THE OECD 1951-88 GROWTH EXPERIENCE REVISITED

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Abstract

This paper presents panel data evidence on an investment driven growth process for 16 OECD countries over the 1951-88 period, as it is predicted by new growth theory. Investments are hypothesized to depend on demand factors, human capital, and trade union power. The two-equation regression model appears to replicate the data in a satisfactorily way. In the search for the ultimate factors behind economic growth, this two-step approach seems more appropriate than a purely eclectic one.

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1. Introduction

What are the ultimate factors behind the process of economic growth? Although numerous fundamental causes have been proposed in literature[2], attempts to assess them quantitatively are less abound. In this respect, leading articles were written by Kormendi and Meguire (1985), Grier and Tullock (1989), and Barro (1991). These studies analyse the influence of a number of variables on the rate of economic growth. Common in their approach is the eclectic way in which variables are selected. Potentially important variables are offered by a number of theories. In doing so, one avoids *a priori* exclusion of factors not included in mainstream theory. Instead of letting one specific theory decide whether a variable enters the analysis or not, an "open mind" approach is preferred.

However, regression results may be sensitive to changes in the set of explanatory variables. As Levine and Renelt (1992) have pointed out, only a few variables are robust for changes in the regression specification. They found a positive and robust correlation between economic growth and the share of investments. To establish a lasting impact of investments on economic growth within a theoretical framework, the assumption of decreasing returns to the set of reproducible production factors must be abandoned. This brings us to endogenous growth theory.

In this paper, a new dataset is constructed to analyse the 1951-88 OECD growth experience. The rate of economic growth is regressed against investments, employment growth, and a catch-up variable (*viz.* Van de Klundert and Van Schaik, 1993). Subsequently, investments are estimated from labour income shares, secondary school enrollment rates, and unemployment figures. Finally, the first regression is re-estimated by making use of the instrumental variable technique. Statistical results support the approach proposed in this paper.

The paper is organized as follows. Some methodological issues are in section 2. The theoretical basis is provided in section 3. The data are described in section 4. Regression results are in the fifth section. The paper concludes with some final remarks, policy implications, and suggestions for further research.

[2] For an overview, see the 1988 fall issue of the *Journal of Economic Perspectives*.

2. Methodology

This section discusses some important methodological elements of empirical research. First, the question how economic theory enters the analysis is addressed. Second, the core of the debate between the two mainstream theoretical approaches is repeated. Third, some remarks are made on the way in which data are structured. Finally, country-sample selection criteria are revisited. To be more concrete, the section deals with the exploratory versus confirmatory approach, endogenous versus neoclassical theory, panel versus cross-section data, and the OECD versus the rest of the world. Although these methodological issues might seem to be unrelated at first sight, in what follows their linkages will become more clear.

Explorative versus confirmative analysis

Empirical analysis is designed either to test a specific theory against the facts, or to provide evidence on a set of hypotheses stemming from a number of theories. The first approach is followed to accept or reject a theory on the ground of its ability to replicate the stylized facts in a satisfactory way. It is designed to confirm or to vitiate the theory under consideration. Empirical literature on economic growth mostly follows this line, *viz.* Mankiw, Romer, and Weil (1992) testing neoclassical growth theory, and Van de Klundert and Van Schaik (1993) testing endogenous growth theory. Such a research design might be unsatisfying because it ignores a bunch of other potentially important theories. Moreover, the statistical results could be biased because of the omission of explanatory variables. To meet this criticism, several authors have pursued a more explorative approach. Kormendi and Meguire (1985), Grier and Tullock (1989), and Barro (1991) develop regression models by eclectically selecting a set of explanatory variables. By doing so, a number of theories are simultaneously tested for their contribution to explain economic growth. To detect the ultimate causes of economic growth, these studies include economical, as well as political, sociological, and cultural factors. Robert Solow expresses his doubts to this approach as follows:

The introduction of a wide range of explanatory variables has the advantage of offering partial shelter from the bias due to omitted variables. But this protection is paid for. As the range of explanation broadens, it becomes harder and harder to believe in an underlying structural, reversible relation that amounts to more than a sly way of saying that Japan grew rapidly and the United Kingdom grew slowly during this or that period. (p. 51, 1994)

Levine and Renelt (1992) have shown that only a few variables are robust for changes in the regression specification. They found a positive and robust correlation between economic growth and the share of investments, but for a number of other variables they could not find stable and significant coefficients. The explorative approach hasn't provided any robust insights into the ultimate factors behind the process of economic growth.

However, the results of Levine and Renelt (1992) provide no basis for dismissing the basic premises of the explorative approach. To clarify this point, realize that the explanatory variables could be distinguished into intermediate and ultimate variables. Intermediate variables are (proxies for) factor inputs in processes of production, *i.e.* capital and labour. Ultimate variables account for the factors behind these intermediate variables. They cover institutional arrangements and legal settings, government policies and proxies for political stability, monetary conduct, civil liberty indices, and so on. To deepen our understanding of the processes at the heart of the decision to accumulate production factors, explorative analysis is a useful device. In this paper the investment process is examined in more detail by examination of the influence of demand slack (Maddison, 1991), distributional coalitions (Olson, 1982), and social capability (Abramovitz, 1991). The advantages of explorative and confirmative empirical analysis are combined in a two-step approach. The first step is to provide confirmatory evidence on models of growth, and the second step is to detect the factors behind the investment decision in an explorative way.

Neoclassical versus endogenous growth theory

In the past decade, theoretical models of economic growth have been the subject of a lively debate among economists. Neoclassical growth models, along the lines of Solow (1956) and others, have been criticized on both theoretical and empirical grounds. The discussion has focused mainly on two issues. The first is whether reproducible factors of production are subject to decreasing marginal returns. As King and Rebelo (1993) have

demonstrated, simulation of neoclassical models produces counterfactually high rates of return to capital in the early stages of development. For example, to replicate the Japanese growth miracle, neoclassical theory predicts an immediate postwar rate of return of more than 500% per annum. In endogenous growth models it is assumed that there are non-decreasing returns to the set of reproducible production factors. The broadly defined capital stock may include productive government investment (*cf.* Barro, 1990) as well as human capital (*cf.* Lucas, 1988). This brings us to the second issue, namely the assumed exogeneity of technical advance in neoclassical theory. In the neoclassical view, countries have access to the world production function at zero cost. New technology immediately spreads out over the world. But, as Lucas (1988) stresses, learning results from processes of social interaction, and technological development is not like a *deus ex machina*. Instead, knowledge is created at the expense of a certain cost. It is however not only unsatisfactory from a theoretical point of view. In empirical research, neoclassical theory leaves room for an unexplained term in the regression, known as the Solow-residual and capturing the exogenous technical progress. Starting from similar regression models[3], endogenous theories of economic growth predict the constant term in the regression equation not to differ significantly from zero.

