International Diversi...cation and the Irish Economy

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Abstract

We take an initial step in investigating the international diversi...cation of Irish production risk. We ...nd evidence that Ireland displays some properties associated with international risk-sharing. These include: high gross stocks of foreign assets and liabilities; high international consumption correlations relative to output correlations; and procyclical behaviour of the rate of return on net external liabilities. Keywords: Ireland, risk-sharing capital ‡ows, balance of payments.

Acknowledgements

Section I: Introduction

Openness to international capital flows promises myriad benefits. For a country with strong growth potential, the ability to borrow overseas enables it to converge more rapidly to its steady state. In addition, international borrowing and lending can also help to stabilise an economy in the face of macroeconomic shocks. A third function is that international capital market activity allows a country to hedge local production risk.

In this paper, we focus on the risk diversification role played by international capital market integration. We do so in the context of the recent history of the Irish economy. The importance of foreign-owned firms in the Irish industrial sector; the rapidly increasing level of overseas investment by indigenous firms in recent years; the substantial external debt of the government; and the magnitudes of two way portfolio capital flows suggest a profile of an economy that is heavily integrated into international capital markets. Our focus here is on whether such integration has enabled Ireland to hedge its macroeconomic risk.

Risk diversification promises significant benefits. First, by stabilising consumption, the welfare of risk-averse agents is raised. Second, if firms face credit constraints, then smooth cash flow is also beneficial in the corporate sector. Third, diversification may persuade investors to undertake high-mean high-variance projects, raising the economy's long run growth rate (see Acemoglu and Zilibotti 1997, Devereux and Saito 1997 and Obstfeld 1994a).

Previewing our results, we find evidence consistent with significant international risk diversification. Indirect evidence is provided by

signi...cant international capital market activity; two way international investment income ‡ows; and high international consumption correlations relative to international output correlations. Direct evidence is provided by the ...nding that the rate of return on net foreign liabilities moves pro cyclically.

In previous work, O 'M alley and Scott (1987, 1994) related pro..t out‡ows to the sales or turnover of foreign-owned domestic subsidiaries.[1] Their focus was on forecasting and so they did not attempt to isolate the cyclical component of pro..t out‡ows. However, their ...nding of a signi...cant positive relationship between the level of activity (as proxied by sales or turnover) and the level of pro..ts is consistent with the evidence and arguments advanced here. An earlier literature (e.g., Prachowny 1963 and Bond 1977) also studied the behaviour of international investment income ‡ows. However, in those papers, the focus was on explaining the levels of the rates of returns on domestic and foreign investments rather than on their risk-diversi...cation properties.

The structure of the rest of the paper is as follows. In section 2, we review some basic facts about Irish international capital market activity. Section 3 investigates international consumption and output correlations. The cyclical behaviour of the rate of return on net foreign liabilities is examined in Section 4. Section 5 concludes.

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[1] In their 1994 paper, they also consider the exchange rate as an additional explanatory variable.

Section II: Basic Facts

In this section, we ...rst review the behaviour of various compo nents of the balance of payments (subsection 2.1) before turning to other measures of international capital market activity (subsection 2.2).

A : The Current Account and International Income Flows

Figures 1-7 and Table 1 detail the evolution of the current ac count, the stock of net foreign liabilities, international factor income ‡ows (all expressed as ratios to G D P) and the implied rate of return on net foreign liabilities stock over 1975-96 A s shown in Figure 1, the ratio of the current account to G D P (CA Y) severely deteriorated during 1976-81 but has been improving since 1982 and moved into sustained surplus in the early 1990s. Figure 2 shows the stock of net external liabilities as a ratio to G D P (EX T Y). W e calculate this stock as the cumulative current account de...cit (in constant prices) since 1963.[2] In line with the evolution of the current account, the stock of net external liabilities grew until 1986 and has since been steadily falling

International factor income out‡ows and in‡ows are graphed in Figures 3 and 4. T he ratio of factor income out‡ows to G D P (IN CM Y) has been increasing over time, rising from 4.7 percent in 1975 to 20.5 percent in 1996 T he ratio of factor income in‡ows to G D P (IN CP Y) ‡uctuated around a low level until 1987 but has signi...cantly grown during 1987-96, more than doubling from 3.5 percent in 1987 to 8.3 percent in 1996 T hese

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[2]W e would like to adjust this measure for revaluation e¤ects, such as capital gains and losses on asset holdings, but do not have the data to make this adjustment.

data indicate that Ireland continues to receive gross capital inflows but also has built up a significant stock of gross foreign assets in recent years, reflecting the overseas investment activities of domestic multinational corporations and the greater international diversification of domestic pension funds. Figure 5 plots the net factor income flow ($NFIY = INCPY - INCMY$) which became increasingly negative during 1975-85 but has since fluctuated with no clear trend.

