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Unemplyment, Investement and Global Expected Returns: A Panel FAVAR Approach

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Unemployment, investment and global expected returns: A panel FAVAR approach

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We consider the hypothesis that a common factor, global expected returns, drives unemployment and investment in 21 OECD countries over the period 1960-2002. We investigate this hypothesis using a panel-factor augmented-vector autoregression (FAVAR). We first estimate the common factors of unemployment and investment by principal components and show that the first principal component of unemployment is almost identical to that of investment and that they both show the pattern one would expect of a rate of return as indicated by long interest rates. We then estimate panel FAVARs to measure the dynamic impact of the global factors. Investment appears to drive unemployment and – allowing for a moving natural rate of unemployment driven by the global factor – produces much faster adjustment by unemployment.

JEL classification: J1, E2

Keywords: Investment, unemployment, principal components.

Keynes and Hayek agreed on little, but one thing they would both have taken for granted was that the medium-term evolution of unemployment was determined by the dynamics of investment, driven by the expected rate of return on capital. This may seem strange in a contemporary context, where one would not expect any such relationship. Instead it is taken for granted that both will settle down – once prices and wages have fully adjusted – to natural rates determined by institutions and the structure of markets. Given this assumption, Blanchard (2000) has labelled the medium-run relationship between investment and unemployment the "Modigliani Puzzle." [1,2]

The standard argument for <u>not</u> expecting a relationship between unemployment and the stock of capital is that the capital stock is trended while the unemployment

[1] See also Modigliani (2000) and Herbertsson and Zoega (2002).

[2] Recent investment-based models of the natural rate trace their origins to the contribution of Walter Oi (1962). Oi argued that labour was a "quasi-fixed" factor of production in that there was both a fixed cost of hiring as well as the variable cost of paying wages. In later developments, the source of the hiring costs was found to be information frictions in the labour market – as in the matching models (see Pissarides, 2001, amongst others) – or the cost of teaching workers how to perform their jobs (Phelps, 1994). A close association between investment and unemployment arises quite naturally in these two types of general-equilibrium models due to the investment dimension of the hiring decision. The real business cycle literature also predicts a positive association between employment (measured in hours) and investment but it has little to say about changes in the rate of (involuntary) unemployment.

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rate is not. Malley and Moutos (2001) deal with this issue by arguing that it is relative capital stocks that matter. Our argument is simpler and does not involve the capital stock as such but the rate of investment; global expected returns will drive both the attraction of investing in capital and labour inducing a common factor. The issue is then how to measure the common factor: global expected returns that drive investment and unemployment. The procedure we use is a factor augmented VAR (FAVAR). These have been used to measure US monetary policy in Bernanke, Boivin and Eliasz (2005); UK monetary policy in Lagana and Mountford (2005); and are discussed in more detail by Stock and Watson (2005).

We use a panel version of the same approach and apply it in a global rather than a national context. Consider a 2^x1 vector of observed focus variables Y_{it} (investment and unemployment in country $i=1,2,\ldots N$ in our case) and a K^x1 vector of unobserved factors, F_t (global expected returns) with a VAR structure

(1) $$\begin{pmatrix} F_t \\ Y_{it} \end{pmatrix} = \Phi_i(L)\begin{pmatrix} F_{t-1} \\ Y_{i,t-1} \end{pmatrix} + v_{it}$$

The unobserved factors are related to a $2N^x1$ vector Y_t, which contains investment and unemployment in all OECD countries

(2) $$Y_t = \Lambda F_t + e_t$$

where the F_t are estimated as the principal components of Y_t. The literature argues that FAVARs have the advantage that: (a) a small number of factors can account for a large proportion of the variance of the Y_t and thus parsimoniously reduce omitted variable bias in the VAR (b) the factor structure for Y_t allows one to calculate impulse response functions for all the Y_t in response to a shock to Y_t (c) the factors may be better measures of underlying economic variables, expected returns in our case, than observed proxies (d) FAVARS may forecast better than standard VARs. In the panel context the use of common global variables will also reduce between group dependence in the errors as shown in Pesaran (2004).

Our hypothesis is that a common factor – which we interpret as a measure of global returns – drives both investment and unemployment. We use a panel of 21 OECD countries over the period 1960-2002 to examine this hypothesis. The data suggest that a single factor – which might naturally be interpreted as a global expected rate of return – drives both investment and unemployment in these countries. Finally we examine the dynamics of how the global factor, our measure of the expected rate of return, drives unemployment and investment in individual countries.

Global Factors

To investigate the hypothesis we measure the common global factors in investment and unemployment separately and then compare them to see whether the variables are driven by common or different factors. We use OECD data for twenty-one countries[3] and forty-three years (1960-2002) on the unemployment rate u_{it} in country i in year t, $i = 1, 2, ..., N; t = 1, 2, ..., T$ which we can stack in the $T \times N$, (43×21) matrix U. Similarly for the same sample we have data on the investment rate, Gross Domestic Fixed Capital Formation as a share of GDP g_{it}, stacked as G. We standardise the data and calculate the underlying global factors as the Principal Components (PCs) of the correlation matrices of U and G. These are the orthogonal linear combinations of the data that explain the maximal variances of the data[4]. If the idiosyncratic errors, e_t above are I(0) the principal-component estimators for F_t are consistent independently of whether all the factors are I(0) or whether some or all of the factors are I(1). We will assume that the errors are I(0) and that the long-memory in investment and unemployment comes from the global factors. This is tested below.

The eigenvalues and proportion of variance explained by the first four PCs are given in Table 1.

