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How can growth be accelerated in Europe?

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Abstract

This paper deals with economic growth in Europe. The special emphasis is in key institutional factors that are commonly assumed to affect aggregate growth: functioning of labor markets, availability of labor and capital, and the size of government. For more explicit measures, we use the data on profit rates, average working hours, dependency ratios, tax rates and other measures of the size of government (e.g. employment shares), measures of price competitiveness, and finally the structure of production. The data also include the terms of trade, interest rates, and foreign demand as control variables. Empirical analysis makes use of cross-country panel data for EU15 countries for 1971-2010. The results suggest that profitability and competitiveness do indeed constitute the main determinants of growth. However, also other variables like working hours and the size of government appear to affect growth in an important manner. All in all, slowdown of growth in Europe does not appear to be a paradox but at least with some margin something can be done in achieving more ambitious growth rates.

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1. Introduction

Most people would likely agree that Europe suffers from a growth slowdown. The GDP growth in Europe has lagged behind the GDP growth in the US and has been far worse than the GDP growth in the NIC countries, particularly China (cf. Figure 1 for the US-Europe comparison). Quite clearly, there is a declining trend in economic growth rates for Europe during the post-WWII period; although there are substantial growth differences among European countries, the overall trend is similar for all of the EU countries (Figure 2). During 1998-2011, GDP has grown by 1.7 per cent annually in EU27 and 1.5 per cent annually in the Euro area. Moreover, these numbers are misleadingly high, given that in most EU/EMU countries, fiscal expansion exaggerates the true equilibrium growth rate[1]. The growth prospects appear no better for Europe; the estimates of annual GDP growth for the near future are in the one per cent range, and the long-term prospects are sometimes even worse due to poor demographic developments (see Figure 8 for several extreme examples).

However, what is the reason for slow or rapid economic growth? Growth theory does not provide us with a clear answer to this question. To phrase this conclusion in a different manner, the story is far from simple, as one may agree after consulting, e.g., Acemoglu (2009). The classical Solow model states that it is (exogenous) technological progress that can keep output growing in the long run (in the short run, capital deepening can also produce output growth; however, diminishing returns will eventually make increased capital impotent). The new growth theory provides a somewhat more optimistic perspective for growth policies. However, alternative versions of this new growth theory generate different recommendations. In particular, according to the AK model, the way to sustain high growth rates is to save a large fraction of GDP, a portion of which will find its way into financing a higher rate of technological progress and thereby stimulate faster growth. By contrast, the Schumpeterian view states that innovation and therefore productivity growth and convergence can be fostered by the following measures: better protection of (intellectual) property rights, which will improve the extent to which successful innovators can appropriate the rents from their innovations; better financial development, which provides easier financing of new and innovative ideas; a higher stock of educated labour, which will improve the ability of individuals either to imitate more advanced technologies or to innovate; and macroeconomic stability, which ensures low (risk-adjusted) equilibrium interest rates and encourages individuals to engage in long-term growth-enhancing investments (cf., e.g., Aghion and Durlauf 2007). These recommendations are sensible, and to a certain extent, they are incorporated into the various programs that have been created to stimulate

[1] See, e.g., Snower et al (2012) for an illustration of how to compute the impact of unsustainable fiscal policy on output growth and obtain an estimate of the corresponding equilibrium growth path.

growth in Europe (cf., e.g., EU Commission 2010)[2]. However, the recommendations are rather abstract, and it is not easy to quantify the importance of different factors for the growth process.

The poor growth numbers have, however, prompted various attempts to quantify the importance of possible growth factors (see, e.g., Collingnon (2011) and Barro and Sala-i-Martin (1998)). The assessment of growth factor importance is also the purpose of this paper. What makes this paper somewhat different from most previous analyses is its emphasis on "deep" background variables. Thus, rather than examining the national accounts numbers to evaluate factors such as exports and investment, we attempt to discover the relationships between key institutional and structural variables and the growth of output. To a certain extent, our variables correspond to those of the growth factors of the aforementioned "new growth theory", but one cannot really characterise the empirical analysis as a test of this theory. As mentioned, we focus only on the EU countries in this study, and therefore the special features of developing countries do not play a role in this investigation.

Thus, we attempt to quantify the importance of several commonly presented explanations for the slowdown of growth in Europe, beginning with the (poor) functioning of the labour market, the (adverse) development of price competitiveness and the (excessive) growth of government. In many respects, the labour market plays the key role in the economy because it determines both the use of the labour input and the level of overall competitiveness of a nation. Obviously, the functioning of the labour market is not independent of the public sector. A large government is almost inevitably associated with a large tax wedge, and the functioning of the labour market appears to be critically dependent on the size of the tax wedge. It may be fair to say that the harmful consequences of a high tax wedge are exceptionally well and unambiguously documented in the literature (see, e.g., OECD (2006))[3].

