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Do Labor Market Policies and Growth Fundamentals Matter for Income Inequality in OECD Countries?

Some Empirical Evidence

PATRICK VANHOUDT*

This paper presents an assessment of the relationship between income distribution, fundamentals affecting economic growth, and labor market policies. When this relationship is tested, the explanatory power turns out to be surprisingly high: on average, economic fundamentals explain about three-fourths of the variation in various inequality measures for the countries of the Organization for Economic Cooperation and Development (OECD). Moreover, Granger causality between accumulating economic fundamentals and inequality seems to hold. [JEL D31, E62, O40]

INCOME DISTRIBUTION is of obvious social concern in its own right. From a policy point of view, the questions are often whether the level of inequality can be controlled and whether a contradiction exists between a growing economy and a widening income distribution. This paper therefore assesses the determinants of inequality in a broader macroeconomic context. In particular, it examines whether inequality is affected by fundamentals related to economic growth and by labor market policies.

The relationship between inequality and growth is, however, not yet well understood. Modern research on this topic originated in a seminal study by Kuznets (1955), who advanced the theoretical conjecture that a nation's

*Patrick Vanhoudt is a fellow of the Belgian Fund for Scientific Research at the University of Antwerp (UFSIA) and a Fulbright scholar. When this paper was written, he was a summer intern in the IMF European I Department. The author would like to thank, without implication, Martin Fetherston, Tim Lane, Ramana Ramaswamy, Bart Turtelboom, and members of the electronic discussion list on economic growth (majordomo@ufsia.ac.be) for helpful comments on an earlier draft.

income distribution becomes less egalitarian, rather than more, as its income increases. Only after its income has passed some threshold does growth bring about more equality. In other words, Kuznets argued that the evolution of income distribution follows an inverted U-shaped curve: economic expansion results in relatively more inequality in the initial stages of a nation's development, and relatively more equality at advanced stages. Unfortunately, empirical evidence supporting the existence of a "Kuznets curve" is inconclusive (see Anand and Kanbur (1993) for a recent reexamination). Persson and Tabellini (1994) showed that there is cross-country support for a robust relationship between measures of inequality and the growth rate, rather than the level of income. Recently, however, Galor and Tsiddon (1996) developed a general equilibrium model in which the evolution of income inequality and output does conform to the Kuznets hypothesis. Their paper presents an endogenous mechanism on the side of human capital accumulation that generates the inverted U-shape relationship between income inequality and per capita output.

Furthermore, unemployment seems to be one of the major sources of inequality in modern societies, with evidence of a significant correlation between unemployment and inequality. For instance, case studies such as Jenkins (1996) find that changes in overall income distribution in the United Kingdom arose from a shift away from employment toward unemployment and toward new forms of employment (for example, self-employment) and wage inequality. Johnson and Webb (1993) report a strong relationship between changes in the tax and benefit system and changes in inequality. Jenkins (1995) emphasizes unemployment, the employment structure, wage inequality, and income from capital as the main contributors to the changes in aggregate income inequality in the United Kingdom.

At the national level, governments invest in labor market policies (active and passive) to deal with unemployment and its possible effect on income distribution. *Passive labor market policies* refer to income compensation schemes, including unemployment compensation and early retirement for labor market reasons. These policies are generally introduced for distributional or insurance reasons, but may also distort the incentive to work—broadly defined as the effort and time devoted to a job, job search, or home production (including child care). Passive labor policies are much more prevalent and costly than active labor market policies in most OECD countries. *Active labor market policies* are often introduced for and directed at specific problems and may be either broadly based or narrowly targeted. In this domain belong expenditures for public employment services, labor market training, youth measures, subsidized employment, and measures for the disabled. The rationale for active market policies is twofold: (1) to undo unemployment resulting from passive policies and (possibly) to reduce the cost of the latter; and (2) to address

possible market failures (such as search externalities, capital market imperfections that may prevent workers from financing their own (re-) training, or insider-outsider distortions).

Consequently, this paper analyzes the hypothesis that inequality in OECD countries is affected both by such policies and by fundamentals related to economic growth.

Section I briefly reviews the relevant fundamentals. Empirical tests (including causality tests) are then the subject of Section II. Section III concludes and summarizes.

I. Relationship Between Inequality, Unemployment Policies, and Economic Fundamentals

Let us review the evidence put forward in the empirical and theoretical studies mentioned above and assume that the level of inequality (*IE*), for simplicity, is a (multiplicative) function only of unemployment and income for each effectively employed worker. Several underlying macroeconomic fundamentals affect the evolution of these variables, and hence the level of inequality.