Table 1. Principal components for unemployment and investment

	Unemployment			Investment		
Shocks	Eigen-values	% of var. explained	Cum. % explained	Eigen-values	% of var. explained	Cum. % explained
First PC	14.16	69%	69%	11.85	58%	58%
Second PC	3.15	15%	84%	2.44	12%	70%
Third PC	0.98	5%	89%	1.59	8%	78%
Fourth PC	0.74	4%	93%	1.00	5%	83%

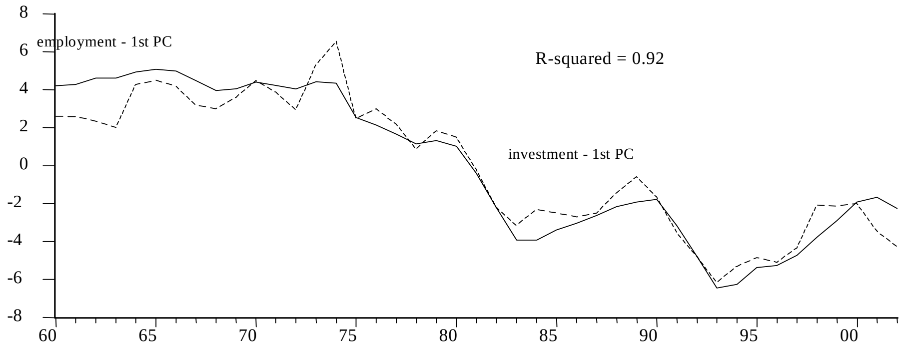
The first two principal components explain 84% of the variation in the unemployment matrix and 70% of the variation in the investment matrix; factors common to all

[3] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, UK and US.
[4] For forecasting, it may be more useful to estimate dynamic factors that take the principal components of the spectral density matrix. However, static factors are commonly used in the FAVAR literature.

countries clearly explain the bulk of the variation in both measures.

Notice that we have calculated the factors for unemployment and investment independently and not imposed a shared factor structure. However, by plotting the unemployment and investment PCs together we can judge whether they share a common factor or whether there are only variable specific factors. The first two sets of PCs for unemployment and investment, respectively, are shown in Figure 1 below. Note that we draw the PC for unemployment inverted (that is with a minus sign) so that it measures shocks to employment, not unemployment, in order to create a more visible fit with the investment PCs.

Figure 1. The first two principal components.



The first PCs for investment and unemployment are almost identical, $R^2 = 0.92$, and there are some similarities between the second PCs, but the fit is not high $R^2 = 0.25$. Below we conduct the analysis assuming that there is a single shared factor. The eigenvectors suggest that the first PC of unemployment is important for all countries, with roughly equal weights, being similar to the mean of the series for each year, with somewhat smaller weights for the United States, Ireland and Portugal. The first PC reflects some of the more important macroeconomic events of the past forty years: the oil shocks, the recessions of the mid-seventies, early eighties and early nineties and the gradual but only partial recovery in the second half of the eighties. This component describes the shocks causing the persistent slump that occurred in many countries in the seventies, eighties and nineties.[5]

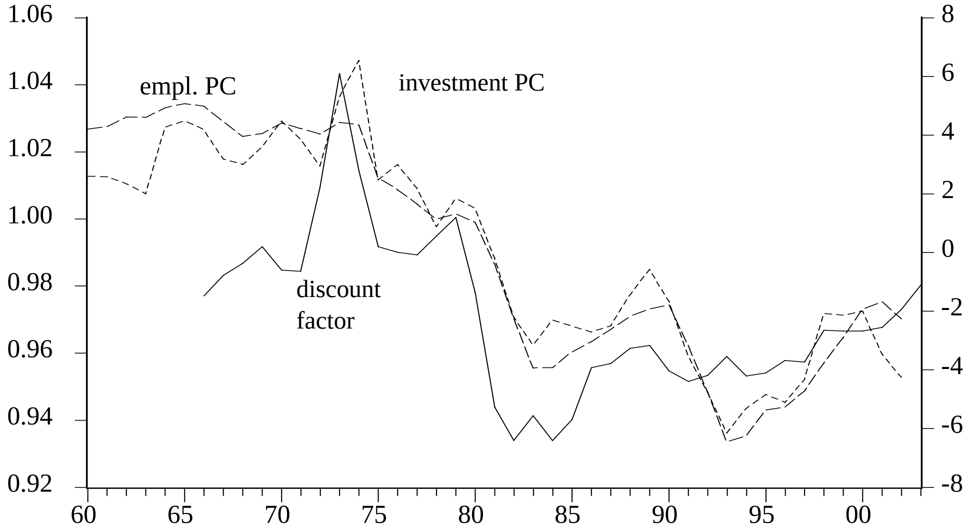
The expected return to production may depend on a large number of factors: anticipated productivity, input prices, competitive pressures, workers bargaining power, cost of capital, etc. They are almost impossible to measure, but in a globalised world the broad movements of the expected rate of return are likely to be quite similar across the advanced industrial countries, and reflected in their investment and employment decisions. Whereas investment and unemployment in any one country will be noisy measures of this, the common component across countries may be a better measure.

While we do not observe expected returns, we do observe a variable related to it. Figure 2 plots a discount factor calculated from the world real rate of interest: $d = 1/(1+r)$, where r is the average (long) real rate of interest for the G7 countries.[6]

Figure 2. The PCs and the world discount factor

[5] There is a growing literature that seeks to explore the similarities and linkages between macroeconomic cycles across countries. Canova, Ciccarelli and Ortega (2004) employ a panel VAR methodology to study these issues. They find evidence for a world business cycle. Their world indicator explains around 30% of the volatility of sales, industrial production, output and employment of the G7. Xiao (2004) derives an International Real Business Cycle (IRBC) model with increasing returns in the production technology that generate sunspots. These sunspots are interpreted as self-fulfilling demand shocks, like animal spirits and generate positive international correlations of output, employment and investment, unlike most IRBC models.