The empirical model uses certain alternative indicators for these institutional and structural factors. The idea is that these factors affect growth via productive inputs and (total factor) productivity. Thus, we do not attempt to identify any behavioural relationships, and we therefore have no (testable) parametric restrictions. Obviously, the estimates can be interpreted as the outcomes of a reduced form model; however, the "door is left open" for alternative interpretations and conclusions.

With respect to the structure of the remainder of the paper, the estimating equation is introduced in section 2, and the corresponding estimation results are reviewed in section 3. Finally, several concluding remarks are provided in section 4.

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[2] The Commission program attempts to incorporate all possible issues, and therefore it produces results that are not very concrete but are instead a collection of aims and intentions.
[3] The OECD study arrives at very high employment (and unemployment) estimates resulting from the size of the tax wedge. Thus, for prime-age males, the elasticity of this factor was 0.3 and for prime-age females, the elasticity of this factor was 0.5.

2. The model

To predict the GDP growth **g** (=Δlog(**y**)), we utilise the following simple linear equation:

$$\mathbf{g}_{it} = \alpha_{i0} + \alpha_1 \mathbf{ws}_t + \alpha_2 \mathbf{fx}_t + \alpha_3 \mathbf{tax}_t + \alpha_4 \mathbf{dep}_t + \alpha_5 \mathbf{hours}_t + \alpha_6 \mathbf{tt}_t + \alpha_7 \mathbf{rr}_t + \mathbf{u}_{it},$$

where the variables on the right-hand side of the equation are as follows:

The wage share, **ws** (the inverse of the profit share)

The real exchange rate, **fx** (an increase in **fx** implies an appreciation in the exchange rate)

The gross tax rate, **tax** (or gov. expenditures, **govexp**)

The (needs-weighted) dependency ratio, **dep**

Average working hours (HP trend), **hours**[4]

The terms of trade (**tt**)

The real interest rate, **rr** (in terms of bond yields)

The error term (**u**).

With respect to the coefficient values, we expect $\alpha_1 < 0$, $\alpha_2 < 0$, $\alpha_3 < 0$, $\alpha_4 < 0$, $\alpha_5 > 0$, $\alpha_6 > 0$ and $\alpha_7 < 0$.

For the wage share, we have two proxies. One of these proxies is a simple income-share of (gross) wages, which is denoted by **ws**, and the other proxy is an adjusted wage share, **ws_a**, which accounts for the difference between the total number of (paid) employees and total employment. Similarly, the size of government is measured both by the gross tax rate and by total expenditures with respect to GDP, **govexp**. Finally, competitiveness is measured not only by the real exchange rate **fx** but also by the (real) unit labour costs, **ulc**.

As a final check, we introduced a measure of high- tech industries into the model. This **hightech** variable represents the share of high industries of the value added of the total manufacturing industry. We would obviously expect that a more advanced structure of the economy allows for higher growth rates of exports and total output.

We use annual data from 15 EU countries for this study. The data span the 1971-2011 period and include a total of 375 data points. With the **hightech** variable, only 253 data points were available. The main data source is the AMECO data bank, although **dep** values were obtained from the DICE data

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[4] The HP trend is used to diminish the importance of the simultaneous cyclical (demand for labour) relationship between output and working hours.

bank, values of the US GDP = **USg** (used as a control) were obtained from the NBER, the unadjusted **ws** values were obtained from OECD data and the adjusted wage share (**ws_a**) data were obtained from AMECO. The **hightech** variable was derived from the OECD Stan data base and it included the following ISIC categories: 3825 (office machinery & computers), 383 (electric machinery), 3845 (aerospace) and 385 (scientific industries); see Viren and Malkamäki (2002) for details.

The data for **dep** and **hours** (which are not frequently used in empirical analyses) are illustrated in Figures 4 and 5. Both of these variables evince a great deal of variability over time. The average working hours variable demonstrates more trend-like development, whereas the dependency ratio undergoes several long swings that correspond to various occurrences, such as demographic changes and changes in pension systems.

The estimates of the model are presented in Table 1. The model is estimated using OLS, or GMM in the case of dynamic panel settings (Arellano – Bond estimator). Additional variables in the model include the US GDP growth rate (**US_g**) and the lagged dependent variable (**g_{-1}**). In most cases, we have included cross-section fixed effects (in one instance, fixed time effects are also included), although these effects are not displayed. However, to indicate the flavour of the result, we report one set of estimates for the cross-section fixed effects in Figure 7 (which correspond to equation (4) in Table 1). If the model included either period fixed effects or US GDP growth, the terms of trade variable, **tt**, became insignificant; thus, this variable is not included in the equations that are reported in Table 1 (see, however, the results in Boxes 1 and 2).