Panel versus cross-section data

Empirical analysis calls for information on economic reality, boiling down into a dataset. The construction of a dataset involves a number of decisions. First, the researcher has to decide upon the structure of the sample. If the analysis aims to explain growth differences between countries (cross-section analysis), each observation summarizes the facts of one specific country. This is the standard way to test neoclassical growth theory. If there is one world steady state, information on the country's initial production level is all what is needed to test neoclassical growth models. Although most studies follow this line, it bears the disadvantage of loss of information. Available data are condensed into one single observation, mostly the average value of the period under consideration. The other extreme is to analyse the performance of one country over time (time-series analysis). Since growth analysis aims to explain a long run phenomenon, and usually

[3] This similarity of regression models for neoclassical and new growth theories - sometimes denoted by the term observational equivalence - is criticized by Pack (1994).

abstracts from short run erratic patterns of change in the variables, this approach is not very appropriate in regression studies. In case studies, however, it is commonly applied. A third possibility is to construct a panel dataset, including observations of different countries over different time periods. It combines the advantages of cross-section and time-series analysis, because it enables the researcher to follow countries over time. A crucial trade-off is the length of the time period. Choosing short time periods increases information quantitatively, but the quality could be affected because erratic fluctuations enter into the observations. This problem is tackled by increasing the time span, but this destroys information. Panel data seem to be appropriate for an assessment of endogenous growth theory.

OECD versus the rest of the world

The countries within the OECD sample have shown a process of convergence in per capita income levels, labour productivity, and total factor productivity, since the starting of the second industrial revolution in 1870 (*cf.* Baumol, 1986). Convergence in the sense that poor countries tend to grow faster than rich economies (or β-convergence) is studied by Abramovitz (1989), Baumol (1986), Dowrick and Nguyen (1989), and many others. They find empirical evidence for this type of convergence within the rich-men's OECD-club. Convergence is not supported on a wider level, and, according to Baumol, there are worldwide at least three clubs discernable. Poor members of these clubs catch-up with the rich ones, but between the clubs there is no clear catch-up tendency. This would raise the belief that the ability to catch-up is contingent to some kind of similarity between the member countries. The similarity applies to the technology of production (*cf.* Abramovitz' technological congruence, 1989), government policies, consumers' demand schedules, geographical positions, organization of the economic system, as well as other factors. Because the countries of the world display large dissimilarities, it seems unjustified to take a random sample for purposes of empirical analysis. It is more appropriate to select samples from more or less comparable countries. This paper focuses on the explanation of growth differentials within the club of industrialized economies. In this respect, doubts are raised against existing empirical growth studies on large country samples.

From these methodological remarks, the following research plan is supported. First, the analysis is embedded in an endogenous growth framework, where investments are hypothesized to depend on a number of other factors. Second, a panel dataset is constructed from a sample of industrialized countries. Finally, tests are performed for the endogenous growth model in a confirmatory way, and for the investment model in an exploratory way.

3. Theoretical considerations

Investments as the costs of change

As noted in the previous section, investments have received a more active role in new growth models. Instead of being only important to the level at which balanced growth takes place in neoclassical models, endogenous growth theorists argue that the investment effort determines the steepness of the balanced growth path. This core property opens the discussion of the final determinants of the growth process, since it gives room for full-fledged models of investment behaviour. It is beyond the scope of this paper to introduce endogenous growth theory in full detail, and for a survey I refer to Van de Klundert and Smulders (1992), and Stern (1991). Probably the most general endogenous growth theory - in terms of the investment concept - is found in *A new view of economic growth,* by Scott (1991). A defiant new growth theory is developed, in which the neoclassical core concept of the production function is replaced by a so called Investment Program Contour (IPC) which is strongly reminiscent of Kaldor's Technical Progress Function (1957, 1962). The growth possibilities are given by

$$g = g(\sigma, l) \tag{1}$$

where g is economic growth, l labour input growth, and σ investment. First-order partial derivatives to σ and l are positive, indicating that economic growth rises with investments and labour input growth. Investments are defined as the costs to change the economic constellation, in terms of consumption foregone. It not only includes additions to the capital stock, but also outlays on R&D, marketing and market research, education, and reallocation of production factors to more efficient sectors. Investments are the constructi-on costs of an economy. Learning-by-doing and learning-by-watching prevent the marginal

returns to investment from declining. Investing changes the economic constellation and opens up new opportunities to invest. The long-run economic growth rate thus crucially depends on intertemporal preferences for consumption. This result is not very appealing to policymakers, because consumer preferences are usually treated as being exogenous. The design of growth-promoting policies therefore calls for a deeper understanding of the processes behind the investment decision.

The determinants of investment

The decision whether, whereinto, and how much to invest is guided by a large number of processes. Although these processes often go beyond the research area of economists, influential authors like Olson (1982) crossed the boundaries of economics, and entered into history, sociology, and political sciences. From the backlog of factors behind the investment decision, three hypotheses are exploratively tested for their predictive value. These are Abramovitz' social capabilities (1989), Maddisons' demand slack (1991), and Olsons' distributional coalitions (1982). Their arguments are repeated below.

Why do some countries grow faster than the productivity leader, while others cannot benefit from the public good character of knowledge? Clearly, not everybody has access to the world library, and those who have may not be able to read. Knowledge is a good with network externalities. Learning from others requires conditions which have to be fulfilled. These conditions are expressed by Abramovitz as social capabilities (1989), and address to social and physical infrastructure, juridical and political systems, and the effective consensus in favor of development. The ability to imitate or to adopt the techniques of the leading country hinges on whether the country has been successful in creating and sustaining these prior conditions for growth. The poorest countries of the world certainly missed these opportunities to benefit from those ahead. An admittedly crude proxy for social capability is the secondary school enrollment rate.[4] McCombie and Thirlwall (1994) illustrate the importance of education and training by looking at the metal trades industry. The observed output-capital ratio is much higher in Germany than in the

[4] A seminal way to deal with unobserved variables like social capability is the application of principal components analysis. Latent variables are identified by the internal coherence of a large number of manifest variables. Introductions in the methodology are found in Jolliffe (1986), Flury (1988), and Jackson (1991). For economic applications, see Morris and Adelman (1988), and Yotopoulos and Nugent (1976).

UK. This disparity of capital productivity is not due to qualitative differences in the machinery. It is simply because German machines breakdown less often (maintenance is better). When breakdowns occur, German foremen are better prepaired to handle them. Production delays are therefore much shorter in Germany than in the UK. This example emphasizes the interdependency of the factors of production.

