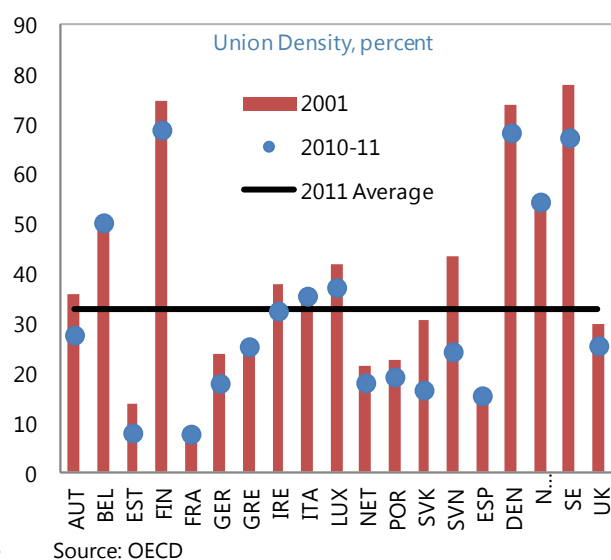
30. **Empirical results.** Higher protection for temporary contracts lowers unemployment rates for youth and adults, but the effects for youth are stronger since a higher share is employed on temporary contracts. A unit increase in the EPL rating¹¹ lowers youth unemployment rates by 2.5-5 percentage points and adult unemployment by 1.5-2 percentage points. A higher share of youth on temporary contracts increases youth unemployment and lowers employment by 0.3-0.4 percentage points, but it has no significant effects on adult employment or unemployment rates. Hence stronger labor market duality can shift the composition of employment toward adults.

Stronger Collective Bargaining, Limited Effect on Youth Unemployment

31. **Theory.** Higher incidence of collective bargaining has the potential to lower employment, but the impact of collective bargaining depends on the level at which the bargaining occurs. Firm level bargaining tends to limit wage increases beyond productivity levels, thereby having less of an impact on employment and unemployment rates. Very centralized or coordinated bargaining systems may also be less detrimental to employment as the overall impact on the labor force can be explicitly incorporated in the bargaining process, and thereby minimize the effect on unemployment. Thus the relationship between the strength of collective bargaining and unemployment tends to be hump-shaped, having the worst effects on unemployment when collective bargaining systems are neither fully centralized nor decentralized.

¹¹ The rating is on a scale from 1 to 6.

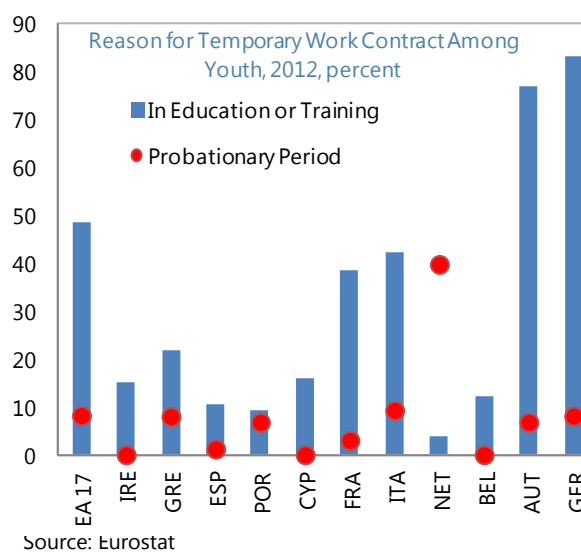
32. **Empirical results.** Overall, higher union density has a limited effect on youth unemployment (i.e., not significant). Some specifications indicate that a percentage point increase in union density could lower youth unemployment rates by 0.2–0.6 percentage points.¹² However, this finding is not robust to alternative specifications, including variations in control variables or allowing country specific interactions. The results from some specifications suggest that higher union density may be associated with an altered employment composition as well, perhaps because employers prefer to hire the non-unionized youth instead of the unionized adults in order to preserve the flexibility to adjust the workforce as needed, leading to higher employment for the youth and lower employment for adults.



More Vocational Training, Less Unemployment

33. **Theory.** Educational attainment may have a large impact on employability (OECD, 2013). Vocational training and expanded access to training could play a significant role in reducing temporary work and contribute to making temporary jobs a stepping stone toward open-ended contracts (OECD, 2004).

34. **Recent developments.** The share of workers in the population with low-education has been declining steadily across all countries. But the level of formal education may not provide a complete picture of the skills of the young unemployed. Vocational training and apprenticeships are also important forms of skilling, but are difficult to measure. Survey data on the reason for temporary contracts suggests that temporary contracts for the youth are associated with education, training, or probation in countries with low youth unemployment rates like Germany, Netherlands, and Austria. The



¹² This result is based on the OECD's indicator on union density which measures the incidence of unionization among the employed, but does not measure the degree of centralization.

share of those in education, training and probation is relatively smaller in Greece, Spain, Portugal, and Cyprus.

35. **Empirical results.** Access to vocational training—measured by the share of temporary workers under probation or vocational training—significantly reduces youth unemployment by around 0.3 percentage points, but has no significant effect for adults. A higher share of individuals with low education has generally no significant effects on youth unemployment or employment rates, but has a strong negative effect on adult unemployment and employment rates. Low education may be less of an obstacle for youth employment, perhaps because young workers can be more easily trained than adults.

More Spending on Active Labor Market Policies, Lower Unemployment

36. **Theory.** According to OECD (2006), most macro-econometric studies have found significant positive effects of spending on ALMP, especially on training, on aggregate unemployment. However, microeconomic evaluation studies of ALMPs find that the effectiveness of programs vary, and that apparently similar programs can yield very different outcomes (e.g., Card, et. Al., 2010, and Kluve, 2010). Studies also show that ALMP programs that specifically target young people are not very effective regardless of the type of the program (i.e., they have a lower probability of yielding positive results).

37. **Recent developments.** Spending on ALMP varies widely across countries, and several countries have increased spending in this area after the crisis. Given dramatic increases in unemployment during the crisis, ALMP funds have had to be distributed across greater numbers of the unemployed.



38. **Empirical results.** Higher spending on active labor market policies, especially training, is associated with significant reductions in youth unemployment rates. An additional 1000 euro per unemployed increase in ALMP spending reduces youth unemployment by around 0.3 and adult

unemployment by around 0.1 percentage points. It also raises employment rates by 0.2 percentage points for youth and 0.1 percentage points for adults.

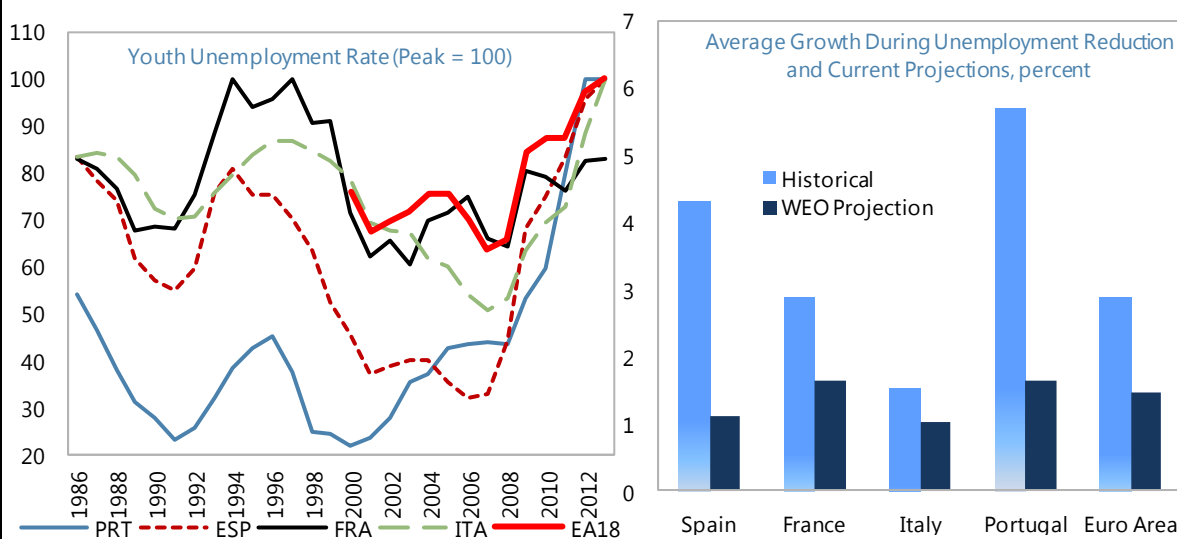
F. Conclusions and Policy Recommendations