Obviously, the cross-section fixed effects are not completely innocent because they capture most of the cross-sectional variance of output growth. Given the approach of the current paper, only the cross-sectional variation is of primary interest because we wish to know the determinants of the equilibrium growth rate, rather than the factors affecting cyclical (short-term) variations in output. It would therefore be useful to present at least one set of estimates that includes no fixed effects but only has a common constant term. Thus, we ask whether our explanatory variables can explain all of the changes (differences) in the examined GDP growth rates. This set of results is displayed below in Box 1. The magnitude of the coefficients is illustrated by computing the growth rate responses to an increase of one standard deviation in each right-hand-side variable (Figure 6)

Box 1 The estimates of the simplest equation

Growth rate of GDP =
- 0.069 (3.66) The wage share (t-ratio)
- 0.053 (3.48) The real exchange rate
- 0.067 (2.85) The government size (expenditures/GDP)
+ 0.006 (0.61) The HP trend of average working hours (log)
- 0.201 (2.91) The needs-weighted dependency ratio
- 0.015 (0.20) The real interest rate
+ 0.033 (1.13) The terms of trade
+ 0.374 (5.35) constant
R^2 = 0.242; SEE = 0.021, DW = 1.168;
OLS with no fixed & random effects. Data source: Ameco data base.

Because we have so many alternative proxies available for functional income distribution, price competitiveness and the size of the government, we create an additional experiment in which all of these variables are introduced into the estimating equation at the same time. The idea is simply to determine how robust the model is in terms of the measurements of different factors. The results are displayed in Box 2 in the Appendix.

In this study, we almost entirely report results that represent common coefficients for all countries (and years). However, we also estimate the models for individual countries. In the cases of individual countries, we are primarily interested in examining which types of convergence patterns can be detected from the data. An idea of the dispersion of data for individual countries can be obtained from Figures 2 and 3, which show the range of growth rates for the examined countries and the relationship between the standard deviations of growth rates and the mean growth rate. On the basis of these figures, it is a bit difficult to perceive that the dispersion would change over time (for instance, during the course of the EMU period), whereas it is easy to observe that the dispersion of growth rates is strongly related to the mean growth rates. This observation, in turn, suggests that individual countries differ greatly in terms of output shocks, which is a phenomenon that creates obvious problems for common economic policies (this issue is more thoroughly analysed in Mayes and Viren (2011)).

3. Interpretations of the results

Overall, our simple model fits the data very well. In general, the coefficients have the correct signs and are of reasonable magnitude. Moreover, the results that are obtained are quite precise, which allows us to generate at least tentative policy conclusions.

The results also appear to be surprisingly robust in terms of various measures of the underlying variables (Box 2). Thus, if we construct an extreme version of the model and include all alternative proxies of our variables, the only coefficient with an unexpected sign is the coefficient of the gross tax rate. This result clearly reflects the fact that the gross tax rate and the expenditures/GDP ratio are sufficiently similar that the coefficients of both variables cannot be correctly estimated from a single equation.

The reported cross-section fixed effects (Figure 7) demonstrate that Greece, Italy, Portugal and Spain are the poor performers among the 15 countries in the data (even after controlling for the background variables). By contrast, the Nordic countries manage quite well. This finding may provide support for various interpretations of the observed differences, including distinctions in the quality of institutions, moral values and/or the credibility of economic policies.[5] Regarding convergence, there appears to be unconditional (but not conditional) convergence in terms of GDP [6]. With respect to other variables, the evidence is rather inconclusive. In terms of unit labour costs, certain striking exceptions can be detected (see Table 2 in Appendix)

On the basis of the estimates derived in this study, the following guide for growth policies appears to be warranted: Keep the profit rate and the price competitiveness at a reasonable level (or improve them). Do not over-expand the welfare state. Larger governments are associated with slower growth rates.7 Secure a sufficient labour supply. Longer workweeks generate better economic growth. Do not allow interest rates to exceed equilibrium levels, but instead keep the risk premia as low as possible. Try to achieve more advanced structure of production and exports.

Clearly, these recommendations largely match the recommendations that are provided by the new growth theory, despite the fact that we do not directly control variables that directly affect innovative activities. The only exception is the output share of high-tech industries (**hightech**). Including this variable does not, however, invalidate the other results and the variable makes a positive contribution to the explanation to differences in growth. The systematically positive and rather precise coefficient estimates suggest that countries that have managed to modernize their industries seem to perform better than countries that stick to their old structures of production.