Can governments play an active role in the outcome of the economic process? According to Maddison (ch. 6, 1991), governmental promotion of domestic demand buoyancy sparked off a secular investment boom during the early fifties. In the golden age, governments had a commitment to full use of resources. For example, the Full Employment Act in the USA dates from 1946. In the UK and Scandinavia, fiscal activism and the commitment to full employment were promoted by the early acceptance of Keynes' theory. Although Italy and Japan did not adopt keynesian policies, their governments strongly intervened in the reconstruction of their economies. Also Germany did not pursue any keynesian conduct, but full employment was achieved by export-induced growth. In the capitalist economies only about 2.5% of the labour force was unemployed in the 1951-73 period. Macroeconomic equilibrium was promoted by using budgetary strategy as an instrument. The subsequent increase in public expenditures changed the demand structure of the economy. Governments became to play a propulsive role in the growth of aggregate demand. Business cycle fluctuations were dominated by swings in government policy. After 1973, the situation changed dramatically. Oil price shocks caused double-digit inflation rates, and policy aspirations changed to fight inflation. Full employment objectives disintegrated, and unemployment rose sharply since the mid seventies. To analyse the impact of unemployment on the investment rate, unemployment figures are incorporated in the empirical part.

The third hypothesis is taken from Olson. In *The rise and decline of nations* (1982), he tries to provide a general explanation as to why growth rates differ substantially across countries. Special interest groups are held responsible for declining growth rates over time, since their power is likely to increase during a long period of political stability. Only a major political disruption, like the occupation by a foreign power or times of totalitarian regimes, can dismantle these powers of vested interests. According to Olson, the Japanese and German economic miracles were unprecedented events because the war experience disrupted the political coalitions. A well-known application of Olson's theory is

the case of the British trade unions (*cf.* Crafts, 1992). Since legalization was early achieved in 1871, and the UK experienced a stable pattern of industrial development, the number of trade unions grew rapidly. Because of the strongly decentralized character of these unions, large inefficiencies in production were preserved. It was not until the early eighties that the power of these interest groups was broken down because of a severe recession. In fact, it was a political decision from the Thatcher-government not to support the economy in these dark days. Mass unemployment affected the bargaining power of trade unions. X-inefficiencies diminished thereafter, thus increasing the British labour productivity at a respectable average annual growth rate of 2.4% between 1979-88.[5] Empirical assessment of the theory is - again - hampered by the unobservable character of the strength of distributional coalitions.[6] In this paper, union power is approximated by the share of total income that accrues to labour.[7]

3. Data and stylized facts

The panel dataset

Selection of variables to be included in the dataset is done in two ways. First, testing growth theory calls for data on economic growth, investment rates, employment growth rates, and catch-up proxies. We therefore include gross non-residential fixed investment ratios (Maddison, 1992), employment growth rates, and relative labour productivity rates (both calculated from Summers and Heston, 1991). Second, data is gathered on labour income shares (OECD, 1983 and 1992), unemployment rates (Maddison, 1991), and secondary school enrollment rates (Barro, 1991), to explain investment

[5] Färe et.al. (1994) presents a seminal way to deal with productivity growth stemming from shifts of the technological frontier (innovation) and shifts towards the frontier (catching-up). To study the topic of productivity growth in more detail, the determinants of both sources of productivity growth should be detected. In the UK example, an important source of the productivity performance of the eighties is of a socio-political nature. It is far from obvious that the UK's innovation potential has improved.

[6] Again, principal components analysis should trigger better results (see footnote 4).

[7] To put it alternatively, union power is treated as a flow variable. If it would be represented by a stock variable, union membership or number of unions are natural proxies. This would require the researcher to account for size of the population or labour force. For more details, see Bruno and Sachs (1985) and Bean (1994).

rates. These variables are proxies for the strength of distributional coalitions (Olson, 1982), demand slack (Maddison, 1991), and social capability (Abramovitz, 1989), respectively. Data on these variables are collected for 16 OECD countries over the 1951-1988 period.[8] To differentiate between episodes, the total period is divided into 8 sub-periods. The cut-off between these sub-periods are the peak years of economic growth, where growth rates are averaged across the countries (*cf.* Maddison, table 4.7, 1991).[9] A simplifying assumption is that cyclical movements are synchronized across countries. The panel dataset is listed in appendix IV. Its main characteristics are summarized in table 1.

Period	1951-88		1951-73		1974-88	
economic growth (g)	4.00	[0.49]	4.84	[0.38]	2.60	[0.43]
investments (σ)	16.86	[0.24]	17.24	[0.22]	16.23	[0.25]
employment growth (l)	0.96	[0.80]	0.96	[0.89]	0.97	[0.64]
catch-up (cu)	0.63	[0.30]	0.57	[0.33]	0.74	[0.16]
labour income share (λ)	0.52	[0.10]	0.50	[0.10]	0.56	[0.07]
sec. school enrollment (sec)	0.76	[0.24]	0.68	[0.23]	0.91	[0.13]
unemployment (u)	3.74	[0.73]	2.58	[0.64]	5.67	[0.55]

Note: Variables are defined in appendix I. Catch-up, labour income share, and secondary school enrollment are in perunages, the other in percentages. Coefficients of variation are in brackets.

Table 1: Summary of the panel dataset.

The 16 countries reached an average annual growth rate of 4.0% in the post-war period. In 30 years they thus managed to triple their GDP levels. This production growth has been supported by an investment effort of approximately 17% per year's GDP and an annual labour input growth of about 1%. Catch-up, defined as the average distance of the following countries to the US in terms of real GDP per worker, is 63% for the whole period. Countries paid 52% of their GDP for compensation of employees (excluding the

[8] Countries: Canada, USA, Japan, Austria, Belgium, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Sweden, Switzerland, UK, Australia.

[9] Sub-periods: 1951-55, 1956-59, 1960-64, 1965-68, 1969-73, 1974-1978, 1979-84, 1985-88.

self-employed). About three-quarter of the teenagers in the relevant age bracket engaged in formal secondary schooling. The average unemployment rate is 3.7% of the labour force. These figures apply to the total 1951-88 period, *i.e.* the first column of table 1. The other two colums show the data when the total period is split into two episodes, 1951-73 and 1974-88. The post-73 growth slowdown appears to be more than 2%-point, compared to the golden period. Investments decline by about 1%-point, and labour input growth is virtually constant across the episodes. The productivity gap is much smaller for 1974-88 compared to 1951-73, so the OECD countries catched-up with the US in terms of output per worker. A larger proportion of GDP accrued to labour in the last episode. More people participate in secondary education, and, finally, the unemployment rate rose sharply after 1973.