The empirical literature on economic growth reveals that both the level and the growth rate of per capita income in OECD countries strongly and positively relate to the share of GDP invested in physical capital and technological knowledge, whereas a higher growth rate of the working force, a higher rate of depreciation, and exogenous growth in labor productivity rather dampen the evolution of the available per capita income (see, for example, Mankiw, Romer, and Weill, 1992, and Nonneman and Vanhoudt, 1996). Because a proportion of GDP is not consumed but reinvested in the economy each period, the respective stock of capital increases, yielding a higher output level in the following period. Although the role of spillovers associated with investments in know-how was not present in the original and extended versions of Solow's (1956) growth theory, several authors have stressed it (Romer 1990, Grossman and Helpman, 1991, and Aghion and Howitt, 1992) as a source of sustained and endogenous long-run growth. Thus, the higher the investment shares in these fundamentals, and the larger the spillover effect, the faster an economy will grow.

Yet there is a reverse side. Investment in physical capital and new technologies may drive workers into unemployment, making them dependent on the lowest guaranteed income level—especially if technological change is biased and the degree of substitution between labor and (new) capital high. One of the forces that influences this substitution is possible market distortions caused by governments' tax policy—in particular changes in the

tax wedge. Moreover, it can be assumed that the stock of physical capital is held by the upper part of the income distribution. The return on new investments will henceforth substantially benefit the income share at the top. Other things being equal, the effect is then that an increasing proportion of income-yielding assets becomes concentrated in the hands of the upper groups, or, simply and popularly stated, "money yields money."

The effects of investment in knowledge may be less harmful for inequality. Although it is undoubtedly true that the stock of technological know-how will also be concentrated in the upper brackets of the income distribution, new investments in this sort of capital will also benefit less skilled workers. New technological knowledge has two effects: on the one hand it can lead to biased technological change and—because of more advanced and more cost-efficient production processes—drive workers into unemployment; on the other, it will diffuse through education and training. Spillovers of investment in new technology then benefit the marginal productivity of many. Growth generated by investment in knowledge will then presumably lead to a fairer division of the additionally generated income over the population. Formal models of inequality along these lines have been introduced by Galor and Tsiddon (1996 and 1997).

Inequality can thus be assumed to be related to the share of GDP that governments invest in (active and passive) labor market policies (s_u), changes in the tax wedge ($\dot{\tau}$), and growth fundamentals such as the investment share in physical capital (s_k) and in technological know-how (s_h) in the economy, and the growth rate of the working force, the depreciation rate, and the rate of (exogenous) growth in labor productivity ($n + \delta + x$). Similar to the well-known "growth" regressions (see Barro and Sala-i-Martin, 1995), let us test here an equation of the form

$$\log[IE] = c_0 + c_1 \cdot \log[s_u] + c_2 \cdot \log[s_k] + c_3 \cdot \log[s_h] + c_4 \cdot [n + x + \delta] + c_5 \cdot \dot{\tau}. \quad (1)$$

In the empirical work let us assume that rates of exogenous technological change, the depreciation rates of capital, and the efficiency of labor market policies are roughly similar across the OECD countries under consideration. Following Mankiw, Romer, and Weil (1992), the sum of the rate of depreciation and labor-augmenting technological change will be set at 5 percent, so that the variation in the fifth term comes from a variation in the growth rates of the labor force. Reasonable changes in this assumption have no important effects on the estimates.

Finally, the restrictive assumptions of this framework should be noted. In particular, the framework focuses on the effect of labor market programs on unemployment (and hence inequality), abstracting from the fact that such programs may also affect inequality directly by transferring money to the

unemployed and/or working poor. Likewise, capital accumulation and technological change may affect inequality directly to the extent that relative factor abundance affects factor prices and thus wages and incomes, except in fully open economies in which factor price equalization applies. Moreover, important variables are left exogenous (fiscal policy and saving behavior) or even omitted (monetary and trade policy). However, the assumptions that (1) labor market policies affect inequality only through unemployment and (2) capital accumulation affects inequality only through per capita income are restrictions on the theoretical framework but not on the empirical work.

II. Empirical Evidence

Description of Data

Table 1 shows the definition and basic sources of the data used. Data used in the regressions are in Appendix I. A correlation matrix for the variables is presented in Table 2. That table makes clear that there is no particular multicollinearity problem between the independent variables (none of them exceeds 0.6 except the correlation between the different measures for inequality and between the different labor market policies).