[6] The world real rate of interest is calculated as the weighted average of the real rate of interest in the G7 countries; the real rates being the difference between the long nominal rates and annual inflation and the weights being the Heston-Summers relative GDP for each country.



A clear relationship is present between the two PCs, on the one hand, and the discount factor, on the other hand. This suggests that the long swings of employment may trace their roots to factors affecting investment.[7]

The fact that a shared common factor, measured by their first PC, drives unemployment and investment is consistent with a number of different causal processes. To investigate the dynamics we estimate a set of factor augmented second order VARs, parameterised as vector-error-correction models (VECM). For each country we estimate a FAVAR of the form

$$(2) \quad \begin{aligned} \Delta u_{it} &= a_1 + b_{11} f^g{}_{t-1} + b_{12} f^u{}_{t-1} + c_{11} u_{it-1} + c_{12} \Delta u_{it-1} + d_{11} g_{it-1} + d_{12} \Delta g_{it-1} + \varepsilon_{1t} \\ \Delta g_{it} &= a_2 + b_{21} f^g{}_{t-1} + b_{22} f^u{}_{t-1} + c_{21} u_{it-1} + c_{22} \Delta u_{it-1} + d_{21} g_{it-1} + d_{22} \Delta g_{it-1} + \varepsilon_{2t} \end{aligned}$$

where u_{it} is the unemployment rate, g_{it} the share of investment, f_t^g is the first PC for investment and f_t^u for unemployment. For brevity we report the average values of the coefficients over the 21 countries (detailed results in the appendix). The averages are calculated by the Swamy Random Coefficient Model, where separate equations are estimated for each country and variance weighted averages of the coefficients and non-parametric standard errors are calculated. These standard errors are correct whereas the standard errors in the country specific equations are not because of the generated regressor problem.

In a standard VAR between investment and unemployment, the unemployment

[7] Nickell (2003) argues that the problem of high unemployment is confined to the big four economies on the European continent; France, Germany, Italy and Spain. He attributes half the variation in the increase in unemployment from the early 1980s to 2003 across a set of twenty countries to differences in labour market institutions. But the failure of employment in the big four to recover goes together with an investment failure.

equation shows very slow adjustment, averaging 5% per annum, and a unit root would not be rejected, for many of the countries. Adding global factors produces much faster unemployment adjustment, 20% per annum and the unit root would be rejected. The lagged first investment PC is significant in both the unemployment and investment equations, while the first unemployment PC is not, though because they are very highly correlated, this will increase their standard errors. Lagged domestic investment is significant in the unemployment equation. Thus there seems to be two linkages, a direct response of unemployment to the lagged global expected rate of return and a lagged response to domestic investment.[8] As is common in unemployment equations, the lagged change in unemployment is very significant.

Table 2. Factor-augmented VECM unemployment and investment equations

Random coefficients model. Number of countries: 21.					
unemployment equation			investment equation		
Coefficient	Estimate	t-statistics	Coefficient	Estimate	t-statistics
a_1	-0.37	0.49	a_2	11.78	8.40
b_{11}	-0.09	2.47	b_{21}	0.59	4.72
b_{12}	0.10	1.71	b_{22}	0.15	1.10
c_{11}	-0.20	4.91	c_{21}	0.04	0.38
c_{12}	0.42	6.41	c_{22}	-0.28	1.66
d_{11}	0.07	2.29	d_{21}	-0.52	10.46
d_{12}	-0.05	1.83	d_{22}	0.04	0.73

In the investment equation, only the lagged investment PC and lagged investment are significant. Thus the system shows stronger effects of investment on unemployment than of unemployment on investment.

We conclude that a large proportion of the variance of both investment and unemployment is accounted for by global shocks, common factors that influence all 21 OECD countries, albeit with different effects in each. In spite of being derived independently the common factors in unemployment and investment are very closely

[8] Country specific dynamic regressions for unemployment, show the first investment PC is significant everywhere but Denmark, Ireland and Netherlands, whereas lagged own investment is significant only in three countries. So the effect of the expected rate of return on unemployment is more global than national.

related. When the global factor is allowed for, the speed of adjustment to the moving natural rate of unemployment is faster than conventional estimates.

Because the first common factor for both unemployment and investment is almost identical, we cannot say whether the global shock comes from the labour market, product market or capital market. But it is more plausible that it comes from a global expected rate of return than from global labour market shocks because the former and not the latter are globally integrated.

Concluding comments

This paper has documented a surprisingly strong empirical relationship between unemployment and investment. In particular, the long swings of the two variables appear to be caused by an almost identical global factor. It follows that any plausible explanation of persistently high unemployment – i.e. the riddle of European unemployment in the seventies, eighties and nineties – must both explain the fall in employment as well as the fall in investment. For this reason, an exclusive focus on labour market institutions is not likely to provide an exhaustive explanation; instead expectations of future discounted profits; productivity and interest rates, must play a big role in explaining the long swings of economic activity, such as the one currently seen in Europe. Instead of posing a puzzle to macroeconomists, the empirical relationship between investment and unemployment should help in the search for the forces causing the long swings in economic activity.