From a policy perspective, our explanatory variables provide a plethora of possibilities for growth programs. These possibilities may be illustrated using the following simple calculation, which will at least provide an idea of the relevant magnitudes of various effects. Take the simplest equation reported in Box 1. Using the mean values of the time series for each variable, this equation implies that one may increase the mean growth rate from 2.4 per cent to 3.4 per cent by changing the right-hand-side variables in the following way:

- Wage share: 66 % → 61 %
- Gov. exp. share: 48 % → 43 %
- (Annual) working hours: 1600 h → 1700 h
- Dependency ratio: 24 % → 23 %
- Real interest rate 3 % → 2 %.

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[5] These interpretations obviously enter a topic that is rather thoroughly analysed by Barro and Sala-i-Martin (1998).
[6] The coefficient of $\log(y_{i,t-1}/y_{ge,t-1})$, where ge refers to Germany, was calculated to be -.043 (3.26) in the unconditional convergence regression; however, if this variable is inserted, e.g., to equation (4) in Table 1 as an additional regressor, the resulting coefficient is -.019 (0.75).

[7] This conclusion may be motivated by the idea that the there is a type of Laffer curve in the productivity of public sector services, as discussed by Koskela and Viren (2000). This notion also arises in the analysis of the extensive empirical evidence that was produced by Tanzi and Shuhknecht (2000).

This result implies that a revolution is not required to generate one per cent of additional growth each year: the "welfare state" does not need to be eliminated, wages do not need to be lowered to subsistence income levels, and working hours do not need to be increased to medieval levels. In fact, in most instances, significant improvements in economic growth could be produced by simply reverting to the conditions of approximately one decade ago. The changes that would be entailed in this reversion are still sufficiently great that they would not easily be sold to the general public within the median voter model. Given the gloomy prospects of most EU countries (Figure 8), however, the need for certain unpleasant reforms has become increasingly compelling.

4. Conclusions

This paper shows that accelerating growth in Europe is not completely unrealistic. However, several unpopular reforms would be required to increase the labour supply, alleviate tax burdens and increase competitiveness. Obviously, these phenomena are not unrelated. Thus, by reducing the growth of the public sector and decreasing tax rates, one may increase both the labour supply and the competitiveness of the private sector. The future development of the public sector is indeed the key aspect of determining the future development of the economy. If the public sector can be maintained in a reasonable fashion, one may manage to achieve low tax rates and low tax wedges in labour markets, and one can also avoid fiscal crises and keep the risk premia (of interest rates) low. Indeed, there are causal relationships in the opposite direction, as well; for instance, an increased labour supply (well-functioning labour markets) generates more tax revenues, allowing for lower tax rates and diminishes the risks of fiscal crises.

Although the message of this paper is clear and the results of the empirical analysis are quite unambiguous, there are several caveats that merit mention. Above all, it is worth noting that in this study, we have not considered either capital deepening (increasing investment and saving activity) or various other factors that may underlie total factor productivity, such as innovative activity and the adaptation of innovations, in any detail (cf. Kilponen and Viren (2010) for an assessment of the importance of these factors). Similarly, financial factors related to economic growth must be more deeply analysed (in accordance with the approach of e.g., Beck et al. (2005)). We also have not considered the implications of global developments, although these developments obviously affect the economic position of European countries relative to other countries. Our rather crude institutional and structural explanatory variables do not capture any of these considerations particularly well, and thus further analysis is certainly required.

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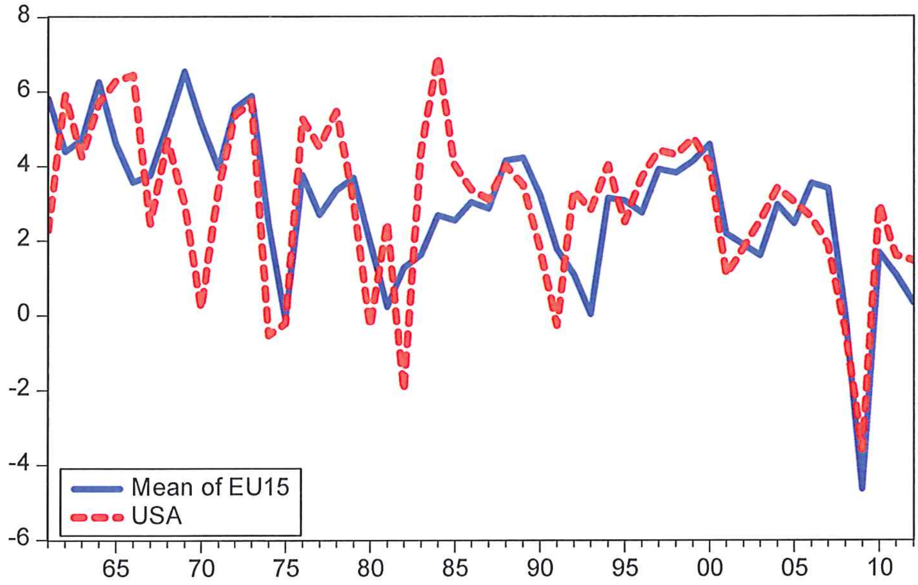
Table 1 Estimation results