Regression Results

Equation (1) is tested for different measures of inequality. The first is the Gini coefficient. Comparisons between Gini coefficients, however, do not indicate which part of the distribution is responsible for the variation in inequality. For instance, the Gini coefficient may have increased either because the income share of the first (lowest) quintile increased at the expense of the second or because the income share of the top quintile decreased to the benefit of the fourth. Therefore, the shares of income in the bottom (first, poorest) and top (fifth, richest) quintiles were used as separate measures of inequality. Another intuitively attractive measure for this exercise is the ratio of the incomes of the top 20 percent to the bottom 20 percent; it basically reflects how many times the rich are richer than the poor. All regressions include either the total percentage of GDP spent on labor market policies (*TLMP*), the percentage spent on active labor market polices (*ALMP*) (that is, public employment services and administration, labor market training, youth measures, subsidized employment, and measures for the disabled), or the percentage spent on passive labor market policies (*PLMP*) (unemployment compensation and early retirement for labor market reasons). The sample consists of 21 OECD countries for which,

Table 1. *Description of the Data*

Variable	Description	Source
Gini	Gini coefficient, latest observation (1991 for most countries except Australia (1990), Belgium (1992), Denmark (1992), France (1984), Germany (1984), Greece (1988), Ireland (1987), Japan (1990), New Zealand (1990), Spain (1989), Sweden (1990), and Switzerland (1982)). (Results do not change very much if the average Gini for the available country observations is used.)	Deininger and Squire (1996)
*q*1, *q*5	First (poorest) and fifth (richest) quintile of the income distribution, latest observation (same years as for Gini, but fewer observations were available).	Same
sk	Average investment share in physical capital, 1965–91.	Summers and Heston (1991) Penn-World Tables, PWT 5.6
sh	Average investment share in research and development, 1975–85 for the available observations.	OECD
n	Average growth rate of the workforce, 1985–91.	OECD, *Employment Outlook*
ALMP	Average share of GDP spent on financing active labor market policies (1985–91). These policies include financing public employment services and administration; labor market training; youth measures; subsidized employment; and measures for the disabled.	OECD, *Employment Outlook*
PLMP	Average share of GDP spent on financing passive labor market policies (1985–91). These policies include financing unemployment compensation and early retirement for labor market reasons.	OECD, *Employment Outlook*
TLMP	*ALMP + PLMP*	
Percentage change	Percentage change in the tax wedge, 1985–91.	OECD, *Jobs Study*

unfortunately, only 15 countries have observations on all variables for the regressions with the Gini coefficient as dependent variable. Only 13 countries had data on all variables for the other regressions. Results are in Table 3. This table shows at least four interesting results, which will be presented in detail in the remainder of this section.

First, accumulating physical capital increases overall inequality, and its coefficient is statistically significant at traditional levels. For the OECD countries, a high investment share in GDP for this type of capital can be

Table 2. *Correlation Matrix*

	Log Gini	Log $q1$	Log $q5$	Log $q5/q1$	Log s_k	Log s_h	Log *TLMP*	Log *ALMP*	Log *PLMP*	Log $n + 5$ percent	Percentage Δ tax wedge
Log Gini	1	–0.80	0.94	0.87	0.08	0.56	–0.47	–0.35	–0.42	0.24	–0.56
Log $q1$		1	–0.85	–0.99	–0.28	–0.40	0.51	0.46	0.39	–0.28	0.34
Log $q5$			1	0.92	0.10	0.48	–0.51	–0.43	–0.41	0.17	–0.52
Log $q5/q1$				1	0.24	0.44	–0.52	–0.47	–0.40	0.25	–0.41
Log s_k					1	–0.37	0.01	0.11	–0.04	–0.24	0.31
Log s_h						1	–0.15	0.15	–0.29	–0.07	–0.30
Log *TLMP*							1	0.77	0.89	–0.20	0.22
Log *ALMP*								1	*0.41*	–0.51	0.16
Log *PLMP*									1	0.02	0.23
Log $n + 5$ percent										1	–0.14
Percentage Δ tax wedge											1

associated with a high Gini coefficient, a low income share of the bottom quintile, a high income share of the top quintile, and a high ratio of richest to poorest quintile of the income distribution. These findings are consistent with earlier studies for the OECD countries. Two early publications on the relationship between investment and inequality (Della Valle and Oguchi, 1976, and Musgrove, 1980) also reported a positive association for the OECD countries.[1] Lim (1980) finds a positive relationship between inequality and aggregate savings as well, but the coefficient is significant at the conventional levels only in some subsamples.