39. **No magic bullet.** The youth unemployment problem in the euro area is multi-faceted and varies across countries. Substantial cross-country differences in the composition and dynamics of youth unemployment suggest that no single policy at the EU or national level is likely to solve the problem. The solution would need to target the country-specific factors affecting youth unemployment. Experience from other countries indicates that there is no one-size-fits all approach to tackling youth unemployment (ILO, 2013).

40. **Strong sustainable growth is key....** A comprehensive strategy to tackle youth unemployment in the euro area should focus on creating conditions for sustainable growth, given the higher sensitivity of youth unemployment to the business cycle. In the short-term, policies to restore the housing sector, improve competitiveness in trade and tourism activities would be particularly beneficial as these are also sectors where youth employment is concentrated. Historically, euro area countries have reduced youth unemployment rates by growing much more strongly than they are currently expected (Box 2).

Box 2. A Historical Perspective on Growth and Youth Unemployment

Not unprecedented. Youth unemployment rates are peaking in the euro area, but such unemployment levels are not unprecedented. In Spain, for example, youth unemployment rates are close to (around 90 percent of) the previous peak (1986 and 1994). Youth unemployment rates remains below their historical peaks for France and Italy.

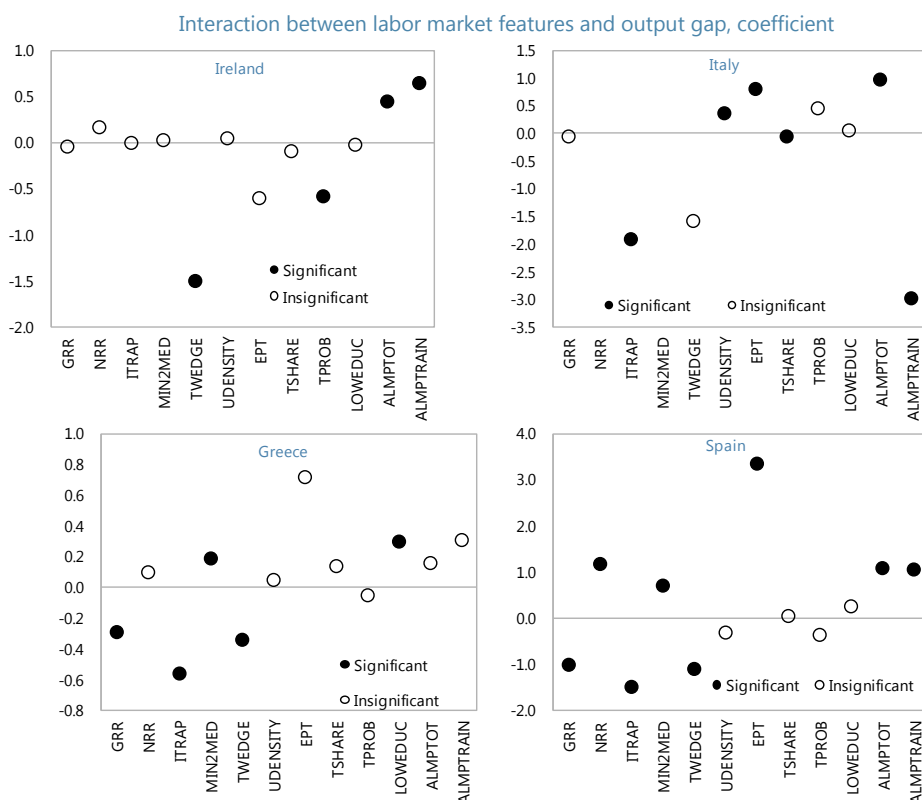


Source: Eurostat, WEO, Staff estimates

Helped by growth. Euro area countries succeeded in reducing high youth unemployment rates in the past, but they have done so in the context of stronger growth than currently envisaged. In some cases, growth rates would have to be double or even triple the current forecasts.

41. **Labor market reforms will help.** The empirical results show that growth explains about half the increase in youth unemployment overall, and about a third in some high youth unemployment countries (such as France and Italy). Therefore, growth alone cannot solve the youth unemployment problem. Empirical analysis also shows that labor market reforms would pay dividends. As the economic recovery solidifies and unemployment rates return closer to their historical averages, labor market institutions may play an increasingly large role in labor market dynamics. Reforms could include: lowering hiring costs by reducing the tax wedge and reconsidering minimum wage policies (which largely affect the youth) to increase labor demand; reform of unemployment benefits to better incentivize the transition from inactivity to work; improvements in skill levels and work-related training; and, ALMPs.

42. **...and may complement the effect of the business cycle.** Labor market institutions affect the sensitivity of youth unemployment rates to the business cycle in Greece, Ireland, Italy and Spain. For example, an increase in the tax wedge increases the cyclical responsiveness of youth unemployment in Greece and also for Spain. Similarly ALMP spending seems to significantly reduce the effect of cyclical changes on youth unemployment in Ireland, Italy and Spain. Thus, a reduction in ALMP spending per unemployed in Ireland and Spain in the aftermath of the crisis may have aggravated the effect of the sharp drop in growth on youth unemployment rates.



Notes: GRR – gross replacement rate, NRR – net replacement rate, ITRAP – inactivity trap, MIN2MED – ratio of minimum to median wage, TWEDGE – tax wedge, UDENS – union density, EPT – OECD temporary employment protection index, TSHARE – share of temporary employees for a given age group, TPROB – share of temporary employees on probation in total temporary employees for a given age group, LOWEDUC – share of population with lower secondary education, ALMPTOT – total spending on ALMP (thousands euro per unemployed), ALMPTRAIN – spending on ALMP training policies.

Source: Staff Estimates

43. **Reforms better as a package.** Given the estimated effects on youth unemployment, the amounts of ALMP spending required to make a sizeable dent in historically high youth unemployment rates would be too large to be feasible. Thus ALMP spending will need to be complemented with growth and other labor market reforms to yield the maximum effect. Empirical analysis shows that ALMPs are likely to be more effective if they are part of the broader, comprehensive strategy to address structural impediments to greater youth employment, e.g., higher tax wedges reduce the effectiveness of ALMP spending in Austria and Germany.

44. **However, ALMP is not a panacea by itself.** ALMP programs need to be designed and monitored properly as meta analysis of such programs show that the impact and cost-effectiveness of ALMPs vary significantly based on their design.