	1	**2**	**3**	**4**	**5**	**5**	**6**	**7**	**8**	**9**	**10**
ws_a	-.270							-.126			
	(4.63)							(3.17)			
ws		-.309	-.211	-.297	-.137	-.179	-.237		-.191	-.745	-.213
		(4.23)	(3.63)	(4.77)	(1.47)	(3.04)	(4.41)		(3.75)	(2.43)	(3.23)
fx	-.038	-.033	-.043	-.038		-.030	-.030	-.035	-.038	-.015	-.019
log	(2.35)	(2.37)	(2.94)	(2.30)		(2.65)	(2.27)	(2.42))	(2.75)	(0.39)	(1.23)
ulc					-.137						
					(4.68)						
tax	-.015	-.143		-.112	-.065	-.100	-.152			-.225	-.116
	(0.38)	(2.63)		(2.00)	(1.12)	(1.93)	(2.95)			(1.15)	(2.22)
govexp			-.142					-.085	-.082		
			(4.69)					(2.88)	(2.29)		
hours	.082	.071	.0433	.027	.071	.059	.038	.042	.027	.089	.057
log	(5.03)	(2.83)	(1.84)	(1.82)	(2.64)	(0.19)	(1.54)	(2.44)	(1.14)	(1.03)	(1.91)
rr	-.081	-.166	-.037	-.180	-.162	-.179	-.094	-.008	-.042	-.032	-.131
	(1.46)	(2.87)	(0.54)	(3.20)	(2.89)	(2.30)	(1.77)	(0.13)	(0.65)	(0.74)	(1.76)
dep				-.245	-.369	.019				-.036	-.286
				(2.15)	(3.10)	(0.20)				(1.15)	(2.24)
USg	.589	.692	.643	.646	.570		.665	.591	.634	.441	.345
	(7.97)	(8.52)	(8.11)	(7.82)	(7.48)		(6.65)	(8.35)	(8.03)	(4.70)	(4.46)
hightech											.303
											(1.90)
g_{-1}						.347	.303	.232	.251	.411	
						(4.51)	(5.49)	(3.02)	(3.89	(3.13)	
panel	CS	CS	CS	CS	CS	CS&TS	CS	CS	CS	..	CS
R^2	0.529	0.495	0.526	0.505	0.561	0.787	0.579	0.595	0.576	..	0.410
SEE	0.0171	0.0166	0.0161	0.0165	0.0157	0.0115	0.0152	0.0159	0.0152	0.0177	0.0133
DW	1.43	1.43	1.45	1.44	1.37	1.85	1.98	1.81	1.89		1.30
J-test	..	..		..		..	..	..		7.41	
(n)										(14)	

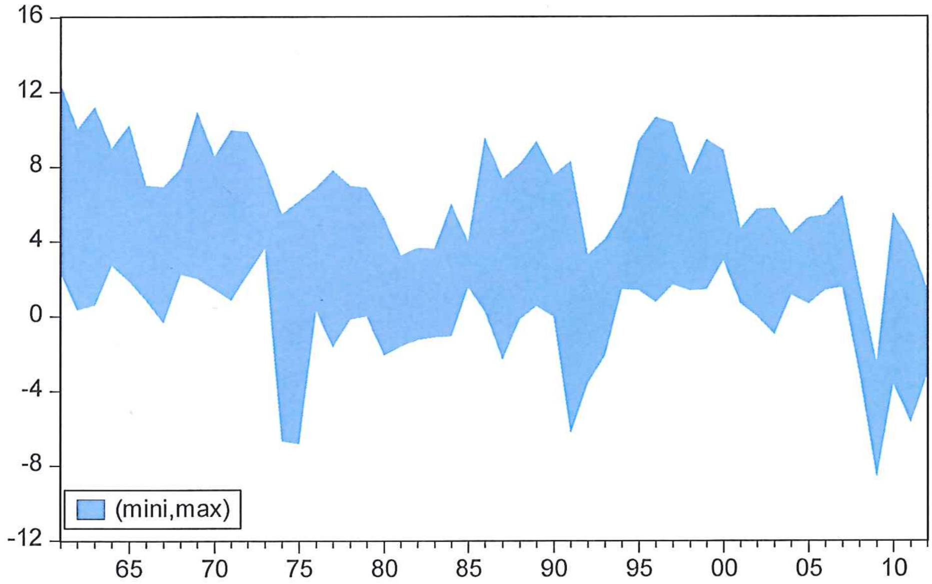
Numbers inside parentheses are corrected t-ratios. CS denotes cross-section fixed effects and TS period fixed effects (test statistics for the cross-section fixed effects always exceed conventional critical values). Estimates in column (9) are GMM estimates. The number of datapoints is 375. However, with equation 10 it is only 253. Main data source: Ameco data base