The same conclusion holds for the relationship between inequality and the accumulation of technological know-how—one that had not previously been tested in the literature. In the equation for the Gini coefficient, the magnitude of the coefficient for the share of investment in technological know-how is, however, less important than the coefficient for the share of investment in physical capital (about two-fifths). Moreover, investment in physical capital has a substantially larger negative impact on the lower part of the distribution than investment in research and development. The gap between the top and bottom part of the distribution is also much more influ-

[1]However, they did not find a significant correlation between these variables for a sample that consisted of developing countries. Gersovitz (1988) argues that their failure to obtain a similar result for the developing countries may be due to the poor quality of the corresponding data. However, more recently Cook (1995) reported a positive significant relationship between inequality and savings for the developing countries after controlling for differences that affect savings behavior, such as dependency ratios, the level and the growth rate of real income, and a measure for capital inflows.

Table 3. *Estimation Results*

Independent variable	Dependent variable											
	Log of Gini			Log of first quintile's income share			Log of fifth quintile's income share			Log of fifth quintile's to first quintile's income share		
Constant	1.852	2.000	1.800	6.054	5.959	6.435	2.560	2.596	2.404	–3.494	–3.363	–4.030
	(0.713)++	(0.620)++	(0.757)++	(1.096)++	(0.854)++	(1.259)++	(0.571)++	(0.464)++	(0.688)++	(1.441)++	(1.017)++	(1.783)+
Log s_k	0.317	0.291	0.334	–0.909	–0.989	–0.935	0.263	0.296	0.273	1.172	1.285	1.208
	(0.133)++	(0.127)++	(0.145)++	(0.176)++	(0.158)++	(0.210)++	(0.124)+	(0.116)++	(0.140)+	(0.236)++	(0.206)++	(0.297)++
Log s_k	0.129	0.122	0.137	–0.236	–0.295	–0.239	0.086	0.111	0.088	0.322	0.406	0.327
	(0.071)++	(0.069)+	(0.073)+	(0.079)++	(0.063)++	(0.087)++	(0.029)++	(0.023)++	(0.034)++	(0.103)++	(0.075)++	(0.117)++
Log (n + 5 percent)	0.295	0.267	0.291	–0.0672	–0.363	–0.786	0.147	0.022	0.195	0.819	0.385	0.981
	(0.233)	(0.219)	(0.238)	(0.326)+	(0.243)	(0.374)+	(0.141)	(0.102)	(0.176)	(0.433)+	(0.282)	(0.519)+
Log *TLMP*	0.013	—	—	0.137	—	—	–0.057	—	—	–0.194	—	—
	(0.040)			(0.102)			(0.032)+			(0.119)		
Log *ALMP*	—	–0.002	—	—	0.202	—	—	–0.082	—	—	–0.284	—
		(0.040)			(0.034)++			–(0.031)++			(0.045)++	
Log *PLMP*	—	—	0.022	—	—	0.056	—	—	–0.024	—	—	–0.080
			(0.039)			(0.112)			(0.036)			(0.138)
Percentage change in τ	–0.030	–0.034	–0.035	0.030	0.029	0.033	–0.019	–0.019	–0.021	–0.049	–0.047	–0.054
	(0.010)++	(0.015)++	(0.015)++	(0.015)+	(0.013)+	(0.019)	(0.010)+	(0.010)+	(0.011)+	(0.024)+	(0.023)+	(0.029)+
No. of observations	15	15	15	13	13	13	13	13	13	13	13	13
R^2 (in percent)	64.1	63.7	64.8	74.6	84.8	68.4	69.7	80.0	63.4	76.4	87.3	69.7
SER	0.09	0.09	0.09	0.14	0.11	0.16	0.06	0.05	0.07	0.18	0.14	0.21

Standard errors in parentheses.

Notes: One plus sign and two plus signs represent significance at the 10 percent and the 5 percent level, respectively. All regressions have heteroscedasticity consistent covariance matrices.

enced by investment in physical capital than by investment in research and development. Consequently, economies that invest relatively more in knowledge will tend to have lower overall inequality levels than economies that spend relatively more on accumulating merely physical capital (machines, equipment, etc). Note, however, that income share losses for the bottom quintile owing to technological progress are not comparable with the rather small gains for the top quintile. This confirms the notion of "biased technological change": new technology makes the unskilled relatively more unskilled, reducing their employment opportunities, relative wages, and hence, income.[2] As the stocks of physical capital and knowledge are—as set out elsewhere—disproportionately held by the upper part of the distribution, the rewards from investment are also to a greater extent reaped by those in the upper part of the income distribution, driving up income there. The signs of the coefficient for these variables should thus not surprise us for the quintiles under consideration.