There is not only a large difference in economic performance over time, but also across countries. Economic growth has been relatively stable in Canada, the US, and the UK. These countries largely escaped from the disruptive effects of the second world war. Other countries, like Japan, France, Germany, and The Netherlands, suffered severe war damages. High rates of growth were reached during the reconstruction period and the sixties. However, the post-73 growth slowdown is most marked in these countries. This would raise the believe that the unprecedented high growth rates in the golden era arise from the exploitation of the advantages of backwardness. Since this process is self-destructing, the growth slowdown of the early seventies could therefore be interpreted as the return to a normal pattern of economic growth. Historical analysis by Van de Klundert and Van Schaik (1993) provides some evidence in this direction.[10]

Investment rates also differ substantially across countries. The USA show a steady investment pattern between 12.4% and 13.7% of GDP. Japan's time pattern of investment is much more volatile, ranging from 17.8% in the early fifties to 27.6% between 1969 and 1973. Most economies show an upswing in investment rates in the golden era, a subsequent downswing in the seventies and early eighties, and recovery in the late eighties. The ability to catch-up with the US differs among the following countries in the post-73 era. Japan, for example, reached in 1982 66% of the productivity in the USA. From then on, the gap widened until 1985. Between 1985-88, catch-up took place very

[10] They look at 8 countries over the 1870-1989 period, and find significant coefficients for the catch-up variable only between 1950 and 1973.

slowly. The Netherlands fell from 87% in 1980 to 75% in 1988. Exceptions of this pattern are the UK and Norway, both catching-up in the eighties. The correlation matrix is shown in table 2.

	g	σ	l	cu	λ	sec	u
g	1						
σ	0.427	1					
l	0.174	0.185	1				
cu	-0.522	-0.377	0.454	1			
λ	-0.621	-0.338	0.232	0.696	1		
sec	-0.258	0.154	0.196	0.328	0.435	1	
u	-0.345	-0.283	0.039	0.311	0.130	0.428	1

Note: Symbols are defined in table 1. Variables are defined in appendix I. Figures are non-lagged correlation coefficients.

Table 2: The correlation matrix.

This correlation matrix illustrates the interdependency of the variables listed in table 1. The rate of economic growth is strongly correlated with most other variables, apparent from the first column. All coefficients have the expected sign, except for the negative coefficient on secondary schooling. This is probably due to a systematic rise in secondary school enrollment for all countries over time, whereas growth rates tend on average to decline over time. It will be shown that controlling for the factors that cause the growth-slowdown yields the expected positive relationship between human capital and growth. The factors of production are also more or less strongly correlated with the other variables.

5. Regression results

This section presents regression results for the growth model, the investment model, and the simultaneous equation model. A linear specification of the IPC is

$$g = \beta_1 \sigma + \beta_2 l \tag{2}$$

To arrive at the regression model, a catch-up term is added to this equation. Catch-up is included in the regression equation to account for the exploitation of the advantages of backwardness in the follower countries. To test the ability of the following countries to reap the benefits of being backward before and after 1973, the catch-up variable is split into two time intervals. Thus, the testable regression equation looks like

$$g = \beta_0 + \beta_1 \sigma + \beta_2 l + \beta_3 \ln(cu_{1951-73}) + \beta_4 \ln(cu_{1974-88}) + \epsilon \tag{3}$$

where ε is a random error term. Scott's new growth theory predicts β_0 to be zero, β_1 and β_2 to be positive, and β_3 and β_4 to be negative (*cf.* section 3). This regression model is identical to the model by Van de Klundert and Van Schaik (1993). Estimation results are reported in table 3. Regression (1) is the benchmark. Economic growth in the post-war OECD world is positively correlated with the investment rate and with labour input growth. The catch-up factor appears with a significant negative coefficient in the golden era, but loses its significance in the post-1973 episode. About 60% of the variation in economic growth across countries and over time is explained by this simple regression model. The constant term in the regression equation does not differ significantly from zero. Examination of the residuals shows systematic underestimations for Italy. Therefore, in regression (2) a country dummy is added to the model, which is significant at the 5%-level. The null hypothesis that the dummy has no additional predictive value is accepted at the 2.5%-level ($F = 4.759 < F(1,122)$ iff $\alpha < 0.025$, and α the level of significance). Thus, the preferred model specification is eq. (1).

	(1)	(2)
constant	0.411 (0.475)	0.222 (0.476)
investment	0.094 (0.032)	0.101 (0.031)
employment growth	0.799 (0.167)	0.846 (0.166)
catch-up$_{1951\text{-}73}$	-3.235 (0.403)	-3.151 (0.398)
catch-up$_{1974\text{-}88}$	0.136 (0.863)	0.244 (0.851)
dummy Italy		0.986 (0.450)
$\bar{R}^2$	0.608	0.620
F-statistic	50.303	42.443
RESET2	1.722	2.361

Note: Standard errors are in parentheses. Variables are defined in appendix I. The coefficient of determination is adjusted for the number of explanatory variables. Ramsey's RESET2 test refers to the case where the error term is regressed on the explanatory variables and the square of the fitted values. There are 128 observations.

Table 3: OLS of economic growth.

What determined investment?

From section 3 the following investment model is proposed:

$$\sigma = \gamma_0 + \gamma_1 \lambda + \gamma_2 \text{sec} + \gamma_3 u + \eta \qquad (4)$$

where η is a random error term. Results for the investment model are reported in table 4. Regressions (3)-(5) present some preliminary evidence in favour of the three hypotheses. Each hypothesis is tested separately for its ability to replicate the investment pattern. All coefficients have the expected sign and are significant, except for the coefficient of the secondary school enrollment rate (which is borderline significant). The F-statistic shows that there is no systematic relationship between investments and secondary school enrollment ($3.041 < F_{crit}$ (1,126)). These regression results might however be biased due to

problems of multicollinearity, as table 2 shows.[11] The joint contribution of these variables to the explanation of investments is tested in (6). All coefficients are highly significant and of the expected sign. Compared to (3)-(5), all coefficients increase in absolute terms while their standard errors decrease. After controlling for unemployment and labour income shares, the secondary school enrollment rate appears with a highly significant positive coefficient in the regression equation. Almost 40% of the variation of investments is explained by this model. High shares of labour income in total income squeeze profits and discourage investments. A 5%-point increase in the labour share will cause investments to decline by almost 2%-point. High unemployment rates point at demand slack and are negatively correlated with investment. Unemployment discourages investment even stronger than the labour income share does. A 5%-point increase in unemployment lowers investment by 3.4%-point. A high secondary school enrollment rate is associated with a flexible and motivated labour force. Increasing this enrollment rate by 5%-point stimulates investment by 0.64%-point. To check for country-specific influences, the residuals of eq. (6) are analysed. Systematic overestimation of investment rates is found for the USA, Denmark, and France, while for Austria, Norway, and Australia investments are systematically underestimated. Adding country dummies to the model is done in eq. (7). All dummies are significant at the 5%-level. In the USA, Denmark, and France, the investment ratio is systematically overestimated by about 3%-point, 3%-point, and 2%-point, respectively. In Austria, Norway, and Australia, investments are underestimated by about 2%-point, 5%-point, and 3%-point, respectively. Apparently, country-specific influences play an important role in the investment process. For example, Norwegian government policies are directed to stimulate investments by keeping borrowing costs artificially low, so that in spite of the extensive distribution of income aggregate capital formation is high (Moene and Wallerstein, 1993). Evidently, more research is needed to explain cross-country differences in investment behaviour.