Figure 1 GDP growth rates in the EU and in the US



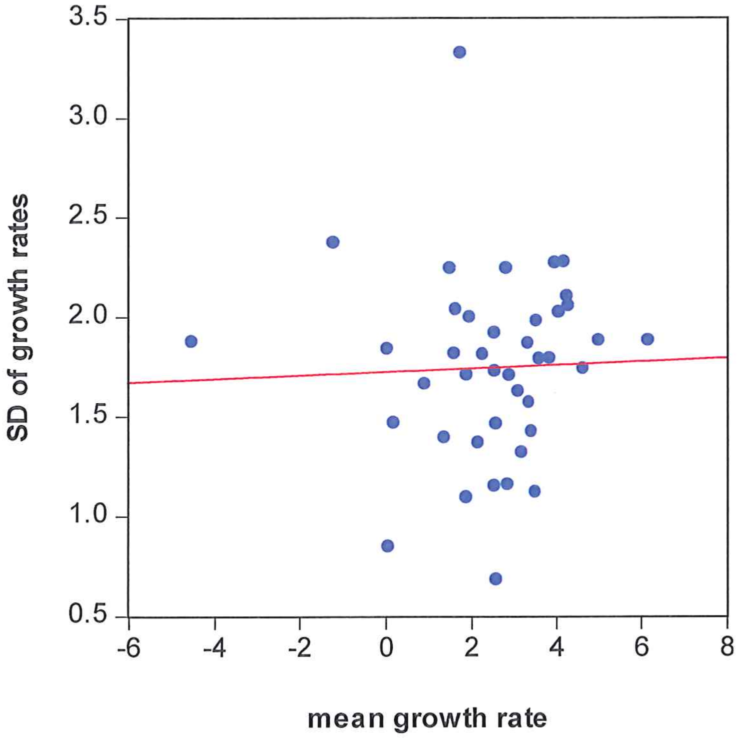
Data source: Ameco data base.