As investment in physical capital and technological know-how are engines of long-run growth, pursuing economic growth is of importance for inequality (which confirms the findings of Persson and Tabellini, 1994, among others), although, according to this paper's results, effects from "capital" accumulation (broadly defined), and hence growth, differ across the distribution.

Second, a statistically significant source of changes in inequality comes from changes in the tax wedge. The link here, of course, runs through labor supply and demand. Workers are motivated to work, at least in part, for the consumption they can finance from the income they earn; employers take on labor insofar as the value of the output of that labor exceeds its cost. High wedge decreases in the simple model described here are related to lower inequality through reductions in unemployment. This link is strongly confirmed in the regression results. Moreover, the reduction in overall inequality arises because a decrease in the tax wedge seems to have a positive effect on the income share of the lowest part of the distribution whereas the income share of the top quintile is negatively affected. A possible explanation is that a reduction in the tax wedge will increase the demand for relatively unskilled labor because of substitution effects between capital and labor. Therefore, the demand for new cost-saving equipment for intensive research and development—and with it the demand for researchers—diminishes so that the

[2]This link can of course be mitigated by evidence suggesting that distributional mobility is high. Yet studies such as the OECD (1996) *Employment Outlook* argue that, in spite of big differences in a country's labor market policies and labor market regulations, earnings mobility is surprisingly uniform and rather low: compared with 1986, about half of those who were still employed in 1991 stayed in the same earnings band. About a third moved up or down one band. Only about 20 percent moved two bands or more.

income share of this highly skilled high-income group somewhat decreases. The gains from reducing the tax wedge for the lower-income group are nearly twice the magnitude of the losses at the top 20 percent level of the distribution. Changes in the tax wedge thus seem to have redistributive effects.

Third, the effect of variation in the growth rates of the labor force could not be estimated precisely. Higher growth rates in the labor force can be associated with higher inequality as measured by the Gini coefficient. Labor force growth has a negative impact on the income share of the lowest quintile, but the opposite holds for the top quintile. It seems to increase the gap between the rich and poor income groups. The major share of the new influx into the labor force may be relatively unskilled, which increases the supply and reduces the wage of this type of labor. As set out elsewhere, biased technological change reduces the demand for unskilled labor so that unemployment increases and the income share of the lowest quintile decreases as the labor force grows.

Finally, there is a message about the impact of labor market policies. Total spending on such labor market policies does not have a significant effect on the Gini coefficient. The total share of GDP spent on labor market policies was even estimated with a positive sign, indicating that inequality increases the higher this share becomes. Passive labor market policies (which include unemployment benefits and early retirement for labor market reasons) turn out to be mainly responsible for this observation. The impact of active labor market policies, on the other hand, was estimated statistically significant at the 5 percent level in all further regressions. These policies improve the income share at the bottom at the cost of a lower income share at the top. Yet the losses in the top quintile are much less important (about 2.5 times smaller) than the gains in the poorest. The effect of passive labor market policies is, in fact, very small compared with the impact of active labor market policies in all the regressions (except when log(Gini) was the dependent variable). However, the sum of the effects of labor market policy and the tax wedge does not seem to offset the effects of investment in both forms of capital.

Given the simplicity of the framework, the regression results are quite remarkable: on average they explain about three-fourths of the variation in inequality measures for OECD countries. For the log of the top-to-bottom income ratio, the model explains up to about 90 percent of the variation. Moreover, growth-related fundamentals appear to be statistically significant and important in magnitude.

Causality

So far it has been implicitly assumed that the causal link runs from economic growth (through investment in different capital goods) along with

(exogenous) labor market and tax policies to inequality. However, this direction is the opposite of that suggested in a class of models in the political economy literature (see Persson and Tabellini, 1994, and Alesina and Perotti, 1996). These models mainly argue that a highly unequal distribution of income and wealth causes social tension and political instability, as well as pressure for distortionary redistributive measures, which, in turn, discourages investment by increasing uncertainty and adversely affecting economic growth. These kinds of models therefore suggest a negative causal relationship running from income inequality to investment (and further to growth).