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Annex 1. Data Definitions

Variable	Definition	Source
Output gap	(Real GDP - Real potential GDP) as a percent of real potential GDP	WEO
GDP growth	Year-on-year growth of GDP, constant price	WEO
Unemployment rate	Unemployed population as a percent of labor force in corresponding age cohort.	Eurostat
Net replacement rate	Net benefits replacement rate is defined as the ratio of net income while out of work (mainly unemployment benefits if unemployed, or means-tested benefits, if on social assistance) divided by net income while in work. A lower net replacement rate is associated with greater incentive to search for and take up a job when unemployed.	European Commission Tax and Benefits Indicators Database
Gross replacement rate	Average of the gross unemployment benefit replacement rates for two earnings levels, three family situations and three durations of unemployment.	OECD
Inactivity trap	The inactivity trap - or the implicit tax on returning to work for inactive persons - measures the part of additional gross wage that is taxed away when an inactive person (not entitled to receive unemployment benefits but eligible for income-tested social assistance) takes up a job. In other words, this indicator measures the financial incentives to move from inactivity and social assistance to employment.	European Commission Tax and Benefits Indicators Database
Minimum wage/Median wage	Minimum wage relative to median wage for full-time workers. This ratio is set to be zero for countries without a national minimum wage.	OECD
Protection of temporary workers	Strictness of employment protection for temporary contracts.	OECD
Share of temporary workers	Temporary employees as percentage of the total number of employees.	Eurostat
Tax wedge (EC)	The tax wedge is defined as the proportional difference between the costs of a worker to their employer (wage and social security contributions, i.e. the total labour cost) and the amount of net earnings that the worker receives (wages minus personal income tax and social security contributions, plus any available family benefits). Tax wedge measures both incentives to work (labour supply side) and to hire persons (labour demand side).	European Commission Tax and Benefits Indicators Database
Union density	Trade union density corresponds to the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners (OECD Labour Force Statistics). Density is calculated using survey data.	OECD
Adjusted bargaining power	Employees covered by wage bargaining agreements as a percentage of all wage and salary earners in employment with the right to bargaining, adjusted for the possibility that some sectors or occupations are excluded from the right to bargain (removing such groups from the employment count before dividing the number of covered employees over the total number of dependent workers in employment).	The QOQ (Quality of Government) Institute, University of Gothenburg
Share of temporary workers on probation	Proportion of total temporary workers on probation (other reasons for being on temporary contracts include "could not find a permanent job", "did not find a permanent job", "in education or training").	Eurostat
Share of low-educated workers	Persons with lower secondary education attainment.	Eurostat
ALMP total spending per unemployed	Active labor market policy: total spending per unemployed.	Eurostat
ALMP spending per unemployed on training	Active labor market policy: spending on training per unemployed.	Eurostat

Annex 2. Methodology

A. Estimating the Okun's Coefficient

1. **The estimation of Okun's coefficient for individual countries was conducted using the following specification:**

Change in unemployment rate over time

$$Urate_{it} - Urate_{it-1} = Constant + \sum_{i=1}^{22} b_i * Growth_{it} * Country\ dummy_i + Country_i + \varepsilon_{it}$$

Where:

$Urate_{it}$: Unemployment rate in a certain age group in country i, year t

$Urate_{it}^*$: Structural (equilibrium) unemployment rate in a certain age group in country i, year t (estimated by using HP filter, with $\lambda=100$)

$Growth_{it}$: GDP growth rate in country i, year t

$Output\ gap_{it}$: Output gap in country i, year t (Source: WEO)

$Country_i$: Country fixed effect

The estimated b_i would be the Okun's coefficient.

B. Impact of Labor Market Institutions

2. **Specification in levels.** Economists have advanced a number of models for unemployment rate, which are consistent with using unemployment rate in levels as dependent variable in reduced form equations. For example, Nickell and Layard (1999) develop a wage bargaining model with numerous identical firms, showing that equilibrium level of unemployment rate will be decreasing in any exogenous factor that increases job separation rate (represented in our case by the output gap), increases the search effectiveness of the unemployed (represented by ALMP policies), lowers the benefit replacement ratio, lowers the strength of the workers in the wage bargain (union density) or raises the elasticity of product demand facing the firm. The latter argument even suggests scope for including variables associated with product market regulation into unemployment equations. Other examples of similar models include Scarpetta (1996) and Bassanini and Duval (2006), who estimate a specification very similar to ours.¹³

3. **Univariate model with interaction terms.** This model assumes that: (i) the effects of the business cycle may depend on labor market features, (ii) this dependence may be different across

¹³ Bassanini and Duval (1996) estimate a reduced form equation consistent with a variety of theoretical models of labor market $u_{i,t} = \sum_j \beta_j X_j + \chi G_{i,t} + \alpha_i + \lambda_t + \varepsilon_{i,t}$ equilibrium (job search, wage setting), where unemployment is regressed on a series of structural variables (in vector X), an output gap measure (G), as well as country and time fixed effects. We depart from this specification by including interaction terms and excluding time fixed effects.

countries and (iii) that the effect of the structural variable itself does not depend on the country, except indirectly via the business cycle. These assumptions, together with limitations of data availability mean that structural variables can only be considered one at a time, otherwise the high number parameters to estimate relative to the size of the sample will prevent efficient estimation of the coefficients.

We consider the following specification:

$$u_{i,t} = \beta_0 + \beta_{1,i}c_i + \beta_2x_{i,t} + \beta_{3,i}c_iy_{i,t}^* + \beta_{4,i}c_ix_{i,t}y_{i,t}^* + \varepsilon_{i,t},$$

where $u_{i,t}$ is one out of six dependent variables (youth and adult unemployment and long-term unemployment rates, as well as employment rates), c_i is the dummy variable equal to 1, if dependent variable is from country i , $y_{i,t}^*$ is the control variable for the regression in levels: output gap, $\Delta y_{i,t}$ is the control variable for the regression in differences: output growth and $x_{i,t}$ is a given labor market feature. Finally $\varepsilon_{i,t}$ is the error term with standard assumptions.

4. **Marginal effects.** The marginal impact of the change in labor market feature $x_{i,t}$ on the level of unemployment or employment is given by the partial derivative:

$$\frac{\partial u_{i,t}}{\partial x_{i,t}} = \beta_2 + \beta_{4,i}c_iy_{i,t}^*,$$

that is the impact of a change in labor market feature differs depending on the country considered and its' output gap. Crucially, therefore the marginal effects of the change in structural variable will depend on the value of the output gap $y_{i,t}^*$ at which they are evaluated. In this note, this point is *the country-specific average output gap* (average growth rate for the specification in differences). The standard errors for the marginal effects are computed using the delta method.

5. **Multivariate approach.** This specification considers several labor market features at a time and assumes that the impact of labor market features, if any, is common across all countries. It allows the impact of the business cycle (output gap) to vary across countries.

$$Urate_{it} = Constant + \sum_j \gamma_j X_{ijt} + \sum_{i=1}^{22} b_i * Output\ gap_{it} * Country\ dummy_i + Country_i + \varepsilon_{it}$$

Where:

$Urate_{it}$: Unemployment rate in a certain age group in country i , year t

X_{ijt} : Labor market institution j , in country i , year t

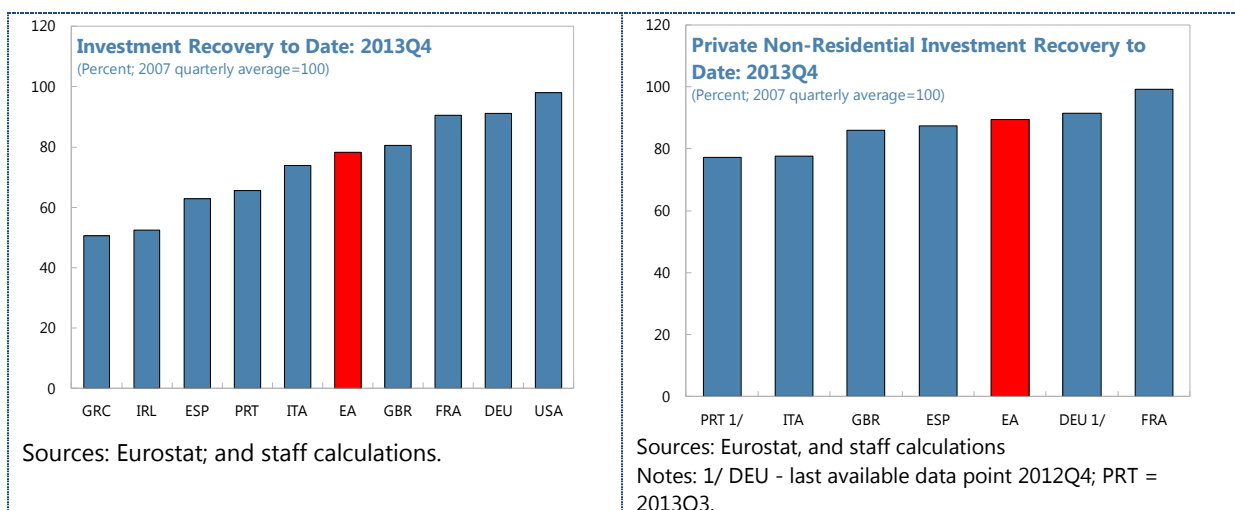
A variety of robustness checks are performed e.g. including time effects, using different measures of the output gap, and youth unemployment, etc. These results are available upon request.

INVESTMENT IN THE EURO AREA: WHY HAS IT BEEN WEAK?¹

Investment across the euro area—both in real terms and in percent of GDP—remains below its pre-crisis level. Its performance has been weaker than in most previous recessions and financial crises. Staff analysis shows that much of this weakness can be explained by output dynamics, although a high cost of capital, financial constraints, corporate leverage, and uncertainty have also constrained investment in parts of the euro area. Investment is expected to pick up as the recovery strengthens and uncertainty declines. However, financial fragmentation and high corporate leverage in some countries will likely continue to weigh on investment.

A. Investment in the Euro Area: Post-crisis Trends

1. **Investment has been hit hard since the onset of the crisis.** It has not recovered since, including in many of the core economies. Total (real) investment remains below its pre-crisis level across the euro area.² Part of this decline reflects declines in public and housing investment in certain countries. For example, housing investment declined from about 12–13 percent of GDP before the crisis to 6 percent of GDP in Spain and to 2–3 percent of GDP in Greece and Ireland after the crisis. Similarly, following the sovereign debt crisis, public investment, as well as private non-residential investment remains well below its pre-crisis levels, in most of the euro area, particularly in stressed countries.³

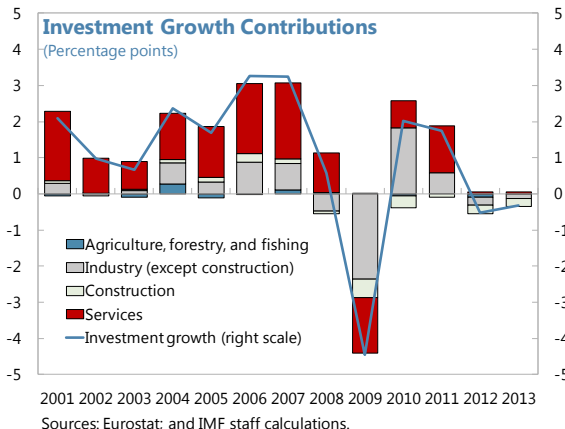


¹ Prepared by Bergljot Barkbu, Pelin Berkmen, Pavel Lukyantsau, Sergejs Saksonovs, and Hanni Schoelermann. We are grateful for the comments provided by Philip Vermeulen and other participants at the ECB seminar, as well as the European Commission staff.

² Investment in percent of GDP remains below its pre-crisis long-term (1995–2007) level, particularly for stressed countries.

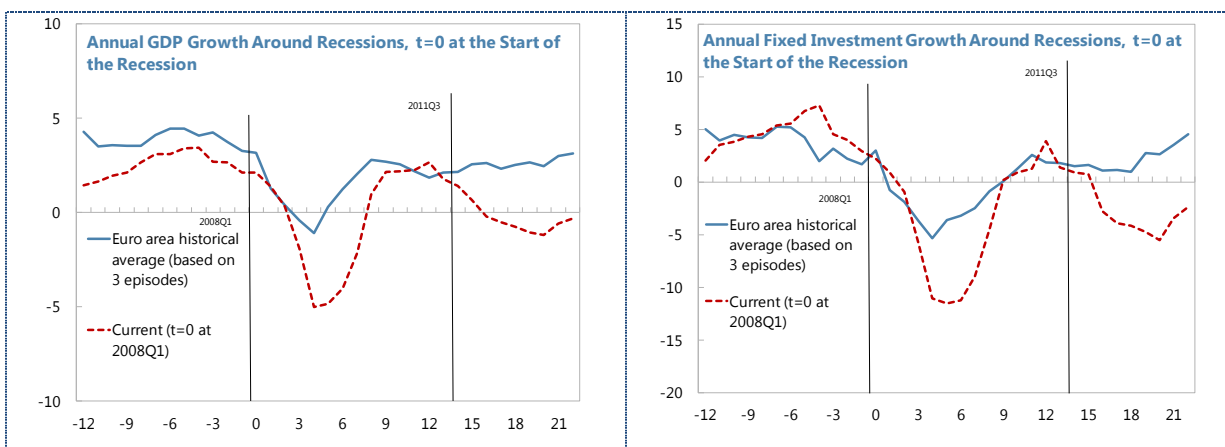
³ For these charts and regressions, private non-residential investment data are obtained from Eurostat to ensure consistency and comparability across countries. Looking into other data sources also shows weak investment dynamics. For example, real fixed-investment in equipment in Germany and real investment by NFCs in France, equipment and transportation machinery in the euro area are also weaker than their pre-crisis levels.

2. **Overall the behavior of investment and its determinants vary largely across the euro area.** Across countries, stressed countries have suffered more than the core countries. Across firm sizes, SMEs have suffered more than the larger corporations. And across sectors, services have suffered substantially.



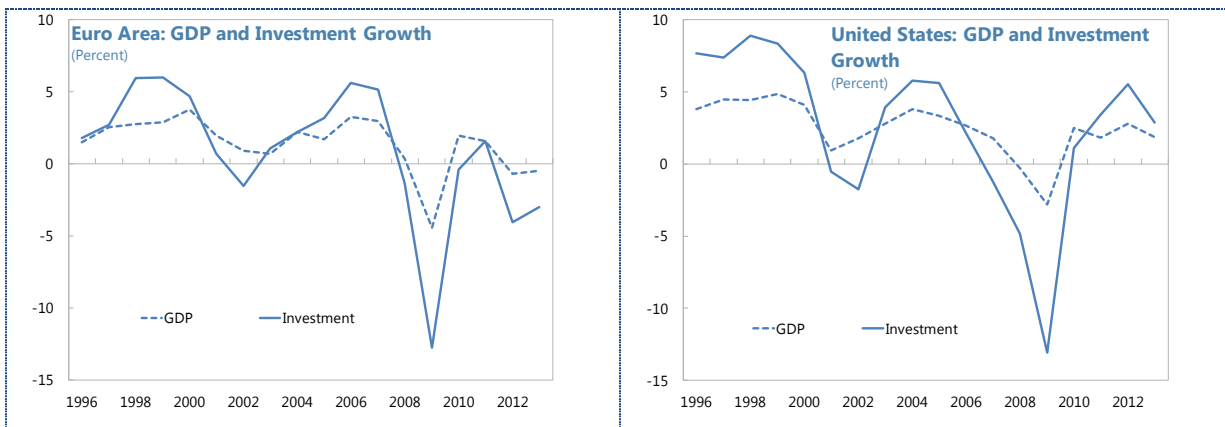
3. **Weak investment performance is associated with weak aggregate demand.**

Real GDP in the euro area remains below its pre-crisis level and is more sluggish than in typical recessions. While the recovery is gaining momentum, domestic demand growth is still fragile, and the output gap for the euro area is still negative and large. Given subdued aggregate demand, it is not surprising that investment has also lagged behind the trends observed in most previous recessions. Indeed, investment growth is still lower than real GDP growth in the euro area, unlike the recovery in the U.S.