Figure 2 Range of cross-country growth rates of GDP



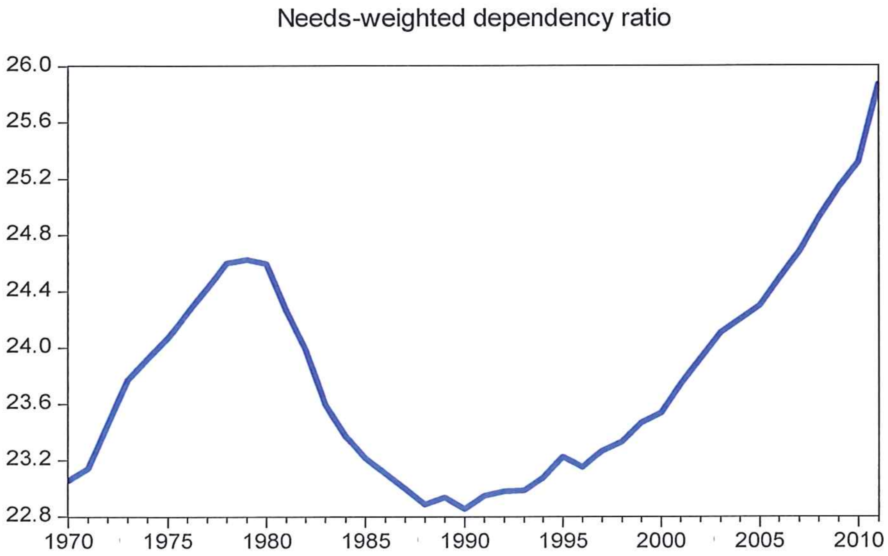
Data source: Ameco data base

Figure 3 Mean and standard deviation of growth rates



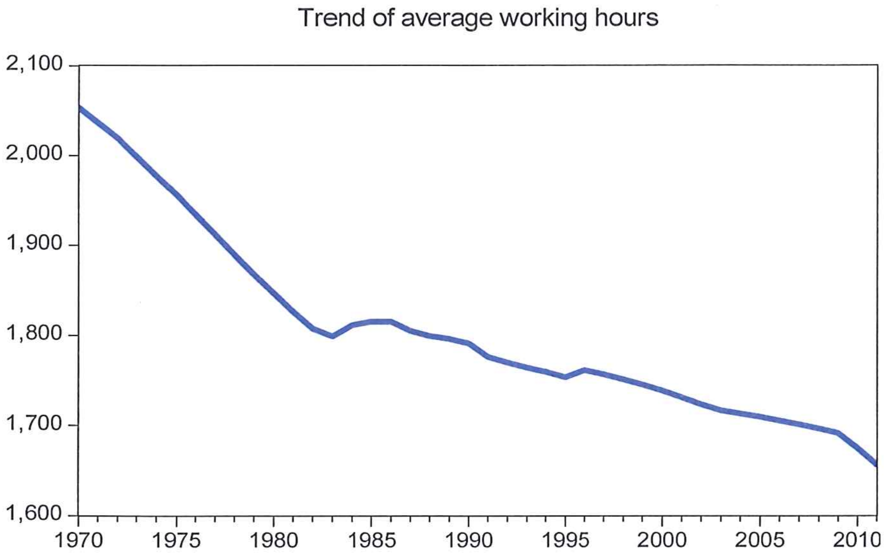
The mean and the standard deviations are derived for the cross-section data of EU 15 countries. Data source: Ameco data base.

Figure 4 The median dependency ratio in the EU



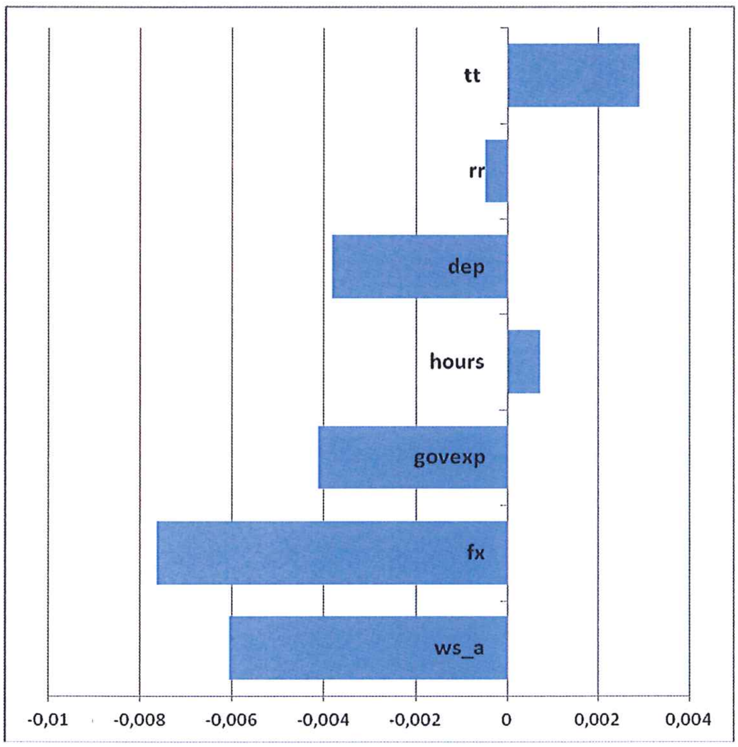
Data source: DICE data base.