Consumption theory, in contrast, suggests a direct positive causal link between inequality and investment. According to the "bequest-augmented" life-cycle hypothesis, if the elasticity of bequests with respect to lifetime resources is greater than unity, aggregate savings and thus investment in a closed-economy model will unambiguously decrease as inequality falls owing to income redistribution from the rich to the poor. Consumption habits may have implications for the saving-investment-distribution link in a life-cycle framework: consumption is relatively more costly for young households, because the habit it induces has thereafter to be fed, and relatively cheaper for old consumers. Therefore, the young will tend to save more than the old, and income redistribution from the latter to the former will raise overall saving. Because consumption habits early in the life cycle make it more difficult to adjust future consumption downward, redistributing income from the rich to the poor will therefore affect overall saving: rich consumers reduce their consumption by the full amount, whereas poorer consumers are reluctant to raise their consumption commensurately, so that aggregate saving—and thus investment in a closed-economy setup—would increase.

Causality tests in the empirics of inequality are rather scarce. In this section a simple Granger causality test is used on a panel of data. The vectors consist of the observations available for 1985–91 for the OECD countries. Because not all countries report annual inequality measures, the number of useful observations remain rather low—in spite of the panel data approach (see Appendix I). The following equations are estimated

$$\begin{aligned} IE &= \omega_0 + \omega_1 \cdot IE_{-1} + \omega_2 \cdot INV_{-1} \\ IE &= \omega_0 + \omega_1 \cdot IE_{-1} \\ INV &= \phi_0 + \phi_1 \cdot INV_{-1} + \phi_2 \cdot IE_{-1} \\ INV &= \phi_0 + \phi_1 \cdot INV_{-1}, \end{aligned} \tag{2}$$

in which *IE* is the ratio of the top to the bottom quintile of the distribution as a measure of income inequality and *INV* is either the share of GDP invested in physical capital or active or passive labor market policies. An *F*-test is then performed to decide whether Granger causality holds. The results of the test are in Table 4. The lower part of that table reports "reverse" causality tests.

Table 4. *Granger Causality Test Results*

Causality: Do variables below Granger-cause q5/q1?	
s_k	yes
Direction	+
F-test	4.928
ALMP	no
Direction	–
F-test	1.114
PLMP	no
Direction	–
F-test	1.723

Reverse causality: Does q5/q1 Granger-cause the following variables?	s_k	*ALMP*	*PLMP*
q5/q1	yes	yes	yes
Direction	–	–	–
F-test	8.935	6.114	22.843

Note: *F*-test value at the 5 percent significance level (4.12) used as cutoff rate.

The Granger causality tests confirm this paper's suggestion: a larger investment share in the previous period widens the gap between rich and poor, but, although the sign of the lagged expenditure shares on labor market policies seems intuitively correct, these variables do not Granger-cause (in)equality. Yet this should not surprise us: owing to a "bureaucratic lag," most labor market policies are only introduced after the unemployment problem occurs.

The data also strongly support the causal link implied in the political economy literature. The lower part of Table 4 shows that a larger gap between rich and poor is negatively causally related to the investment share. The tests, however, reject the causal direction suggested by consumption theory.

III. Conclusion

This paper analyzes whether inequality differences between OECD countries can be explained in terms of differences in growth-related fundamentals and labor market policies. Therefore, a simple regression exploring the link between variables affecting per capita income and inequality as posited by Kuznets (1955) and the growth literature was fitted to the data. The explanatory power of the regressions is high. On average the model explains about three-fourths of the variation in inequality measures.

The source of inequality is important in evaluating policy options. The results here indicate that a large part of the difference in inequality is due to broader economic forces. Inequality in OECD countries is negatively affected by the engines of economic growth: the accumulation of physical capital and technological know-how. The results for the relationship between aggregate investment in physical capital and inequality reconcile with earlier findings. The relationship between inequality and research and development—a key factor in the theory of economic growth—had not previously been tested.

The estimations indicate that the gains for the upper part of the distribution from investments in capital significantly outweigh the losses of the bottom quintile. Moreover, the impact of accumulating either kind of capital differs: investment in physical capital has a larger negative impact on the bottom part than investment in knowledge, and the income gains from accumulating technological know-how are smaller for the richest quintile compared with the gains from investment in physical capital. Accumulating technological know-how widens the gap between rich and poor less seriously than accumulating physical capital. According to growth theory, investment in research and development is the most important factor generating long-run growth. This paper suggests that it is also the least harmful growth fundamental for income distribution.

The tax wedge has a significant effect on inequality in almost all of the estimated regression equations. A decrease in the tax wedge has the predicted positive effect on the income share of the bottom part of the distribution. This supports the hypothesis that reducing tax distortions has a favorable effect on employment, particularly for lower-paid workers.