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Appendix 1
Estimation results for equation (2)

Unemployment (dependent variable is Δu)

	f^g	f^u	u	Δu	g	Δg	constant	SER	LL	R2
Australia	0,07	0,55	-0,64	0,34	0,07	-0,18	1,80	0,66	-36,25	0,57
	(0,13)	(0,19)	(0,17)	(0,14)	(0,10)	(0,08)	(2,79)			
Austria	-0,10	0,03	-0,21	0,12	0,04	0,00	-0,44	0,23	6,11	0,58
	(0,04)	(0,04)	(0,05)	(0,18)	(0,03)	(0,03)	(0,87)			
Belgium	-0,06	0,13	-0,16	0,59	0,09	-0,04	-0,83	0,55	-29,20	0,59
	(0,11)	(0,13)	(0,08)	(0,15)	(0,08)	(0,09)	(1,90)			
Canada	-0,21	0,14	-0,36	0,59	0,29	0,05	-3,57	0,66	-36,45	0,59
	(0,14)	(0,16)	(0,12)	(0,19)	(0,08)	(0,12)	(2,19)			
Denmark	0,02	0,31	-0,22	0,56	0,17	-0,03	-3,01	0,79	-43,62	0,27
	(0,15)	(0,21)	(0,17)	(0,24)	(0,12)	(0,10)	(3,07)			
Finland	-0,38	-0,14	-0,12	0,65	0,13	-0,03	-2,43	0,93	-50,21	0,67
	(0,17)	(0,16)	(0,09)	(0,13)	(0,08)	(0,07)	(2,39)			
France	0,07	0,48	-0,38	0,05	0,06	-0,01	1,28	0,36	-11,87	0,70
	(0,07)	(0,10)	(0,09)	(0,14)	(0,06)	(0,06)	(1,76)			
Germany	-0,13	0,13	-0,26	0,15	0,05	-0,17	-0,09	0,44	-19,91	0,63
	(0,09)	(0,11)	(0,06)	(0,15)	(0,04)	(0,06)	(1,02)			
Greece	-0,11	0,02	-0,15	0,46	-0,01	0,01	1,22	0,52	-26,44	0,53
	(0,11)	(0,10)	(0,06)	(0,16)	(0,04)	(0,04)	(1,27)			
Iceland	-0,16	-0,05	-0,27	0,38	0,02	0,01	-0,02	0,51	-25,63	0,35
	(0,09)	(0,09)	(0,10)	(0,16)	(0,03)	(0,03)	(0,76)			
Ireland	-0,29	-0,33	0,07	-0,21	0,22	-0,34	-5,53	1,41	-66,74	0,31
	(0,29)	(0,32)	(0,11)	(0,20)	(0,08)	(0,13)	(2,42)			
Italy	0,04	0,22	-0,25	0,27	-0,02	-0,04	2,27	0,38	-13,95	0,65
	(0,08)	(0,08)	(0,06)	(0,14)	(0,05)	(0,04)	(1,44)			
Japan	0,00	0,03	0,16	0,05	0,06	-0,07	-2,18	0,17	17,00	0,45
	(0,03)	(0,03)	(0,06)	(0,20)	(0,02)	(0,02)	(0,70)			
Netherlands	-0,08	0,01	-0,18	0,69	-0,01	-0,06	1,03	0,67	-37,11	0,55
	(0,15)	(0,19)	(0,08)	(0,14)	(0,10)	(0,10)	(2,42)			
New Zeal.	-0,07	0,12	-0,29	0,43	-0,05	-0,02	2,25	0,76	-41,68	0,30
	(0,15)	(0,15)	(0,13)	(0,17)	(0,06)	(0,06)	(1,78)			
Norway	-0,16	-0,05	-0,26	0,58	0,01	0,01	0,36	0,43	-19,34	0,40
	(0,08)	(0,08)	(0,11)	(0,17)	(0,03)	(0,03)	(0,97)			
Portugal	-0,07	0,00	-0,24	0,72	0,09	-0,08	-0,98	0,67	-36,84	0,60
	(0,12)	(0,12)	(0,07)	(0,13)	(0,03)	(0,04)	(0,92)			
Spain	-0,06	0,55	-0,45	0,40	-0,17	0,07	8,36	0,52	-26,92	0,85
	(0,09)	(0,13)	(0,07)	(0,10)	(0,07)	(0,05)	(2,11)			
Sweden	-0,20	0,03	-0,09	0,37	0,18	-0,09	-3,45	0,56	-29,79	0,59
	(0,11)	(0,14)	(0,08)	(0,18)	(0,09)	(0,09)	(2,02)			
UK	0,04	0,28	-0,22	0,70	0,29	-0,19	-4,13	0,70	-38,69	0,64
	(0,14)	(0,16)	(0,09)	(0,14)	(0,10)	(0,11)	(2,01)			
US	-0,18	-0,05	-0,40	0,71	0,36	0,04	-4,34	0,78	-42,73	0,40
	(0,15)	(0,14)	(0,12)	(0,25)	(0,12)	(0,17)	(2,03)			

Standard errors in parentheses.