Figure 5 The average working hours in the EU



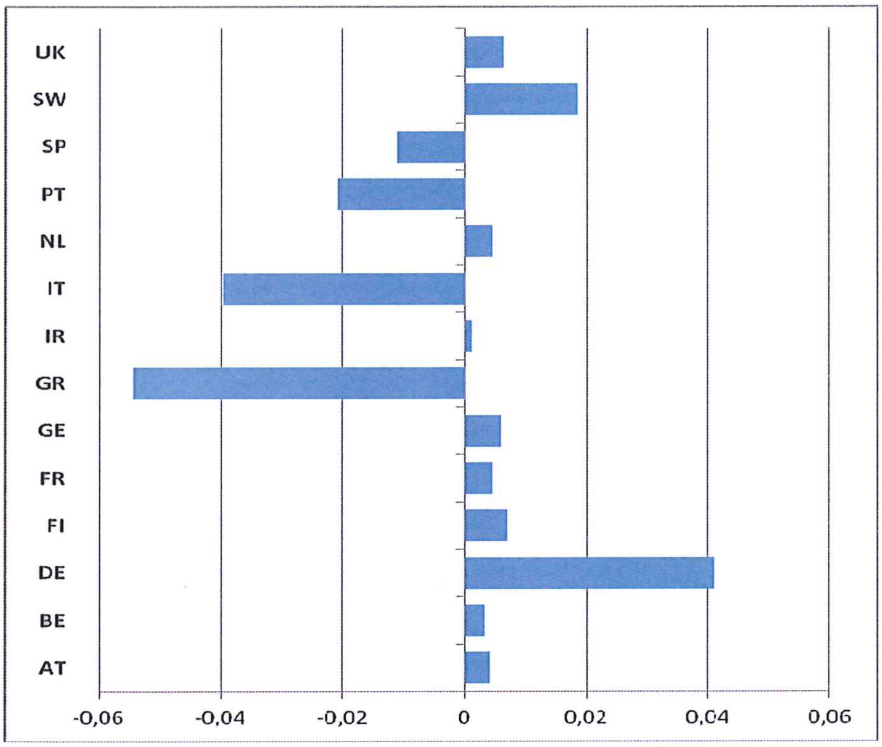
Data source: OECD/MEI.

Figure 6 Growth effects of one standard deviation increase in exogenous variables



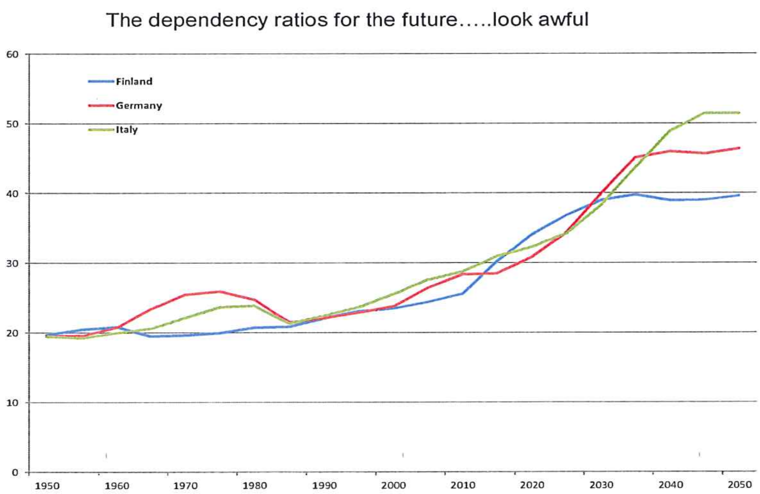
The values are related to estimates in Box 1.

Figure 7 Cross-section fixed effects



These estimates are derived from equation 4 in Table 1 and they represent a level-difference from predictions of the respective model.

Figure 8 Long-run forecasts of the dependency ratios



Data source: Eurostat 2007 projections (*ec.europa.eu/social/BlobServlet?docId=1540&langId=en)*

Appendix

Box 2 Panel data estimates with all alternative measures in the same equation

Growth rate of GDP =
- 0.054 (2.27) The wage share (t-ratio)
- 0.035 (2.04) The adjusted wage share
+0 .006 (0.76) The terms of trade
- 0.038 (2.63) The real exchange rate
-0.063 (2.52) The unit labor costs
+ 0.182 (3.80) The gross tax rate
- 0.138 (3.88) The government size (expenditures/GDP)
+ 0.029 (1.85) The HP trend of average working hours (log)
- 0.297 (4.27) The needs-weighted dependency ratio
- 0.062 (0.88) The real interest rate
+ 0.571 (7.53) The US GDP growth rate
+ 2.846 (1.04) constant
R^2 = 0.529; SEE = 0.016, DW = 1.346;
OLS with no fixed & random effects.

See Box 1 for definitions and data sources.

Table 2 Convergence of unit labor costs

	coefficient	**t-ratio**
All countries	-.078	2.61
Individual coefficients		
Austria	+.012	0.26
Belgium	+.040	0.36
Denmark	-.000	0.01
Finland	-.096	1.54
France	+.048	0.85
Greece	-.038	1.45
Ireland	-.096	1.19
Italy	+.050	0.45
Luxembourg	-.466	2.34
Netherlands	-.002	0.03
Portugal	-.211	2.19
Spain	+.029	0.23
Sweden	-.030	0.43
UK	-.018	0.29

On the first row, we have a common coefficient for all countries and on subsequent rows country-specific coefficients. Germany is the reference country in both experiments.
Data source: Ameco data base.

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