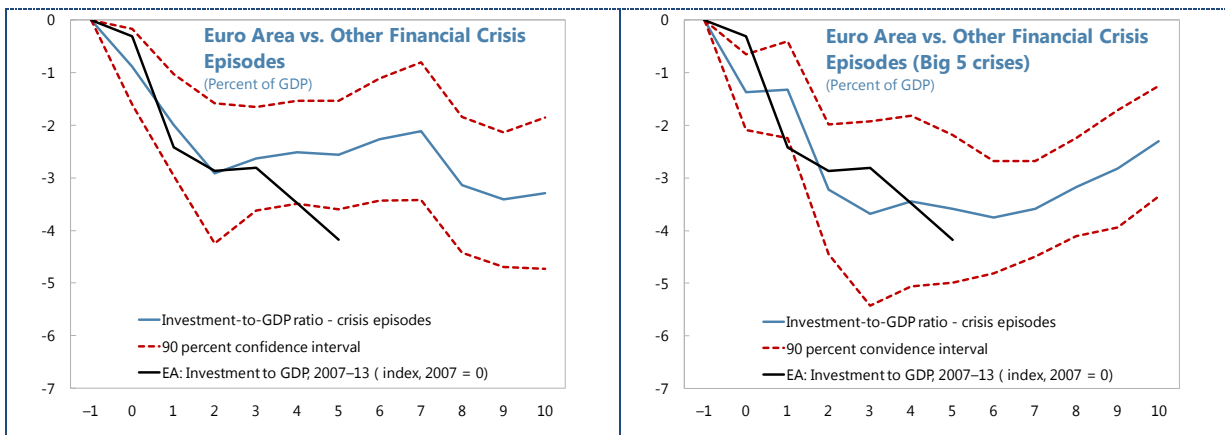
Source: OECD; Eurostat; Staff calculations.

Notes: Quarterly data and yoy change. t=0 at 2008 Q1; the shade area starts from 2011 Q3 (t=15) to indicate the back-to-back recession in the euro area; historical episodes are based on CEPR-dated recessions: 1974Q3 to 1975Q1, 1980Q1 to 1982Q3, and 1992Q1 to 1993Q3.



Source: Eurostat; Staff calculations.

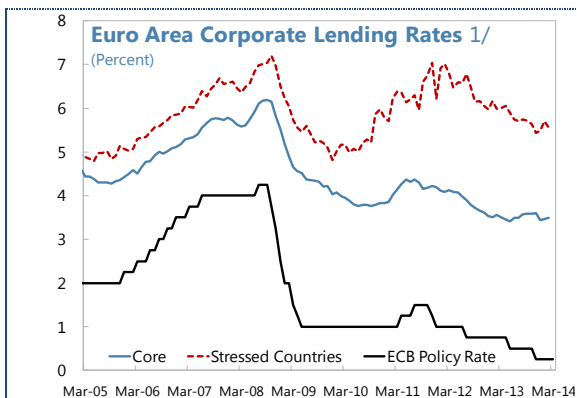
4. **In addition, financial crises tend to have durable effects on investment, reflecting credit supply constraints, balance sheet problems, and other supply-side factors.** Previous experience with financial crises shows that the decline in the investment-to-GDP ratio could be long-lasting, with a peak impact of 3 to 3½ percentage points three years after the crisis (WEO 2014). In the euro area, the observed decline in investment-to-GDP ratio since the beginning of the crisis is more severe than the standard financial crisis but is in line with the decline observed in the most severe crises— with the ratio standing at 4¼ percentage points below the pre-crisis level.



Source: WEO 2014, Chapter 3; and staff calculations.

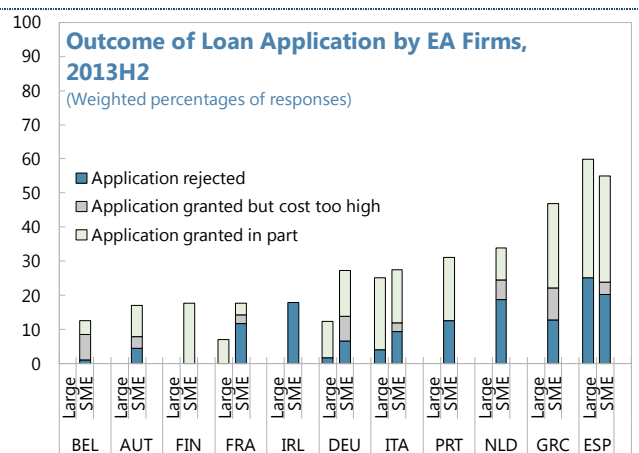
Notes: Gross fixed capital formation in percent of GDP. The entire sample of advanced economy financial crises between 1970 and 2007 identified by Laeven and Valencia (2012). Big 5 financial crises are those in Spain, 1977; Norway, 1987; Finland, 1991; Sweden, 1991; and Japan, 1992. Dashed red lines denote 90 percent confidence bands; and black line denotes the actual evolution of the investment-to-GDP ratio in the euro area from 2007 to 2013. X-axis units are years; t = 0 denotes the year of the financial crisis.

5. **In the euro area, the high cost of capital and limited access to funding could impose additional impediments to investment in certain countries.** While the ECB’s policy rate is close to zero, lending rates remain elevated in some countries as financial fragmentation persists. Given that debt financing in the euro area is mostly bank-based (about 90 percent), this increases the cost of capital, particularly for smaller firms. In addition, many smaller companies have difficulty accessing credit (SAFE survey). Recent improvements in corporate bond and stock markets are likely to benefit only larger corporations.



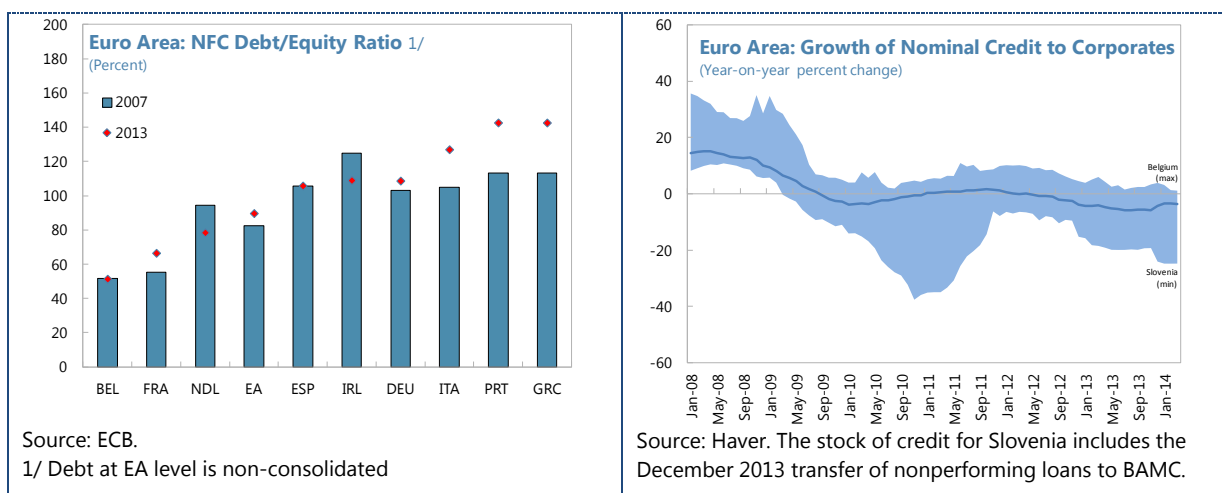
Sources: Haver, ECB, staff calculations.