Investment (dependent variable is Δg)

	f^g	f^u	u	Δu	g	Δg	constant	SER	LL	R2
Australia	0,26	-0,59	0,70	-0,02	-0,63	-0,06	11,52	1,54	-70,06	0,42
	(0,30)	(0,43)	(0,40)	(0,32)	(0,22)	(0,19)	(6,50)			
Austria	0,75	0,21	0,25	-0,38	-0,64	0,07	15,94	1,16	-58,85	0,52
	(0,22)	(0,22)	(0,26)	(0,90)	(0,15)	(0,16)	(4,42)			
Belgium	0,66	0,50	-0,17	-0,73	-0,38	-0,19	8,72	1,10	-56,72	0,44
	(0,22)	(0,27)	(0,17)	(0,30)	(0,15)	(0,18)	(3,78)			
Canada	0,60	0,01	0,34	-0,56	-0,60	-0,24	10,63	1,11	-57,16	0,56
	(0,23)	(0,27)	(0,21)	(0,31)	(0,13)	(0,20)	(3,68)			
Denmark	0,61	-0,35	-0,04	-0,37	-0,88	0,15	21,14	1,72	-74,59	0,35
	(0,32)	(0,46)	(0,36)	(0,52)	(0,25)	(0,22)	(6,65)			
Finland	1,70	1,19	-0,42	-0,68	-0,87	0,08	23,77	2,17	-83,99	0,63
	(0,39)	(0,37)	(0,22)	(0,30)	(0,18)	(0,16)	(5,56)			
France	0,49	-0,47	0,44	0,25	-0,50	-0,16	8,35	0,80	-44,04	0,73
	(0,16)	(0,23)	(0,19)	(0,31)	(0,13)	(0,14)	(3,93)			
Germany	-0,12	-0,25	-0,03	0,20	-0,32	0,33	7,25	1,41	-66,71	0,18
	(0,29)	(0,36)	(0,19)	(0,49)	(0,14)	(0,21)	(3,30)			
Greece	0,35	-0,07	-0,38	-0,40	-0,56	0,10	16,94	2,31	-86,43	0,35
	(0,50)	(0,44)	(0,29)	(0,70)	(0,16)	(0,18)	(5,69)			
Iceland	0,66	-0,19	0,34	-1,61	-0,54	-0,10	12,18	2,45	-88,77	0,49
	(0,44)	(0,42)	(0,47)	(0,78)	(0,14)	(0,15)	(3,67)			
Ireland	1,06	0,90	-0,20	-0,22	-0,33	-0,01	9,27	2,03	-81,15	0,35
	(0,42)	(0,46)	(0,16)	(0,28)	(0,11)	(0,18)	(3,46)			
Italy	0,78	0,31	0,03	0,01	-0,49	-0,10	10,79	1,41	-66,53	0,50
	(0,29)	(0,30)	(0,24)	(0,50)	(0,17)	(0,16)	(5,35)			
Japan	-0,02	-0,27	-1,13	1,81	-0,58	0,47	20,79	1,34	-64,67	0,36
	(0,26)	(0,23)	(0,48)	(1,51)	(0,15)	(0,19)	(5,39)			
Netherlands	0,16	-0,14	0,09	-0,46	-0,34	-0,09	7,19	1,33	-64,40	0,24
	(0,29)	(0,37)	(0,16)	(0,27)	(0,20)	(0,19)	(4,79)			
New Zeal.	1,51	1,26	-0,32	-0,32	-0,74	0,28	18,27	2,13	-83,14	0,49
	(0,41)	(0,41)	(0,37)	(0,47)	(0,18)	(0,16)	(5,03)			
Norway	1,42	0,93	-0,17	-0,41	-0,49	0,29	14,02	2,24	-85,22	0,39
	(0,42)	(0,39)	(0,55)	(0,86)	(0,14)	(0,18)	(5,01)			
Portugal	0,11	-0,12	0,54	-0,02	-0,51	0,33	10,93	2,61	-91,34	0,41
	(0,48)	(0,48)	(0,26)	(0,51)	(0,13)	(0,15)	(3,59)			
Spain	0,55	0,16	-0,04	-1,01	-0,79	-0,06	19,89	2,02	-80,99	0,49
	(0,37)	(0,51)	(0,26)	(0,38)	(0,26)	(0,18)	(8,15)			
Sweden	0,32	-0,29	-0,14	0,08	-0,71	0,34	14,81	1,28	-62,93	0,49
	(0,25)	(0,32)	(0,19)	(0,41)	(0,20)	(0,21)	(4,62)			
UK	0,68	0,12	0,21	-0,49	-0,85	0,01	14,42	0,92	-49,39	0,66
	(0,19)	(0,21)	(0,11)	(0,18)	(0,13)	(0,14)	(2,62)			
US	0,26	-0,01	0,57	-0,46	-0,64	0,02	8,53	0,92	-49,47	0,50
	(0,18)	(0,17)	(0,14)	(0,30)	(0,14)	(0,20)	(2,40)			

Standard errors in parentheses.