We plot the implied rate of return on the stock of net foreign liabilities in Figure 6. We calculate the rate of return as

$$RoR_t = \frac{NFI_t}{EXT_{t-1}} \tag{1}$$

where net factor income and the stock of net external liabilities are measured in constant prices. We employ factor income flows as a proxy for investment income flows, since the OECD does not decompose factor income into payments to labour and capital. Ideally, we would like to measure rates of return separately for the stocks of gross foreign assets and gross foreign liabilities but the Irish data are inadequate for this task. A perfect measure would also include capital gains and losses on the stocks of foreign assets and liabilities but data limitations preclude this step.

We see from Figure 7 that the rate of return has been rising throughout the period but has sharply increased during the 1990s. On an accounting basis, this is explained by the fact that net factor income flows have not declined despite the contraction in the stock of net foreign liabilities, suggesting that foreign investments in Ireland are especially profitable.

B : Other Indicators of International Capital Market Integration

In Figure 7 and Table 2, we report some data on Irish partic-
ipation in international capital markets. Figure 7 plots the total debt
raised by Irish agents on international capital markets, as a ratio to GDP
(ICAPY). As is clear from Figure 7, this measure has sharply fluctuated
but has been on a generally rising path, from 5.2 percent in 1975 to 10.8
percent in 1996. Of course, this measure is incomplete since it ignores
equity transactions and does not include the acquisition of foreign assets
by domestic concerns.

Figure 8 shows the the total issue of bonds (BONDY), both euro
bonds and foreign bonds, and Figure 9 the amount of international bank
loans (LOANY) incurred by domestic agents, each expressed as a ratio
to GDP. It is clear that bond issues have grown both in absolute and
relative importance, indicating that Irish entities are increasingly able to
tap the international securities markets, reducing ...nancing costs relative
to dependence on bank loans.

A partial source of information on bilateral investment patterns
is provided by United States Bureau of Economic Analysis which publishes
data on the direct investment position of the US in other countries and the
direct investment position of the US in other countries. According to the
most recent estimates (Bargas 1997), the value of the US direct investment
position in Ireland was $8400 million in 1995 and $11749 million in 1996,
or 13.6 percent and 17.4 percent of Irish GDP respectively. However, the
value of the Irish direct investment position in the US was almost as large,
being $7418 million in 1995 and $9776 million in 1996, or 12.0 percent and

14.5 percent of GDP respectively.

Estimates of bilateral investment income flows between Ireland and the United Kingdom over 1988-96 are provided in Table 3. The data indicate that income inflows and outflows are in approximate balance. An implication, comparing these figures to the aggregates in Table 1, is that the United Kingdom is an important destination for Irish outward investment but that the United Kingdom plays a relatively smaller small as a source of inward investment flows into Ireland.

More comprehensive data are provided by the Bundesbank for recent

Section III: International Consumption and Output Correlations

Table 3 reports output and consumption per capita correlations between Ireland and various international groups of countries. We employ data from the Penn World Tables version 5.6 in order to ensure that consumption and output are measured in comparable terms across countries, at the price of being unable to extend the sample into the 1990s.

A basic prediction of international risk-sharing models is that consumption should be more highly correlated across countries than output: countries should share production risk in order to obtain a more stable path for consumption.[3] In row (1) of Table 3, for informational purposes, we report the domestic correlation of consumption and output. In rows (2) and (3), following Obstfeld (1995), we report the international

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[3]See Obstfeld (1989, 1995), Backus, Kehoe and Kydland (1995) and Hess and Shin (1997) for reviews of this literature.

output and consumption correlations between Ireland and a "rest of the world" comprising of all countries in the Penn World Tables with continuous data over 1950-90 that is of quality C- or better (in all cases, we exclude Ireland from the aggregate). In rows (4) and (5), we report correlations between Ireland and the EU15 comprising all current members of the European Union. In rows (6) and (7), we consider only the EU12 which are the set of EU member countries prior to 1996. In rows (8) and (9), the international group is the eleven countries which are likely, at the time of writing, to be in the ...rst wave of EMU members.[4] Last, the foreign country is the United Kingdom in rows (10) and (11).

With the exception of the EMU group, we see that the pattern over the full 1951-90 period is for the consumption correlation to exceed the output correlation. However, this hides a major change between 1951-72 and 1973-90. During the earlier period, the output correlation was in all cases above the consumption correlation whereas the opposite is true for the more recent period. This is especially striking since the output correlation in all cases has actually declined between 1951-72 and 1973-90.