1/ Unweighted average; MFI lending to corporations under €1 million, 1–5 years maturity. Core: Germany, France, Belgium, Netherlands. Stressed countries include Greece, Ireland, Italy, Portugal, and Spain. In the sample, Ireland is excluded from May 2011 and Greece from September 2012.



Source: ECB, Safe survey.

6. **Moreover, the corporate sector is highly leveraged in some countries, further depressing credit flows to the private sector.**⁴ Corporate debt-to-equity ratios remain elevated in some stressed countries, and the deleveraging process is still at an early stage. As companies repair their balance sheets and reduce debt, this feeds back into the banking sector through low demand for credit and higher NPLs. As a result of both corporate and banking sector deleveraging, the credit to the private sector continues to shrink.



7. **Investment in the euro area could recover without credit, but credit-less recoveries are associated with lower investment and GDP growth.** Empirically, credit-less recoveries are rare, especially in advanced economies, which suggests risks to recovery unless credit growth resumes (IMF, 2014). In addition such recoveries are associated with lower investment and output growth than in recoveries with credit. This, in turn, could have long-term consequences through lower potential output.

8. **Against this backdrop, the paper explores to what extent output dynamics and other factors can explain private non-residential investment across the euro area.** First, to analyze the impact of the output dynamics, an accelerator model is estimated for the euro area and selected euro area countries.⁵ While this model tracks investment closely, actual post-crisis investment has remained below its model-implied value for most countries. Second, to explore the impact of the cost of capital and financial constraints, we augment the model with the (real) cost of capital and a proxy for financial constraints (EC survey). These additional factors are significant for some of the countries; however, actual investment continues to remain below its estimated level for most countries. Finally, to explore the effects stemming from uncertainty, corporate leverage, and cash flow, a more eclectic (bond market) model is estimated. Controlling for these factors, changes in output are more representative of demand factors. Accordingly, uncertainty is associated with low investment in most countries. In addition, high corporate

⁴ In addition to these standard factors, investment in many smaller European countries has been affected by availability of the EU structural funds. For instance, there are indications that investment in Portugal in certain sectors was too high prior to the crisis (see OECD WP 994).

⁵ Select countries are Germany, France, Italy, Spain, Portugal, Ireland and Greece. We use quarterly data for 1990/99 and 2012/13.

leverage is associated with subdued investment in Italy and Portugal, and to a lesser extent in Spain, and France. Overall, this model seems to be a better fit for stressed countries, with the residuals substantially smaller than in the previous two models.

B. Drivers of Investment: Output Changes versus Other Factors

9. **Three types of investment models are used to explain the dynamics of private non-residential investment**, following Lee and Rabanal (2010): 1) an accelerator model (Clark, 1917; and Jorgenson, 1971); 2) a neoclassical model (Jorgenson, 1971; and Caballero, 1994); and 3) a bond-market model (Philippon, 2009; Bloom, 2009; Lee and Rabanal, 2010).⁶ Appendix 1 presents data sources and definitions.

Are output changes enough to explain the decline in investment (Accelerator Model)?

10. **The first step is to explore whether changes in the output are sufficient to explain investment dynamics in the euro area.** The accelerator model relates real investment to past changes in real output, taken to be the primary determinants of the changes in the desired capital stock. A common approach is to run these regressions on the investment-to-capital stock ratio:

$$\frac{I_t}{K_{t-1}} = \frac{\alpha}{K_{t-1}} + \sum_{i=1}^N \beta_i \frac{\Delta Y_{t-i}}{K_{t-1}} + \delta + e_t,$$

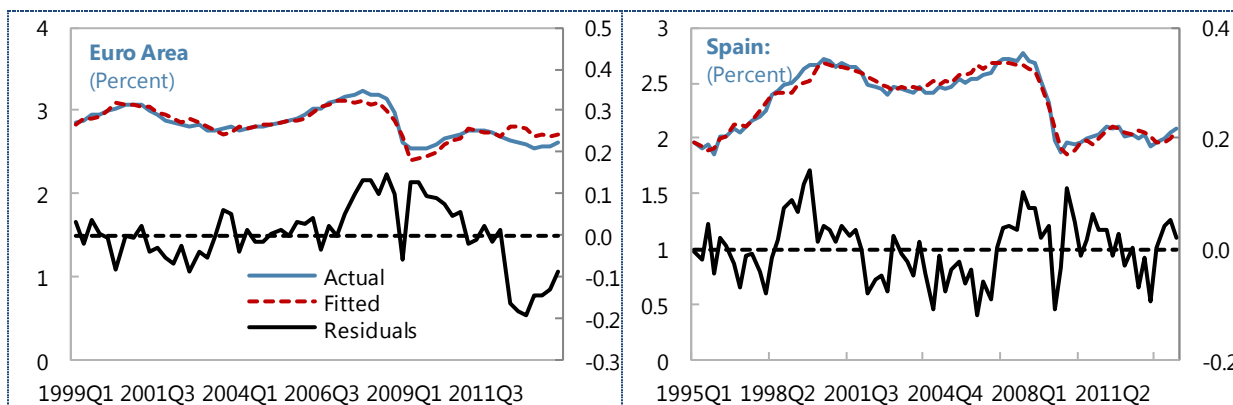
where I is real private non-residential investment, K is the total capital stock, ΔY is the change in real GDP.⁷

11. **The results indicate that changes in output can capture broad changes in the investment but cannot fully account for the decline in investment after the crisis in most cases (Appendix 2).** Lags of changes in the real GDP (up to 12) are correctly signed and significant. While the model provides a good fit for overall trends, real non-residential private investment, particularly during the second phase of the crisis, is lower than in-sample fitted values, with the exception of Spain. The model seems to track Spain's investment closely, implying that output has played an important role in investment dynamics. For most countries, underinvestment becomes smaller towards the end of the sample. The model does not seem to

⁶ A model based on Tobin's Q was also estimated. This model relates the real investment-to-capital ratio to the ratio of firm value to the replacement cost of the existing capital stock (Tobin, 1969; and Hayashi, 1982). Alternative definitions of Tobin's Q (for NFCs) are used: i) interpolated from annual Tobin's Q (CVU, Woldscope); ii) price-to-book ratio; iii) stock prices deflated by GDP deflator. The model also controls for firms' leverage (debt-to-asset ratio) and cash-flow (CVU, Woldscope). Among the Tobin's Q proxies used, only price-to-book ratio appears to be significant in a few specifications for Germany, France, and Portugal. Controlling for endogeneity (by two-stage least squares) and running the regressions for the pre-crisis period, the significance of the results increases: price-to-book ratio and leverage are significant and correctly signed for Germany, Greece, Portugal, and the euro area. Overall, however, model performance remains weak.