[11] If two explanatory variables are positively correlated, then the omission of one of them in the regression model will cause the coefficient on the other variable to be upward biased because it partly operates as a proxy for the omitted variable (see for example Dougherty, 1992).

	(3)	(4)	(5)	(6)	(7)
constant	29.758 (3.213)	18.391 (0.575)	14.313 (1.500)	29.989 (2.666)	27.137 (2.274)
labour income share	-0.246 (0.061)			-0.387 (0.056)	-0.352 (0.047)
unemployment		-0.410 (0.124)		-0.672 (0.112)	-0.536 (0.091)
sec. school enrollment			0.033 (0.019)	0.127 (0.018)	0.131 (0.015)
dummy USA					-3.017 (0.979)
dummy Austria					2.073 (0.929)
dummy Denmark					-3.013 (0.948)
dummy France					-2.153 (0.929)
dummy Norway					5.376 (0.948)
dummy Australia					3.047 (0.917)
$\bar{R}^2$	0.107	0.073	0.016	0.386	0.616
F-statistic	16.296	10.928	3.041	27.609	23.589
RESET2	13.299	1.744	3.651	0.048	0.052

Note: Standard errors are in parentheses. Variables are defined in appendix I. The coefficient of determination is adjusted for the number of explanatory variables. Ramsey's RESET2 test refers to the case where the error term is regressed on the explanatory variables and the square of the fitted values. There are 128 observations.

Table 4: OLS of investments.

Final regression results

If the investment rate is hypothesised to depend upon labour income shares, unemployment levels, and secondary school enrollment rates, the former regression results should be re-estimated. One of the Gauss-Markov conditions - regressors are uncorrelated with the error term - is not satisfied, and the OLS estimator is biased and inconsistent. The simultaneous equation model is

$$g = \beta_0 + \beta_1 \sigma + \beta_2 l + \beta_3 \ln(cu_{1951-73}) + \beta_4 \ln(cu_{1974-88}) + \epsilon \quad (3)$$

$$\sigma = \gamma_0 + \gamma_1 \lambda + \gamma_2 \text{sec} + \gamma_3 u + \eta \quad (4)$$

A consistent estimation technique is the instrumental variables (IV) method. The IV estimator is defined as

$$\hat{\beta}_{IV} = (Z'X)^{-1} Z'y$$

where y the endogenous variable, X the matrix of explanatory variables, and Z the matrix of instruments. These instruments should be highly correlated with the investment rate, and uncorrelated with the error term in the first equation, *i.e.*

$$E(N^{-1} Z'X) > 0$$

$$E(N^{-1} Z'\epsilon) = 0$$

where N the number of observations. Results are reported in table 5. The basic model, excluding country dummies, is estimated in regression (8). The constant term and the post-73 catch-up variable appear with insignificant coefficients, and the other coefficients are significant and have the expected sign. Regression coefficients differ in magnitude from those in the benchmark regression. As (9) shows, adding country dummies to the set of instruments yields results more in line with the benchmark regression. Since Sargan's chi-square statistic on the validity of the instruments strongly rises compared to eq. (8), (9) is the preferred model. Although the statistical results are similar to the previous eq. (1), the economic interpretation is much richer. Equation (9) shows that economic growth is explained by private investment rates, employment growth rates, and a catch-up variable, whereby investments are influenced by unemployment levels, secondary school enrollment rates, labour income shares, and country-specific factors. Moreover, the constant term in regression (9) is much closer to zero, whereas the t-statistic of the null hypothesis that the intercept term equals zero decreases from 0.87 in (1) to 0.32 in (9). The IV model thus reduces the room for an unexplained residual.

Regression (9) can be used to interpret the post-73 growth slowdown. The unability to exploit the catch-up potential after 1973 shows up in an insignificant coefficient of the

catch-up variable over the 1974-88 period. This finding is probably more satisfying than the conclusion of a recent OECD study that "the dummy variable for the pre-73 period is the most important variable in explaining the productivity growth slowdown" (p. 32, 1993). However, the model does not explain why countries suddenly lost their ability to take advantages of a backward situation. A guestimate in this direction is that the oil price shocks and the subsequent regime switches from demand-oriented policies towards fighting inflation increased the unemployment level. Since lower degrees of resource utilisation tend to increase the resistence to change (*cf.* OECD, 1993), the unemployment rises could have hampered producitvity increasing reforms.

	(8)	(9)
constant	-1.046 (0.738)	0.181 (0.557)
investment	0.225 (0.059)	0.115 (0.041)
employment growth	0.525 (0.205)	0.756 (0.176)
catch-up$_{1951\text{-}73}$	-2.414 (0.525)	-3.105 (0.435)
catch-up$_{1974\text{-}88}$	1.590 (1.065)	0.365 (0.911)
$\bar{R}^2$	0.554	0.607
F-statistic	40.382	50.022
Sargan's chi-square	3.563	24.518

Note: Standard errors are in parentheses. Variables are defined in appendix I. Sargan's misspecification statistic is 3.56 in eq. (8) and 24.52 in eq. (9). In both cases, the null hypothesis that the regression is correctly specified and that the instrumental variables are valid instruments, is not rejected at standard significance levels. There are 128 observations.

Table 5: IV of economic growth.

A decomposition table of the economic growth rate for the 1974-88 period is inserted in appendix II. Large residuals are found for Switzerland 1974-78, and the UK 1985-88. The positive residual for the UK is due to decreases in the rate of X-inefficiencies in British production, as stipulated earlier. Another remark that can be made is that

only Denmark and The Netherlands had negative residuals in the last sub-period. Only these countries performed below expectations. Third, labour input growth contributes relatively strongly to economic growth in Canada, the US, The Netherlands, and Australia. Decomposing the investment rate is done in appendix III. To get the intuition, consider the constant term of the investment model (7) as the initial investment endowment for all countries. Then, investments decrease with labour income shares and unemployment, and increase with school enrollment. Country-specific factors that are not captured by the investment model are added for six countries. Outliers (say, $|\eta| > 2$) in the residual term are found for Canada 1985-88, Japan 1974-88, Norway 1974-88, Switzerland 1974-88, and Australia 1974-78. This table highlights the quantitative effects of government policies on investment ratios. Consider, for example, the case of The Netherlands. Consensus among social partners on the importance of wage restraints decreased the labour income share from 58% in 1974-78 to 53% in 1985-88, thereby stimulating investments by approximately 2%-point. However, the rise in the unemployment level from 5.8% in 1974-78 to 9.8% in 1985-88 accounted for a reduction in the investment ratio of 2%-point. The positive effect of a conduct of wage restraints on investments is thus undone by the negative effect of rising levels of unemployment.