Perhaps the most spectacular case is with respect to the EMU group. Although the output correlation fell from 0.39 to 0.316, the consumption correlation has sharply increased from 0.087 to 0.481. The correlation of Irish and UK output and consumption growth rates also shows a dramatic change. During the earlier period, the output correlation was

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[4]The EMU group is the EU15 group minus Denmark, Greece, Sweden and the United Kingdom.

higher than the consumption correlation (0.553 versus 0.286). In the more recent period, the output correlation was almost zero and the consumption correlation was significantly higher than the output correlation (0.255 versus 0.081).

This places Ireland amongst a rare set of countries for which the international consumption correlation is higher than the output correlation – the usual case is the so called "quantity anomaly" by which output is more highly correlated internationally than consumption (see Backus, Kehoe and Kydland 1995) – and suggests that Ireland has diversified consumption risk relatively more than many other industrial countries. Moreover, this diversification is a recent phenomenon, being evident only since the mid-1970s.

However, such correlation tests are only an indirect method of examining the extent of international risk-sharing since they do not reveal the mechanisms by which diversification actually occurs. For instance, agents can in principle share risk by writing cross-insurance contracts which specify payoffs contingent on GDP realisations, by building internationally diversified portfolios or via the overseas investment activities of multinational corporations. In the next section, we consider a more direct test of the role of one particular mechanism – a contingent rate of return on the stock of net external liabilities – in diversifying domestic production risk.

Section IV : Are International Income Flows Stabilising?

To investigate the cyclical behaviour of the rate of return on net foreign liabilities, we employ the specification

$$\phi RoR_t = \alpha + \beta\,\phi\log(Y_t) + \varepsilon_t \tag{2}$$

where ϕ denotes a filtered measure, RoR_t is the rate of return on net foreign liabilities in year t, Y_t is GDP in year t and ε_t is an error term.

For robustness, we consider three filters: (i) the first-difference filter; (ii) the Hodrick-Prescott (1997) HP filter; and (iii) the Baxter-King (1994) band-pass filter. The first-difference filter in essence assumes a constant long-run growth rate, whereas the HP filter allows the trend growth rate to be time varying. Baxter and King (1994) criticise the HP filter for placing an excessive weight on high-frequency fluctuations in calculating the filtered component and propose instead a band-pass filter that focuses on the frequencies that matter for business cycle analysis.[5]

Under risk-sharing, the rate of return on net foreign liabilities RoR_t should move procyclically. A procyclical rate of return means that, holding fixed the stock of net foreign liabilities, net payments to overseas investors rise during a boom and fall during a recession. In this way, domestic production risk is hedged: in exchange for sharing the fruits of an upturn by paying out a larger share to outside investors, domestic agents are cushioned against a downturn since the share of domestic output al-

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[5] In practice, as explained by Baxter (1995), the band-pass filter can be implemented by adjusting the smoothing parameter in the Hodrick-Prescott filter from $\lambda = 100$ to $\lambda = 10$ (for annual data). Although the Hodrick-Prescott filter has been in use since 1980, formal publication was only in 1997!

located to foreigners declines under those conditions. Similarly, investing in overseas assets that have a high payoff when the domestic economy is doing badly insulates domestic income from fluctuations in domestic output.

It should be recognised that a contingent rate of return on net foreign liabilities can be generated by equity-type investments (e.g., foreign direct investment or portfolio investment in stock markets) or via investments that promise a fixed income stream in a given currency. In the latter case, real exchange rate movements convert the fixed income stream in one currency into a time varying real return in another currency. (Unfortunately, the Irish data do not permit us to compare across different asset classes to explore whether there are systematic differences in their risk-diversification properties.)

In addition to equation [2], we also examine the specification

$$\Delta RoR_t = \alpha + \beta \Delta \log(Y_t) + \gamma \Delta \log(Y_t^{ROW}) + \varepsilon_t \tag{3}$$

where Y_t^{ROW} is a GDP measure for the "rest of the world," as proxied by a trade-weighted GDP average over Germany, the United Kingdom and the United States. We control for international fluctuations since risk diversification is only feasible if the domestic and international business cycles are imperfectly correlated.

As a precursor to the estimation, Figure 9 plots the rate of return and log(GDP), in first differences. The visual impression of a positive relationship is striking.

The econometric results are presented in Table 4. The first-

difference filter is employed in columns (1)-(2); the HP filter in columns (3)-(4); and the band-pass filter in columns (5)-(6). Regardless of the filter method and whether or not we control for Y_t^{ROW}, the robust finding across the specifications is that the rate of return on net foreign liabilities moves procyclically. The estimated effect is quantitatively large: taking the results in column (1) for illustrative purposes, a one standard deviation increase in the GDP growth rate increases the rate of return by 1.1 percentage points (the standard deviation of the first difference of the rate of return is 1.8 percentage points). The foreign growth rate Y_t^{ROW} is always insignificant. This makes sense due to the fact that Ireland is a net debtor—net income flows are dominated by income outflows, which are determined by domestic conditions, whereas income inflows, which are affected by international economic conditions, have been relatively small (although are rising rapidly towards the end of the sample).