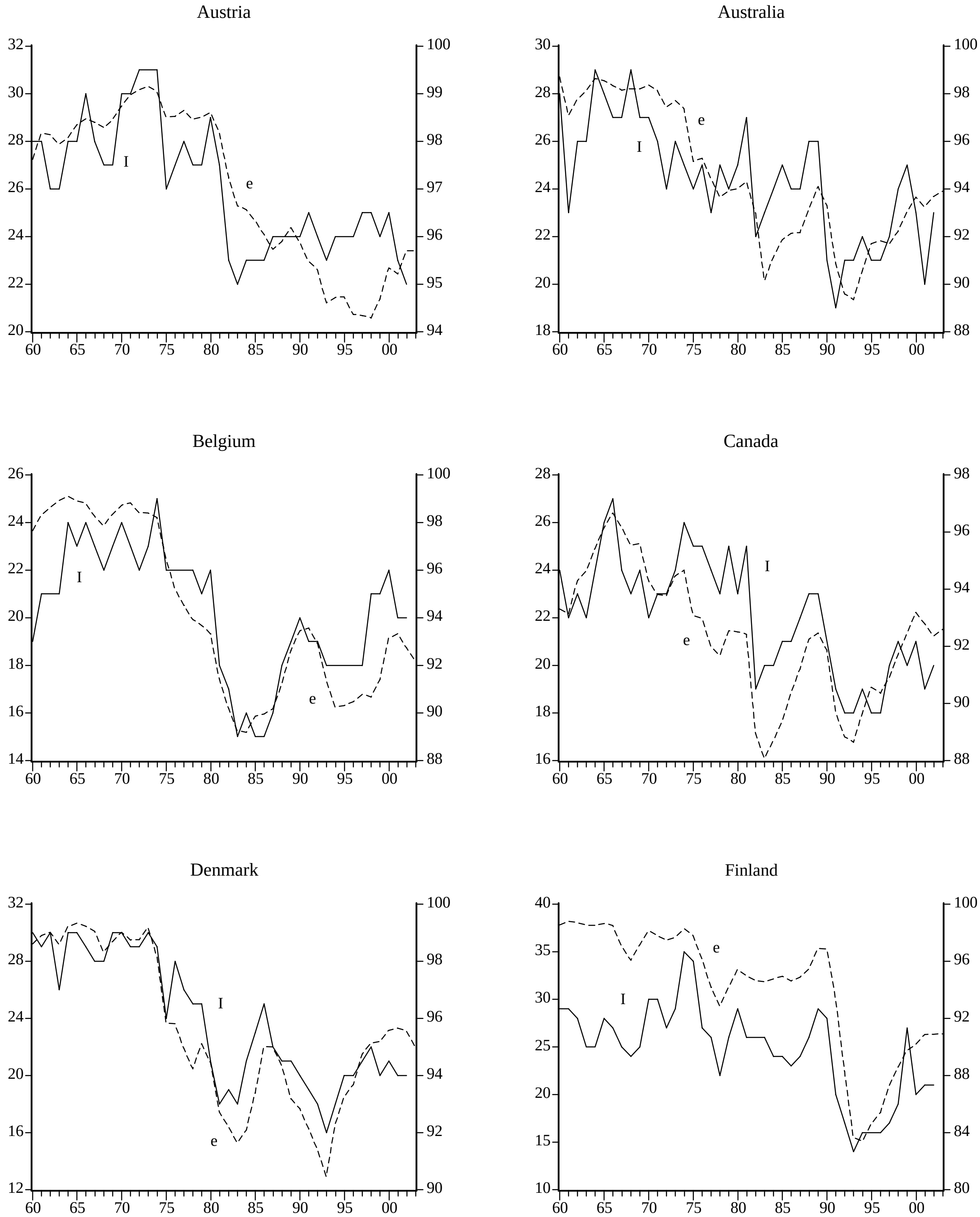
Appendix 2

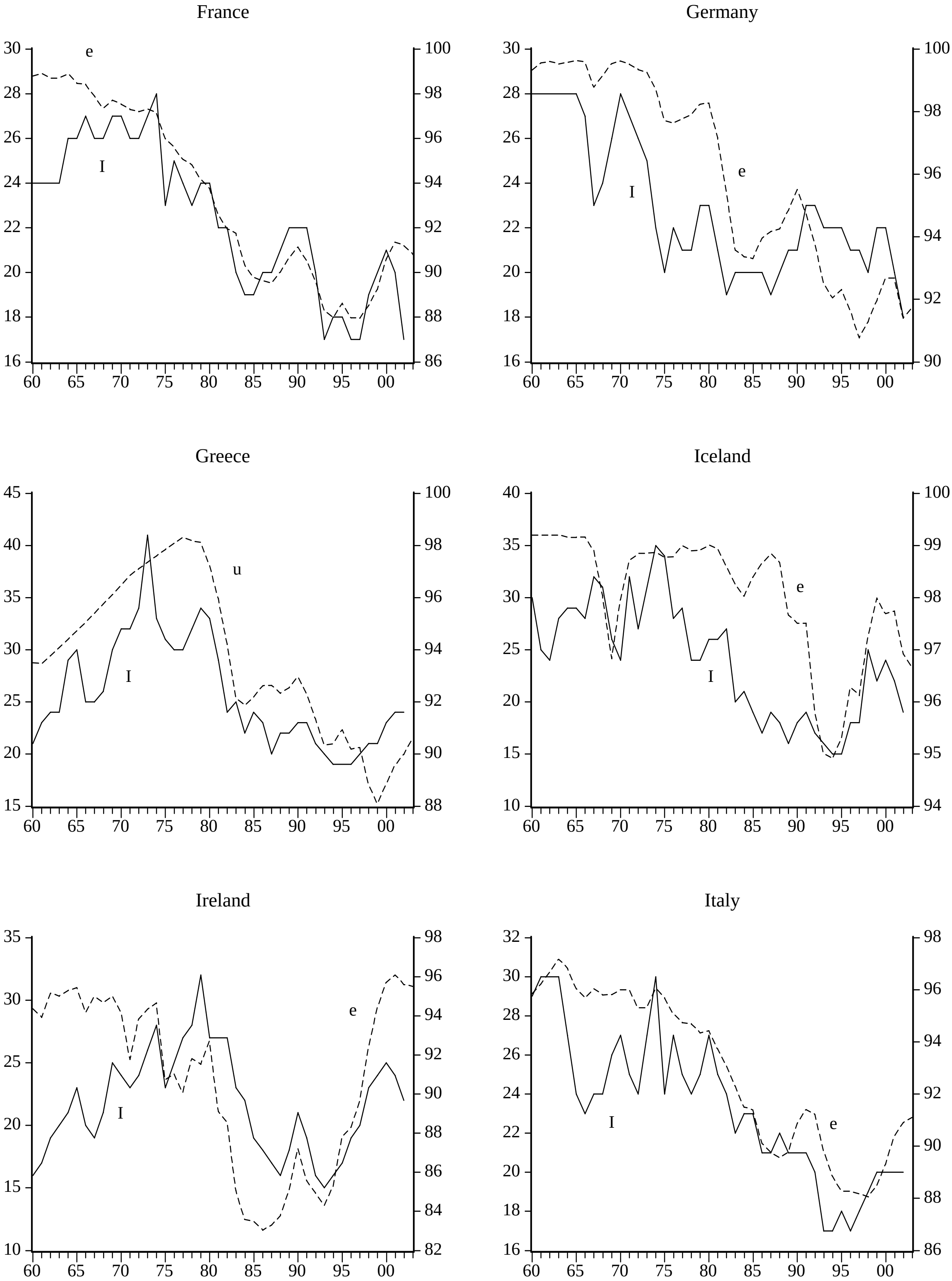
Eigenvectors for unemployment and investment