⁷ For Ireland and Greece, total real investment is used. As the residuals are highly correlated—a common result in the literature—we report Newey-West standard errors. Note that the constant δ can be interpreted as an indirect estimate of the depreciation rate.

explain well the behavior of total investment in Greece and Ireland. As a robustness check, the regressions are run for machinery and equipment investment in Ireland and Germany (with data up to 2013Q4). For both cases, the results are broadly the same.

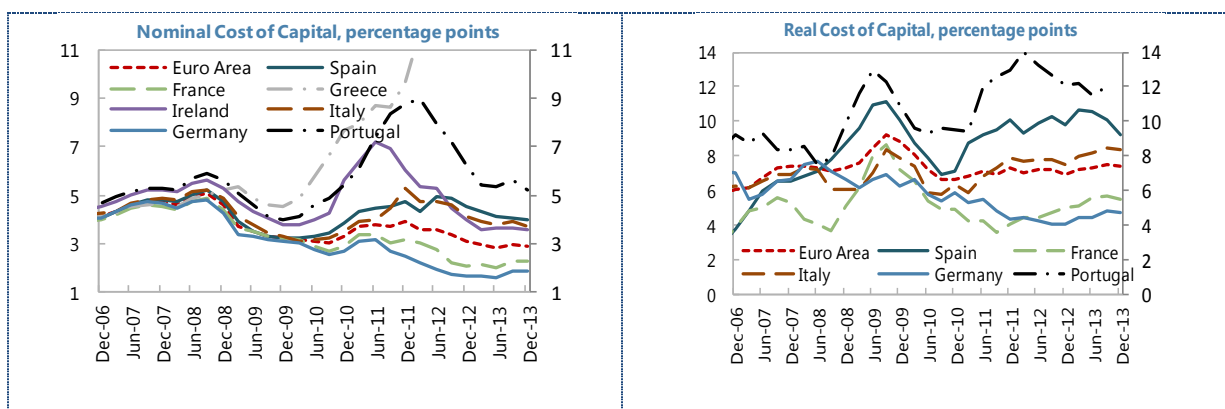


Do cost of capital and financial constraints matter for investment (neoclassical model)?

12. **Since output developments cannot explain fully the decline in investment after the crisis, we explore whether the cost of capital and financial constraints are additional impediments.** In the neo-classical model, current investment is a function of the lags of changes in desired capital stock, which in turn is determined by the cost of capital. Under the additional assumption that the cost of capital is equal to its marginal product, investment can be related to the past changes in output and changes in the real cost of capital. This baseline specification is then augmented with a variable to capture credit rationing (based on a question on financial constraints from the EC consumer and business survey). Up to 12 lags are found to be significant.

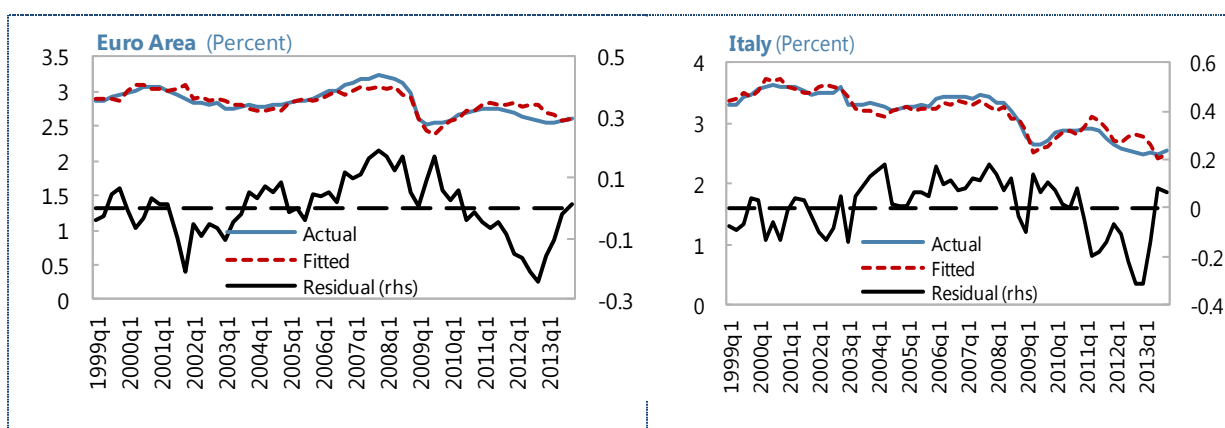
$$\frac{I_t}{K_{t-1}} = \frac{\alpha}{K_{t-1}} + \sum_{i=1}^N \beta_i \frac{\Delta \left(\frac{Y_{t-i}}{r_{t-i}} \right)}{K_{t-1}} + \sum_{i=0}^N \gamma_i f c_{t-i} + \delta + \varepsilon_t$$

13. **Both nominal and real costs of capital are elevated for the stressed countries** (See Appendix 1 for definition of the cost of capital). While reduced policy rates have translated into lower cost of borrowing in the core countries, these rates have remained elevated in the stressed countries—a sign of continued fragmentation.



14. **The high cost of capital and financial constraints help explain part of the decline in investment in Italy, but actual investment remains below the estimated level for others**

(Appendix 3).⁸ Lagged coefficients of real cost of capital are generally positive and statistically significant. This is consistent with the expectation that lagged desired investment—captured by the changes of the ratio of output to the cost of capital—has a positive effect on investment in the current period. In addition, in line with expectations, the financial constraint variable is significant for investment in the euro area, Spain, and Italy. The gap between the actual and fitted investment in the euro area and Italy closes towards the end of the estimation period. Focusing on core countries and including longer lags for Germany and France, the underinvestment result survives for Germany but not for France.⁹ The robustness checks using series for machinery and equipment investment in Ireland and Germany produce marginally better results, but the broad messages are the same.



15. **Out-of-sample projections also imply underinvestment.** For all countries, one-step-ahead forecasts from 2008Q3 onward produce projected investment levels that are above realized investment levels, particularly during the second phase of the crisis. In the case of Germany, during the first phase of the crisis, the decline in projected investment was deeper than the actual decline. This has reversed during the second phase of the crisis. To test whether the crisis has changed the investment dynamics, an intercept and interaction dummies are added to the specification. While the intercept terms are generally significant, the results are mixed for the interaction terms (All results are available upon request).

⁸ Similar to the accelerator model, the residuals are serially correlated and the model is not a good fit for Greece and Ireland. Macroeconomic adjustment in those countries has been especially severe, which, combined with the relatively small sample, may affect estimation results. In addition, the sample size is smaller for Greece, limited by cost of capital calculations. Appendix 3 presents the results for the extended model; the results for the baseline model without financial constraints are available upon request.

⁹ We have also modeled the short and long-run investment dynamics using a vector error correction model, controlling for cost of capital, output, and labor costs. While we did not obtain consistently significant coefficients for the cost of capital measure, output and labor costs were significant, showing that higher labor costs dampen investment growth. Augmenting the VECM model with indicators of capacity utilization and uncertainty generally failed to establish significant results.

Do other factors (uncertainty, leverage, and cash flow) play a role in investment dynamics?

16. **To account for other factors that could potentially weigh on investment, we use a more eclectic model.** Philippon (2009) suggests using bond prices instead of equity prices to estimate the value of Tobin's Q. The proposed measure, called "Bond Market's Q", is a function of the real risk-free rate, the spread between bond yields and government bonds, leverage, and uncertainty. We substitute the real rate with the real lending rate for non-financial corporations in our baseline model, and following Lee and Rabanal (2010), include a measure of cash flow.