6. Concluding remarks

To improve economic modelling, economists should leave the ivory tower and visit the real world (*cf.* Bovenberg, 1994). They should talk with business men, politicians, and labour union representatives. These are the people who can tell an economist where to look for the ultimate factors of economic growth. Thereafter, economists should go back to the ivory tower and develop simple models. If the model is too difficult for politicians, it cannot have any relevant impact on government policies. A first attempt to such a research design is made in this paper. It has been shown that the post-war growth experience for 16 OECD countries is well described by a straightforward regression model, based on Scott's theory of endogenous growth. Private investments, employment growth, and a catch-up factor together explain about 60% of growth rate differences across countries and sub-periods. To check for simultaneity bias in the regression coefficients, an instrumental variable model is developed subsequently. Investments are asserted to depend on demand factors (Maddison, 1991), social capability (Abramovitz, 1989), and strength of

distributional coalitions (Olson, 1982). Admittedly simple indicators for these factors are the unemployment rate, secondary school enrollment, and the share of total income accruing to labour. Taken jointly, these variables explain the investment pattern quite well. However, this investment model is not sufficiently general and a number of dummy-variables had to be included to capture country-specific factors. The prefered regression model explained roughly 60% of the volatility of investments in the panel dataset. Finally, the benchmark equation is re-estimated by applying the method of instrumental variables. Statistical results do not change substantially, but from an economic point of view the outcome is more satisfying. Advises to policymakers are clear and straightforward.[12] To raise the rate of economic growth, governments should try to limit the power of distributional coalitions (or, alternatively, internalize the detrimental effects of labour unions like in The Netherlands). A promotion of wage-restraints is one way to increase investments and economic growth. Second, demand-oriented policies create a stimulating environment for those who invest. Policies directed to fight unemployment appear to stimulate investments. Finally, a network of educational training facilities is needed to provide the entrepreneurs with a motivated and flexible working force. Qualified people are necessary to handle state-of-the-art equipment. Although these policy implications are not very startling, the way to arrive at them is formalized in an endogenous growth framework in this paper. By doing so, the transmission channels by which these factors affect economic growth can be explored. It has been shown that the ultimate factors work through the accumulation channel, *i.e.* they influence the investment ratio. Further research could aim to design appropriate industrial policy programmes. To identify the factors behind investment processes more properly, principal components analysis seems a seminal statistical tool.

[12] These policy advises do not take account of Lucas' critique on econometric models.

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Appendix I: List of variables and their description.

symbol	name	description
g	economic growth	growth rate of real Gross Domestic Product (1985 international prices; Chain index)
σ	investments	gross non-residential fixed investment as a percentage of GDP
l	employment growth	growth rate of the number of workers, calculated from variable 1, 2, and 19 in Summers and Heston (p. 362)
cu	catch-up	real GDP per worker (1985 international prices) relative to the USA
λ	labour income share	compensation of employees paid by resident producers as a percentage of GDP (current prices)
sec	sec. school enrollment	ratio of total students enrolled in secondary education to estimated number of individuals in the age bracket 12-17 years
u	unemployment	unemployment as a percentage of the total labour force

Sources: *g, l, cu calculated from Summers and Heston (1991),* σ *from Maddison (1992) and Van de Klundert and Van Schaik (1993),* λ *from the OECD's National Accounts (1983, 1992), sec from Barro (1991), and u from Maddison (1991).*

The sample

Countries: Canada, United States of America, Japan, Austria, Belgium, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Sweden, Switzerland, United Kingdom, Australia.

Period: The period under consideration is 1951-1988. According to Maddison (table 4.7, 1991), yearly growth rates of GDP averaged over the 16 countries reached peak values in 1955, 1959, 1964, 1968, 1973, 1978, and 1984. These peak years in economic activity are taken as cut-offs between sub-periods. We thus have divided the total period into 8 sub-periods, 1951-55, 1956-59, 1960-64, 1965-68, 1969-73, 1974-78, 1979-84, and 1985-88. The number of observations is 128. Variables enter the dataset as averages over the sub-periods, except for catch-up and secondary school enrollment. Catch-up is measured in the first year of each sub-period. Secondary school enrollment rates are only reported for 1960, 1970, and 1985.

Appendix II: Decomposition of Economic Growth, 1974-88.

	g	σ	l	ln(cu)	ε
Canada	4.42	1.93	2.37	-0.07	0.01
	2.86	1.90	1.51	-0.05	-0.68
	3.39	1.65	0.83	-0.05	0.79
USA	2.59	1.53	1.77	0	-0.89
	2.33	1.58	1.21	0	-0.64
	3.68	1.45	0.73	0	1.32
Japan	3.43	2.78	0.53	-0.25	0.19
	3.86	2.75	0.64	-0.20	0.49
	4.00	2.72	0.63	-0.17	0.64
Austria	2.60	2.45	0.59	-0.18	-0.45
	2.17	2.16	0.61	-0.16	-0.62
	2.57	2.11	0.37	-0.16	0.07
Belgium	2.16	1.74	0.68	-0.09	-0.36
	1.13	1.58	0.59	-0.09	-1.14
	2.24	1.46	0.30	-0.11	0.41
Denmark	1.25	1.77	0.97	-0.19	-1.48
	2.42	1.47	0.62	-0.19	0.33
	1.75	1.71	0.38	-0.16	-0.36
Finland	1.21	2.35	0.60	-0.20	-1.72
	4.48	2.06	0.65	-0.20	1.78
	3.43	2.08	0.46	-0.16	0.87
France	2.62	1.81	0.67	-0.11	0.07
	1.42	1.68	0.68	-0.09	-1.03
	2.34	1.66	0.52	-0.11	0.10
Germany	1.92	1.68	0.39	-0.14	-0.20
	1.55	1.70	0.50	-0.12	-0.72
	2.27	1.64	0.10	-0.13	0.47
Italy	3.61	1.96	0.35	-0.15	1.26
	2.92	1.84	0.49	-0.10	0.52

	3.20	1.68	0.42	-0.09	1.02
Netherlands	3.15	1.77	1.11	-0.06	0.15
	1.29	1.59	1.09	-0.06	-1.51
	2.15	1.74	0.82	-0.09	-0.50
Norway	5.23	3.29	1.53	-0.15	0.38
	3.37	2.48	0.90	-0.11	-0.09
	3.94	2.54	0.63	-0.08	0.67
Sweden	1.43	1.86	0.84	-0.14	-1.30
	2.36	1.64	0.46	-0.15	0.23
	2.32	1.69	0.28	-0.13	0.29
Switzerland	-0.92	0.88	0.20	-0.02	-2.16
	1.74	0.84	0.43	-0.05	0.35
	3.23	0.99	0.27	-0.06	1.84
UK	1.36	1.71	0.36	-0.18	-0.71
	1.29	1.54	0.37	-0.16	-0.63
	4.08	1.60	0.23	-0.16	2.23
Australia	2.49	2.09	1.77	-0.08	-1.46
	2.80	2.18	1.48	-0.09	-0.95
	3.68	2.28	1.23	-0.09	0.09

Note: ε *is calculated as the actual growth rate minus the contributions of investments, labour input growth, and catch-up, minus the constant term from regression 9.*

Appendix III: Decomposition of Investments, 1974-88.