	First PC		*Second PC*		*Third PC*		*Fourth PC*	
	U	*G*	*U*	*G*	*U*	*G*	*U*	*G*
Australia	0.252	0.220	0.100	-0.035	0.040	0.196	-0.019	-0.044
Austria	0.235	0.253	-0.209	0.002	-0.019	-0.113	0.205	-0.208
Belgium	0.246	0.231	0.123	-0.074	-0.253	-0.384	-0.020	0.093
Canada	0.228	0.251	0.210	0.126	0.135	0.135	-0.002	0.144
Denmark	0.234	0.260	0.185	-0.169	0.133	0.089	-0.034	-0.028
Finland	0.219	0.228	-0.194	0.116	0.097	0.114	-0.425	0.177
France	0.258	0.276	-0.022	-0.016	-0.104	-0.101	0.026	-0.054
Germany	0.247	0.186	-0.130	-0.350	-0.183	-0.050	0.052	-0.411
Greece	0.193	0.221	-0.285	0.273	-0.103	-0.144	0.367	-0.138
Iceland	0.191	0.248	-0.231	0.072	0.382	-0.057	-0.342	0.130
Ireland	0.183	0.123	0.311	0.486	0.216	-0.239	0.220	-0.074
Italy	0.244	0.241	-0.130	-0.008	-0.153	0.125	0.122	-0.172
Japan	0.180	0.233	-0.226	-0.156	-0.482	-0.111	0.007	-0.233
Netherlands	0.211	0.231	0.295	-0.311	-0.047	-0.091	0.082	-0.123
New Zeal.	0.218	0.172	-0.1376	0.162	0.410	0.370	0.135	0.206
Norway	0.239	0.212	-0.0996	0.098	0.210	0.323	0.215	0.194
Portugal	0.154	0.010	0.2901	0.464	-0.345	-0.090	-0.474	-0.270
Spain	0.256	0.175	0.0256	-0.046	-0.107	-0.417	0.057	0.496
Sweden	0.199	0.257	-0.2545	-0.191	0.130	0.040	-0.400	0.113
UK	0.234	0.226	0.2212	0.035	-0.045	-0.013	0.026	0.255
US	0.085	0.166	0.4292	0.290	0.147	0.343	-0.003	-0.308

Appendix 3. The data

The employment rate (100-u(%)) and investment (share of GDP in %)

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e
I
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Germany
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I
60 65 70 75 80 85 90 95 00
Greece
45 40 35 30 25 20 15
100 98 96 94 92 90 88
u
I
60 65 70 75 80 85 90 95 00
Iceland
40 35 30 25 20 15 10
100 99 98 97 96 95 94
e
I
60 65 70 75 80 85 90 95 00
Ireland
35 30 25 20 15 10
98 96 94 92 90 88 86 84 82
e
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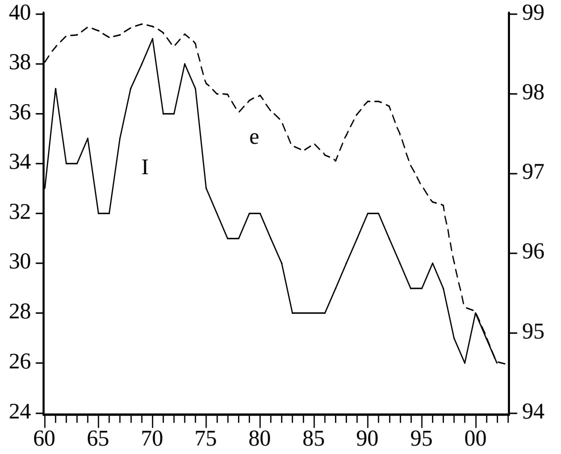
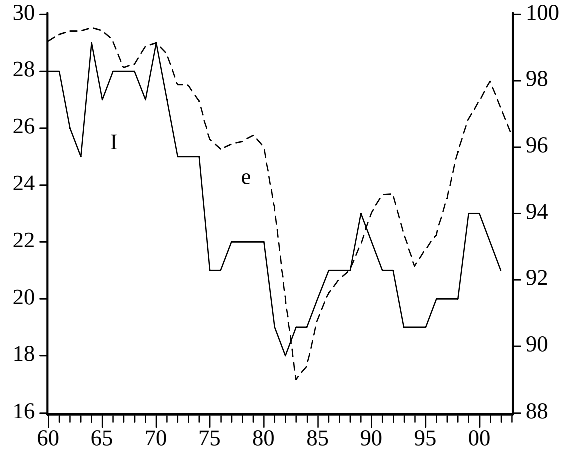
98 96 94 92 90 88 86
I
e
60 65 70 75 80 85 90 95 00