17. **The model captures any additional impact on investment from uncertainty and corporate leverage.** The ratio of private non-residential investment to total capital stock is modeled as a function of overall real lending rates to NFCs, corporate bond spreads, uncertainty, corporate leverage, and the cash flow-to-sales ratio. To account for demand effects, we augment the baseline model with changes in real output over total capital stock. This also allows us to compare this model with the accelerator and neoclassical models. Finally, similar to the neoclassical model, we control for financial constraints to account for possible credit rationing (Appendix 4).¹⁰

$$\frac{I_t}{K_{t-1}} = \alpha + \beta_1 cbond_{t-1} + \beta_2 rlr_{t-1} + \beta_3 lnuncer_{t-1} + \beta_4 leverage_{t-1} + \beta_5 cash\ flow_{t-1} + \varepsilon_t$$

18. **High uncertainty is associated with low investment, particularly for the stressed countries.** In the baseline model (without controlling for output changes and financial constraint variable), uncertainty reduces investment in most countries and in the euro area as a whole, though the effect is fairly small. An increase in uncertainty by one standard deviation reduces the investment-to-capital-stock ratio by around 0.1 percentage points—except for Greece and Ireland for which the effect is larger). The results remain broadly unchanged when we control for output changes and financial constraints.

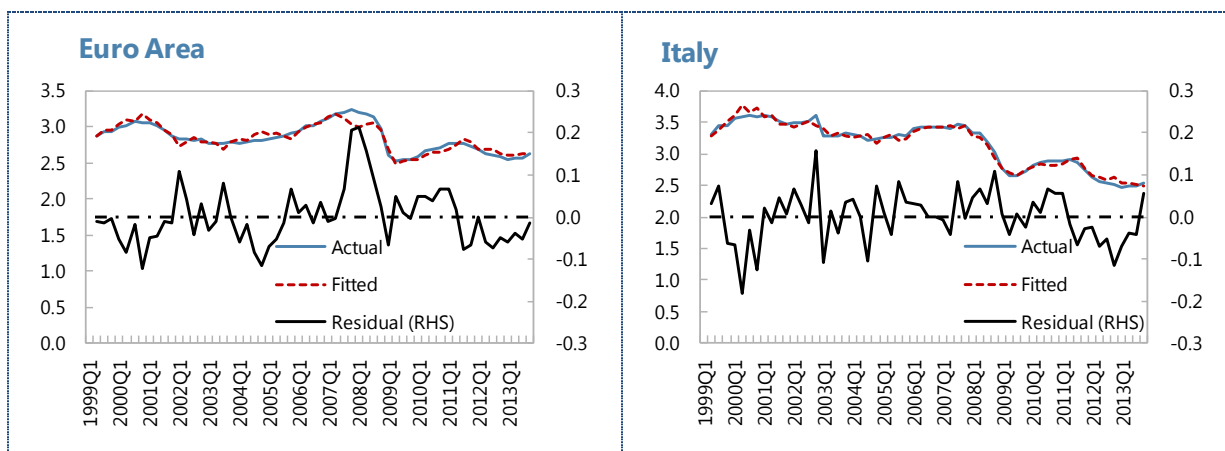
19. **Higher corporate leverage is associated with weak investment in some countries.** In the baseline model, corporate leverage reduces investment in Italy, Portugal, France, and Spain by between 0.1 and 0.4 percentage points for every 10 percentage-point increase in the debt-to-equity ratio. Controlling for output changes and financial constraints, leverage is still important for Italy, Portugal, and France. Cash flow is significant for a few countries in the baseline model, but only has the expected positive sign for Germany, Greece, and, after controlling for the changes in output, Spain.

20. **Corporate bond spreads and real lending rates are significant and correctly signed only for a few countries.** The former are significant for Ireland, as well as for Germany and Spain once we control for output changes and financial constraints. A 100 basis-point increase in

¹⁰ Appendix 4 presents the results for the extended model. The results for the baseline and other steps are available upon request.

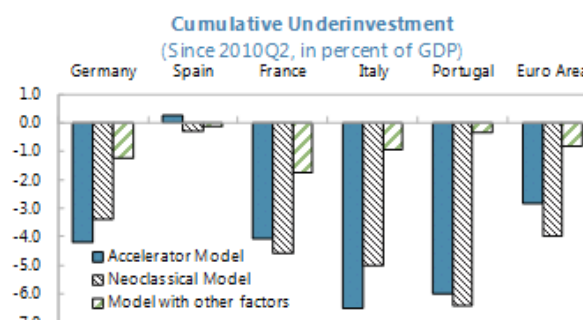
the spread of corporate over government bond yields decreases investment by about 0.1–0.8 percentage points. Real lending rates (deflated by GDP deflator) are correctly signed and significant for determining investment in Italy once we control for the output changes and financial constraints.¹¹ The financial constraint variable is significant for Italy and Portugal.

21. **Overall, the model seems to work better for stressed countries, in particular for Spain and Italy,** and to a lesser extent for Portugal and the euro area as a whole. It performs comparatively poorly for Germany and France.¹² The robustness checks using the series for machinery and equipment investment in Ireland and Germany (with data up to 2013Q4) produced broadly similar results.



The magnitude of missing investment

22. **Since the European debt crisis, investment has been systematically lower than its estimated level, except for Spain.** To better gauge how much investment has been missing since the start of the European sovereign crisis, we look at the cumulative underinvestment since then. Overall, controlling only for output, the cumulative underinvestment is about 3–6 percent of GDP (excluding Spain). Once we also control for other determinants, the cumulative underinvestment declines substantially to about ½–2 percent. In Spain, output changes alone are enough to explain much of the decline in investment. However, other factors such as cost of capital, financial constraints, and uncertainty also important factors affecting investment in Spain, implying that these factors may affect investment through their impact on output.



Notes: Germany ends in 2012Q4 and Portugal in 2013Q3.

¹¹ The coefficients for the euro area, Germany, and Spain have the reverse sign, which is a common finding in the literature, possibly reflecting difficulties in identifying credit demand and supply.

¹² Pérez Ruiz (2014) uses a broader set of determinants to explain the level of business investment in France. The model provides a good fit for France.

C. Conclusions

23. **Investment has been weak across the euro area.** Empirical evidence suggests that output dynamics can explain the broad trends in investment, including its collapse after the financial crisis. In particular, output accounts for the behavior of investment in Spain. In other countries (including in Germany and France), private non-residential investment has been lower than implied by output developments only since the onset of the crisis.

24. **In addition to output dynamics, there is evidence that the cost of capital and financial constraints matter for investment.** Real cost of capital and financial constraints have been important factors in constraining investment, particularly for Italy and Spain. Nevertheless, controlling for these factors reduces the underinvestment only for Italy.

25. **High uncertainty and corporate sector leverage are additional impediments to investment,** particularly in Italy, Spain, Portugal, and France. After controlling for all of these factors, investment (in cumulative terms) is lower than its estimated level by up to about 2 percent of GDP since the beginning of the European debt crisis.

26. **Investment is expected to pick up as the recovery strengthens and uncertainty declines.** However, a sustained recovery in investment will require dealing with the corporate debt overhang and financial fragmentation. Corporate debt-to-equity remains elevated in some stressed countries, and the deleveraging process is still at an early stage. At the same time, borrowing costs need to be substantially lower particularly for smaller firms.

27. **Future work will focus on firm level investment, particularly for SMEs.** Firm-level analysis will supplement macro-level regressions. The use of microeconomic data will allow to differentiate between the investment patterns of large and small corporations, as well as the impact of firm-specific variables, such as cash-flow, leverage, and Tobin's Q.

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