	σ	λ	u	sec	η
Canada	16.80	-19.88	-3.82	13.49	-0.13
	16.55	-19.55	-5.02	13.49	0.49
	14.35	-19.22	-4.88	13.49	-2.18
USA	13.30	-21.27	-3.68	12.97	1.15
	13.73	-21.39	-4.17	12.97	2.20
	12.58	-21.28	-3.42	12.97	0.18
Japan	24.20	-19.16	-1.02	12.58	4.66
	23.88	-19.34	-1.25	12.58	4.76
	23.68	-19.08	-1.43	12.58	4.47
Austria	21.30	-18.93	-0.92	10.35	1.59
	18.80	-19.15	-1.60	10.35	-0.01
	18.37	-18.73	-1.89	10.35	-0.57
Belgium	15.16	-20.45	-3.18	12.58	-0.91
	13.77	-20.70	-5.77	12.58	0.53
	12.73	-19.41	-5.79	12.58	-1.79
Denmark	15.38	-19.73	-3.25	13.49	0.75
	12.83	-19.62	-4.83	13.49	-0.34
	14.88	-19.17	-3.60	13.49	0.03
Finland	20.44	-19.65	-2.22	13.36	1.82
	17.94	-19.10	-2.79	13.36	-0.67
	18.12	-19.24	-2.65	13.36	-0.48
France	15.74	-19.15	-2.28	12.58	-0.38
	14.65	-19.73	-4.08	12.58	0.91
	14.40	-18.77	-5.51	12.58	1.11
Germany	14.60	-20.17	-1.72	9.69	-0.35
	14.80	-20.29	-2.84	9.69	1.10
	14.28	-19.68	-3.48	9.69	0.60
Italy	17.07	-17.39	-3.41	9.83	0.91
	15.96	-16.75	-4.42	9.83	0.17

	14.57	-15.83	-5.63	9.83	-0.94
Netherlands	15.36	-20.55	-3.09	13.36	-1.50
	13.83	-19.86	-5.03	13.36	-1.78
	15.10	-18.61	-5.27	13.36	-1.52
Norway	28.58	-20.38	-0.95	12.71	4.70
	21.58	-17.78	-1.31	12.71	-4.55
	22.13	-18.56	-1.33	12.71	-3.21
Sweden	16.16	-22.29	-0.99	10.87	1.42
	14.30	-21.85	-1.47	10.87	-0.39
	14.73	-20.64	-1.21	10.87	-1.43
Switzerland	7.63	-21.19	-0.19	8.25	-6.38
	7.26	-21.85	-0.28	8.25	-6.00
	8.64	-21.88	-0.40	8.25	-4.47
UK	14.84	-21.73	-2.65	11.66	0.43
	13.37	-20.33	-5.06	11.66	-0.05
	13.90	-19.39	-5.52	11.66	0.02
Australia	18.16	-19.49	-2.56	12.45	-2.42
	18.92	-18.59	-3.91	12.45	-1.21
	19.80	-17.56	-4.21	12.45	-1.06

Note: η *is calculated as the actual investment rate minus the contributions of the labour income share, the unemployment rate, secondary school enrollment, the country-dummy, minus the constant term from regression 7.*

Appendix IV: The panel dataset.

	obs.	g (%)	σ (%)	l (%)	cu (perunage)	λ (perunage)	sec (perunage)	u (%)
Canada	1	4.40	16.40	2.07	0.84	0.51	0.52	3.40
	2	3.80	18.80	2.07	0.88	0.51	0.52	5.13
	3	4.64	17.34	2.57	0.84	0.51	0.66	5.86
	4	5.55	19.35	2.69	0.84	0.53	0.66	3.78
	5	3.81	17.00	2.96	0.85	0.55	0.66	5.56
	6	4.42	16.80	3.13	0.83	0.56	1.03	7.12
	7	2.86	16.55	2.00	0.87	0.56	1.03	9.37
	8	3.39	14.35	1.09	0.87	0.55	1.03	9.10
USA	9	4.07	12.40	1.16	1.00	0.57	0.86	3.68
	10	2.27	12.83	1.16	1.00	0.58	0.86	5.03
	11	4.01	12.28	1.65	1.00	0.57	1.00	5.56
	12	4.73	13.68	1.77	1.00	0.58	1.00	3.85
	13	3.22	13.12	2.11	1.00	0.61	1.00	4.92
	14	2.59	13.30	2.34	1.00	0.60	0.99	6.86
	15	2.33	13.73	1.60	1.00	0.61	0.99	7.78
	16	3.68	12.58	0.96	1.00	0.60	0.99	6.38
Japan	17	9.50	17.78	2.01	0.16	0.41	0.74	2.00

	18	7.53	21.78	2.01	0.19	0.42	0.74	2.10
	19	11.71	26.54	1.81	0.23	0.42	0.87	1.36
	20	9.88	25.10	1.76	0.29	0.43	0.87	1.23
	21	8.78	27.60	1.12	0.39	0.46	0.87	1.22
	22	3.43	24.20	0.70	0.50	0.54	0.96	1.90
	23	3.86	23.88	0.85	0.58	0.55	0.96	2.33
	24	4.00	23.68	0.83	0.63	0.54	0.96	2.68
Austria	25	6.40	15.65	-0.24	0.26	0.46	0.50	4.46
	26	4.59	17.68	-0.24	0.31	0.46	0.50	3.28
	27	5.99	20.36	-0.72	0.38	0.46	0.72	1.98
	28	4.08	21.30	-0.84	0.43	0.48	0.72	1.75
	29	5.78	21.87	0.14	0.49	0.48	0.72	1.40
	30	2.60	21.30	0.78	0.62	0.54	0.79	1.72
	31	2.17	18.80	0.81	0.65	0.54	0.79	2.98
	32	2.57	18.37	0.49	0.65	0.53	0.79	3.53
Belgium	33	3.25	12.30	0.03	0.50	0.44	0.69	4.74
	34	1.68	13.05	0.03	0.52	0.45	0.69	3.10
	35	5.33	15.35	0.22	0.55	0.47	0.82	2.18
	36	3.64	16.63	0.27	0.60	0.50	0.82	2.03
	37	5.45	16.16	0.65	0.64	0.52	0.82	2.20
	38	2.16	15.16	0.90	0.78	0.58	0.96	5.94