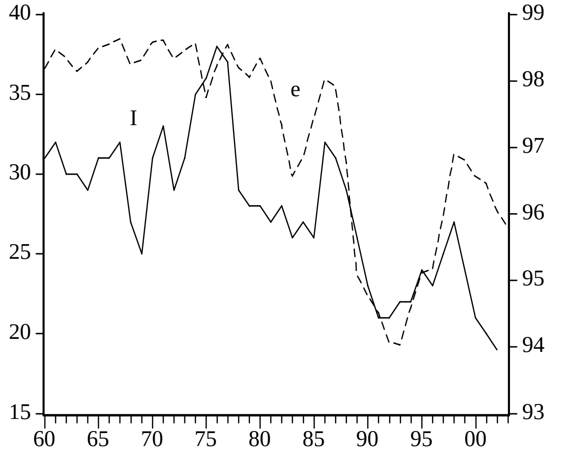
Japan



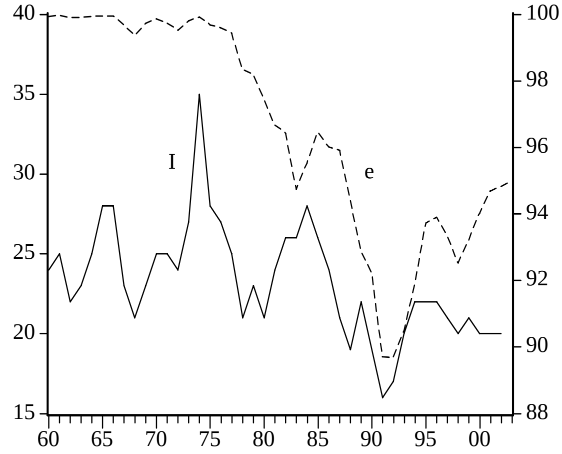
Netherlands



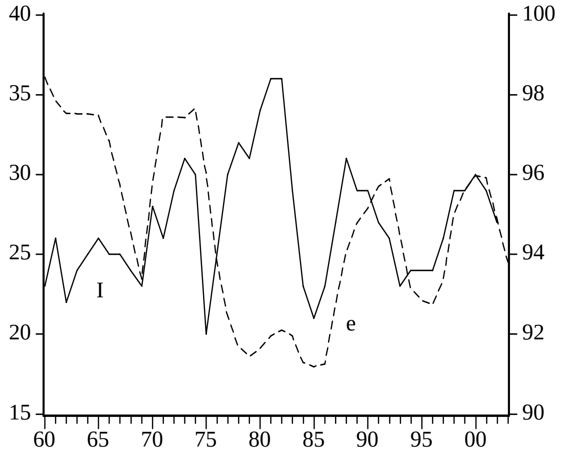
Norway



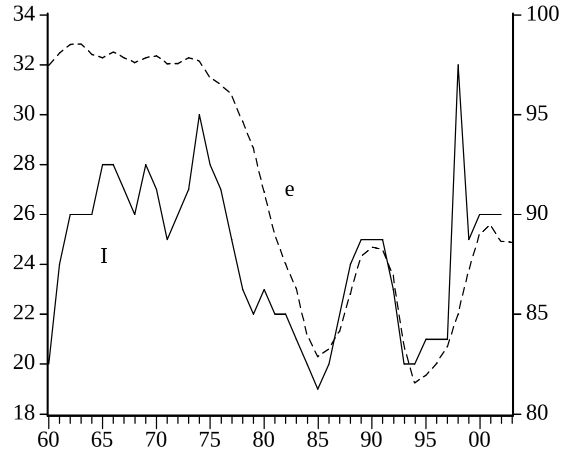
New Zealand



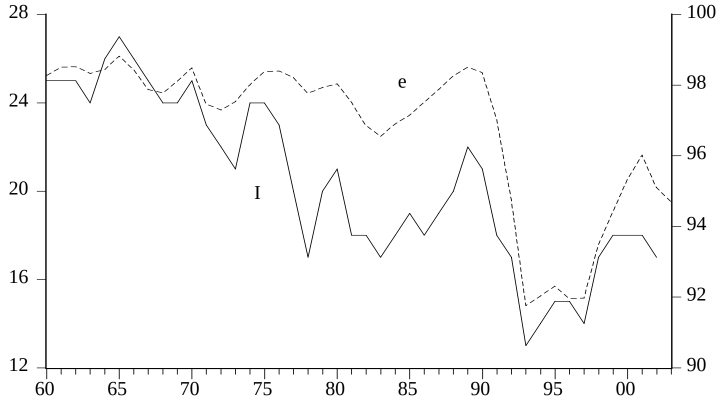
Portugal



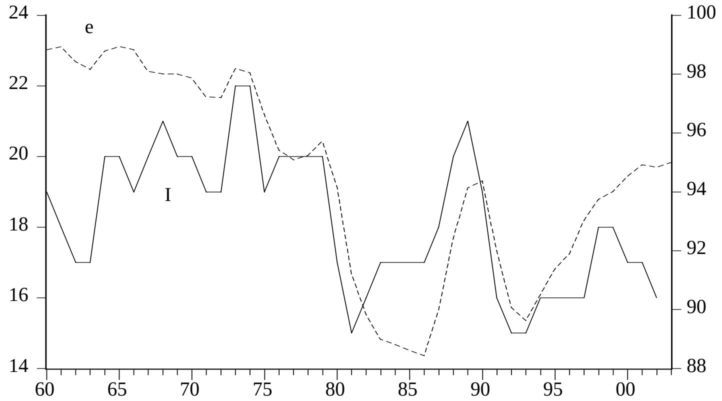
Spain



Sweden



United Kingdom



United States