The effect of changes in labor force growth could not be estimated precisely, but higher labor force growth seems to widen the gap between the top and bottom quintiles, by decreasing income at the lower and increasing it at the upper part of the distribution. The major share of the new influx in the labor force may be relatively unskilled, which increases the supply and reduces the real wage for this type of labor. Moreover, biased technological change increases unemployment so that the income share of the lowest quintile goes down as the labor force grows.

Spending on labor market policies does not have a significant impact on the Gini coefficient but does affect other measures of inequality: in particular, active labor market policies substantially improve the income share at the bottom and reduce the gap between the top and bottom quintile income shares. The resulting reduction in the income share at the top of the distribution owing to this type of policy (presumably financed by redistributive taxes) can be ignored. In contrast, passive labor market policies have only a small impact that could not be estimated precisely; moreover, this kind

of labor market policy tends rather to increase inequality as reflected in the Gini coefficient. In total, the sum of the labor market policies and the tax wedge effects seems not to offset the effects of investment in physical capital and "knowledge."

Causality tests confirm the causal relationship in this model as well as the causal direction implied in the political economy literature, but rejects the causality suggested by the consumption theory.

Caution is needed in interpreting the reported results, given the small sample size as well as compromises dictated by the limitations of the data set. Incomplete panel data estimations and/or estimations of a system including equations for unemployment and per capita GDP as well as inequality with tests for the resulting cross-equation restrictions may complete this paper's findings. Taking these caveats into account, the estimates provide an initial assessment of the determinants of inequality in a broader macroeconomic context. The results suggest that labor market policies and taxation are important in accounting for income inequality, but that the underlying determinants of economic growth—accumulation of capital and know-how—are more important in explaining cross-country differences in income distribution for industrial countries.

APPENDIX

Table A1. *Cross-Section Regressions*

		Quintile				
	Gini	1	2	3	4	5
Australia	41.72	0.046	0.097	0.155	0.238	0.464
Austria	31.78	0.0723	0.1244	0.1746	0.2405	0.3882
Belgium	30.01	0.072	0.13	0.183	0.2442	0.3708
Canada	27.65	0.0768	0.1368	0.1896	0.2484	0.3484
Denmark	34.57	(. . .)	(. . .)	(. . .)	(. . .)	(. . .)
Finland	31.28	0.0569	0.1156	0.1779	0.2519	0.3977
France	37.76	0.0595	0.1125	0.1628	0.2271	0.4381
Germany	36.18	0.0567	0.112	0.1725	0.2429	0.4159
Greece	35.19	0.0619	0.1159	0.1704	0.24	0.4118
Ireland	34.6	0.0493	0.0971	0.1584	0.2492	0.446
Italy	32.19	0.0841	0.1317	0.1771	0.2328	0.3743
Japan	35.	(. . .)	(. . .)	(. . .)	(. . .)	(. . .)
Netherlands	34.55	0.0582	0.1174	0.179	0.2463	0.3991
New Zealand	40.21	0.0458	0.1052	0.1631	0.2386	0.4473
Norway	33.31	0.054	0.1117	0.1701	0.2487	0.4155
Portugal	35.63	0.0614	0.1197	0.1718	0.2429	0.4042
Spain	25.91	0.0839	0.1432	0.1868	0.2333	0.3528
Sweden	32.52	0.074	0.127	0.167	0.25	0.382
Switzerland	40.87	0.0493	0.1096	0.1598	0.2192	0.4621
United Kingdom	32.4	0.0764	0.1261	0.1596	0.2295	0.4084
United States	37.94	0.045	0.107	0.166	0.241	0.441