	39	1.13	13.77	0.78	0.78	0.59	0.96	10.77
	40	2.24	12.73	0.39	0.73	0.55	0.96	10.80
Denmark	41	1.52	13.59	0.07	0.42	0.47	0.65	4.62
	42	5.00	14.40	0.07	0.43	0.47	0.65	4.40
	43	6.10	16.62	1.05	0.52	0.50	0.94	1.78
	44	3.47	17.30	1.30	0.56	0.53	0.94	1.23
	45	4.20	17.18	1.29	0.57	0.54	0.94	0.94
	46	1.25	15.38	1.28	0.60	0.56	1.03	6.06
	47	2.42	12.83	0.82	0.60	0.56	1.03	9.02
	48	1.75	14.88	0.51	0.64	0.54	1.03	6.73
Finland	49	6.24	19.27	0.08	0.33	0.47	0.74	0.72
	50	2.65	19.84	0.07	0.37	0.46	0.74	2.18
	51	5.84	19.85	0.68	0.42	0.47	0.77	1.38
	52	2.61	18.46	0.84	0.44	0.51	0.77	2.43
	53	7.03	19.61	0.81	0.45	0.51	0.77	2.34
	54	1.21	20.44	0.79	0.57	0.56	1.02	4.14
	55	4.48	17.94	0.85	0.58	0.54	1.02	5.20
	56	3.43	18.12	0.60	0.64	0.55	1.02	4.95
France	57	4.39	13.00	0.25	0.40	0.44	0.46	2.40
	58	4.51	14.23	0.25	0.44	0.45	0.46	1.68
	59	6.46	16.88	0.77	0.50	0.46	0.75	1.42

	60	5.07	17.40	0.89	0.56	0.47	0.75	1.65
	61	5.74	16.64	0.89	0.62	0.50	0.75	2.56
	62	2.62	15.74	0.88	0.74	0.54	0.96	4.26
	63	1.42	14.65	0.89	0.78	0.56	0.96	7.62
	64	2.34	14.40	0.69	0.74	0.53	0.96	10.28
Germany	65	9.51	15.18	1.18	0.34	0.46	0.53	6.08
	66	5.85	17.25	1.17	0.45	0.47	0.53	2.83
	67	5.42	18.20	0.45	0.52	0.49	0.66	0.72
	68	3.44	16.93	0.27	0.56	0.51	0.66	1.00
	69	4.99	17.54	0.42	0.60	0.54	0.66	0.72
	70	1.92	14.60	0.52	0.69	0.57	0.74	3.20
	71	1.55	14.80	0.67	0.73	0.58	0.74	5.30
	72	2.27	14.28	0.14	0.70	0.56	0.74	6.50
Italy	73	6.45	14.41	0.15	0.30	0.39	0.34	7.70
	74	5.27	13.67	0.15	0.35	0.40	0.34	6.73
	75	6.49	15.76	0.12	0.43	0.43	0.61	3.32
	76	5.19	13.72	0.11	0.47	0.44	0.61	5.20
	77	4.78	16.04	0.32	0.55	0.47	0.61	5.50
	78	3.61	17.07	0.46	0.67	0.49	0.75	6.36
	79	2.92	15.96	0.65	0.75	0.48	0.75	8.25
	80	3.20	14.57	0.56	0.77	0.45	0.75	10.50

Netherlands	81	5.25	16.80	0.16	0.48	0.44	0.58	3.08
	82	2.82	19.55	0.16	0.58	0.47	0.58	1.90
	83	6.43	20.58	1.21	0.64	0.49	0.75	0.94
	84	5.26	21.00	1.47	0.67	0.53	0.75	1.93
	85	4.93	18.20	1.47	0.72	0.56	0.75	2.70
	86	3.15	15.36	1.47	0.84	0.58	1.02	5.76
	87	1.29	13.83	1.44	0.84	0.56	1.02	9.38
	88	2.15	15.10	1.09	0.79	0.53	1.02	9.83
Norway	89	3.98	23.09	0.07	0.48	0.46	0.53	1.68
	90	2.70	25.27	0.07	0.53	0.48	0.53	2.63
	91	4.76	23.97	1.08	0.56	0.51	0.84	2.12
	92	4.33	23.45	1.34	0.58	0.53	0.84	1.75
	93	4.12	22.73	1.75	0.60	0.55	0.84	1.66
	94	5.23	28.58	2.02	0.67	0.58	0.97	1.78
	95	3.37	21.58	1.19	0.75	0.51	0.97	2.45
	96	3.94	22.13	0.84	0.80	0.53	0.97	2.48
Sweden	97	3.22	15.18	0.63	0.54	0.53	0.55	1.76
	98	3.40	15.89	0.63	0.56	0.53	0.55	1.78
	99	5.19	18.04	1.18	0.60	0.56	0.72	1.60
	100	3.16	18.63	1.31	0.63	0.59	0.72	1.78
	101	3.41	16.92	1.19	0.63	0.60	0.72	2.22

	102	1.43	16.16	1.11	0.68	0.63	0.83	1.84
	103	2.36	14.30	0.61	0.67	0.62	0.83	2.73
	104	2.32	14.73	0.38	0.71	0.59	0.83	2.25
Switzerland	105	5.04	12.80	1.61	0.74	0.53	0.26	0.00
	106	3.56	15.98	1.61	0.77	0.52	0.26	0.00
	107	6.56	11.51	1.73	0.81	0.53	0.48	0.00
	108	2.85	8.83	1.76	0.83	0.54	0.48	0.00
	109	4.73	9.25	0.86	0.82	0.56	0.48	0.00
	110	-0.92	7.63	0.27	0.95	0.60	0.63	0.36
	111	1.74	7.26	0.57	0.87	0.62	0.63	0.52
	112	3.23	8.64	0.36	0.85	0.62	0.63	0.75
UKD	113	3.20	10.34	0.38	0.52	0.58	0.67	2.44
	114	2.18	12.13	0.39	0.53	0.59	0.67	2.65
	115	3.57	13.42	0.46	0.56	0.60	0.73	2.58
	116	2.71	14.70	0.48	0.55	0.59	0.73	2.80
	117	3.53	14.42	0.48	0.55	0.59	0.73	3.38
	118	1.36	14.84	0.48	0.61	0.62	0.89	4.94
	119	1.29	13.37	0.49	0.64	0.58	0.89	9.43
	120	4.08	13.90	0.31	0.64	0.55	0.89	10.30
Australia	121	4.81	19.38	2.01	0.65	0.51	0.51	1.82
	122	4.18	19.73	2.01	0.68	0.51	0.51	2.35

123	5.01	20.54	2.43	0.72	0.50	0.69	2.08
124	5.34	21.28	2.53	0.69	0.51	0.69	1.68
125	4.91	19.60	2.41	0.74	0.53	0.69	2.00
126	2.49	18.16	2.34	0.80	0.55	0.95	4.78
127	2.80	18.92	1.96	0.78	0.53	0.95	7.30
128	3.68	19.80	1.63	0.78	0.50	0.95	7.85