Table A2. *Cross-Section Regressions*

	TLMP	*ALMP*	*PLMP*	*sk*	*sh*	*n*	Tax wedge change
	(percent)						
Australia	1.5243	0.3243	1.2	30.1145	1.05	2.1778	–0.0275
Austria	1.3271	0.31	1.0171	27.6388	1.1	1.0889	(. . .)
Belgium	4.2229	1.21	3.0129	25.4182	1.4	0.1333	0.0013
Canada	2.3814	0.5643	1.8171	25.6248	1.25	1.6111	0.0444
Denmark	5.49	1.23	4.26	27.7091	1.1	0.8222	–0.0067
Finland	2.5171	1.0286	1.4886	36.84	1.2	0.0444	0.0023
France	2.8729	0.7743	2.0986	28.8642	2.05	0.4889	0.0019
Germany	2.3971	1.0271	1.37	29.5909	2.45	0.8444	–0.0091
Greece	0.8586	0.36	0.4986	26.6545	0.2	0.4333	(. . .)
Ireland	4.8257	1.5586	3.2671	27.1642	0.8	0.1778	(. . .)
Italy	1.5417	0.6833	0.8583	29.8861	0.95	0.6778	0.0033
Japan	0.456	0.14	0.316	36.3448	2.4	1.2667	–0.0044
Netherlands	3.72	1.0886	2.6314	26.577	2.05	2.4333	–0.0035
New Zealand	2.1757	0.79	1.3857	26.2727	0.95	1.6	(. . .)
Norway	1.4457	0.7	0.7457	32.9345	1.45	0.7111	0.0373
Portugal	0.955	0.5717	0.3833	24.306	0.35	0.7667	(. . .)
Spain	3.23	0.6729	2.5571	27.643	0.45	1.3222	0.0013
Sweden	2.8357	1.92	0.9157	25.4685	2.25	0.5333	–0.0201
Switzerland	0.4357	0.2129	0.2229	31.7127	2.3	1.1333	(. . .)
United Kingdom	2.1671	0.7271	1.44	20.1188	2.25	0.8444	–0.0128
United States	0.76	0.2514	0.5086	23.3097	2.55	1.4444	–0.0333

Table A3. *Panel Regressions*

			Quintile		*ALMP*	*PLMP*
	Year	Gini	1	5	percent	
Australia	1985	37.58	0.0510	0.4220	0.42	1.30
	1986	40.60	0.0480	0.4525	0.38	1.31
	1989	37.32	0.0560	0.3988	0.25	0.86
	1990	41.72	0.0460	0.4640	0.26	1.11
Canada	1985	32.81	0.0627	0.3912	0.63	1.87
	1986	32.50	0.0637	0.3890	0.62	1.86
	1987	32.28	0.0675	0.3870	0.55	1.64
	1988	31.91	0.0680	0.3835	0.50	1.57
	1989	27.41	0.0777	0.3469	0.51	1.58
	1990	27.56	0.0754	0.3385	0.53	1.92
	1991	27.65	0.0768	0.3484	0.61	2.28
Italy	1986	33.58	0.0808	0.3813	0.69	0.86
	1987	35.58	0.0788	0.3989	0.77	0.81
Netherlands	1985	29.10	0.0757	0.3669	1.09	3.24
	1986	29.68	0.0721	0.3683	1.12	2.99
	1987	29.40	0.1010	0.3470	1.10	2.84
New Zealand	1985	35.82	0.0552	0.4111	0.84	0.64
	1986	35.53	0.0543	0.4079	0.71	0.86
	1987	36.45	0.0548	0.4175	0.70	1.07
Norway	1985	31.39	0.0818	0.3688	0.66	0.51
	1986	33.11	0.0510	0.4020	0.50	0.38
Portugal	1990	36.76	0.0570	0.4240	0.72	0.42
	1991	35.63	0.0614	0.4042	0.81	0.52
Spain	1985	25.19	0.0966	0.3442	0.34	2.89
	1986	26.00	0.0891	0.3478	0.64	2.59
	1987	25.79	0.0914	0.3428	0.66	2.53
	1988	24.42	0.0949	0.3371	0.76	2.42
	1989	25.91	0.0839	0.3528	0.79	2.30
Sweden	1985	31.24	0.0704	0.3816	2.11	0.86
	1986	31.72	0.0697	0.3866	2.01	0.88
	1987	31.65	0.0760	0.3800	1.88	0.81
	1988	32.22	0.0740	0.3830	1.77	0.68
	1989	31.33	0.0810	0.3780	1.54	0.64
	1990	32.52	0.0740	0.3820	1.69	0.88
United Kingdom	1985	27.10	0.0890	0.3785	0.74	2.11
	1986	27.80	0.0841	0.3919	0.86	2.00
	1987	29.30	0.0832	0.4061	0.86	1.61
	1988	30.80	0.0819	0.4059	0.76	1.14
	1989	31.20	0.0812	0.3985	0.67	0.86
	1990	32.30	0.0778	0.4099	0.62	0.95
	1991	32.40	0.0764	0.4084	0.58	1.41
United States	1985	37.26	0.0470	0.4350	0.28	0.56
	1986	37.56	0.0460	0.4380	0.26	0.52
	1987	37.56	0.0460	0.4380	0.25	0.47
	1988	37.76	0.0460	0.4400	0.24	0.40
	1989	38.16	0.0460	0.4460	0.24	0.44
	1990	37.80	0.0460	0.4420	0.24	0.49
	1991	37.94	0.0450	0.4410	0.25	0.68

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