As a robustness check, we recalculated the rate of return on the basis of the alternative estimates of the stock of external liabilities pro vided by Honohan and Kelly (1997) and obtained very similar regression results to those reported in Table 4.[6]

The evidence in Table 4 supports the notion that Irish produc-tion risk is at least partially diversified, since volatility in domestic GDP is hedged by offsetting movements in the rate of return paid on net ex-ternal liabilities. Moreover, this result is in line with the findings in Sec-

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[6] These results are available upon request from the author. Honohan and Kelly at-tempt to correct for capital gains and losses on holdings of net foreign liabilities by adjusting for the erosion of nominal values caused by domestic and foreign inflation. We thank Patrick Honohan for generously providing these data.

tions 2 and 3 that Ireland has extensive gross international assets and liabilities and that the international consumption correlation exceeds the international output correlation. It would be desirable to study more disaggregated data (e.g., gross stocks) but con...dentiality issues prevent the Central Statistical O¢ce from publishing a detailed breakdown of the international investment position. It is to be hoped that the end-1997 survey of credit institutions and ...nancial services companies, which is part of a global IMF eªort to improve data on international investment ‡ows, will provide some extra insights into risk diversi...cation patterns.

Section V : Conclusions

In this paper, we have taken an initial step in examining international risk diversi...cation in the context of the Irish economy and found some evidence in support of partial risk sharing. Our focus has been on the positive dimension of this question (is there diversi...cation?) but future research should also address the normative issues involved. For instance, it may be useful to address how the advent of EMU alters the optimal pattern of international diversi...cation – in the absence of the devaluation option, alternative hedging mechanisms may become yet more important, especially within the prospective euro area.

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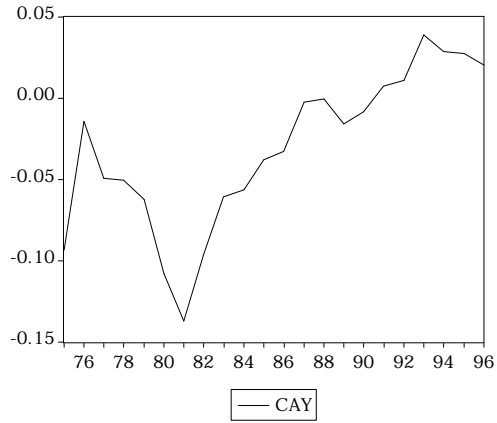[22] Prachowny, M. (1969), A Structural Model of the US Balance of Payments, Amsterdam: North-Holland.

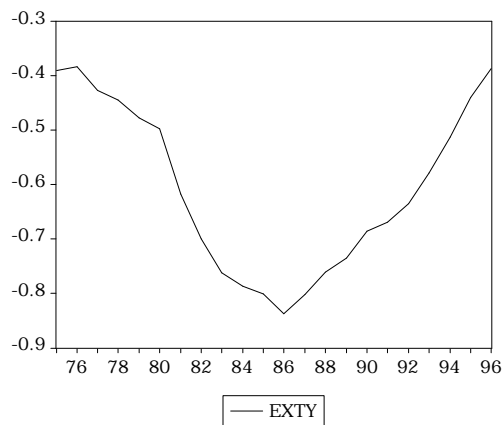Fig. 1: Current Account de..cit as a ratio to G.D.P. Source: O.E.C.D. Economic Outlook.

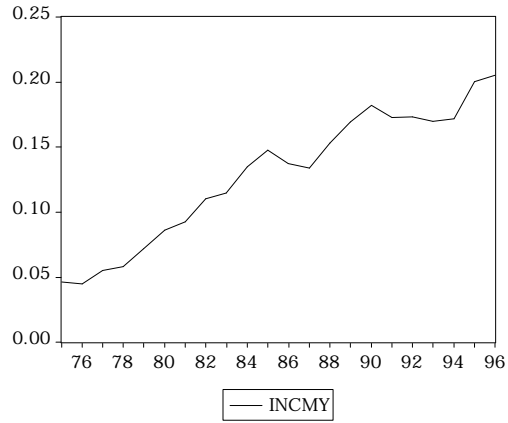Fig. 2: Cumulative current account de..cit as a ratio to G.D.P. Source: O.E.C.D. Economic Outlook.

Fig. 3: International Income Outflow as a ratio to G.D.P. Source: OECD Economic Outlook.
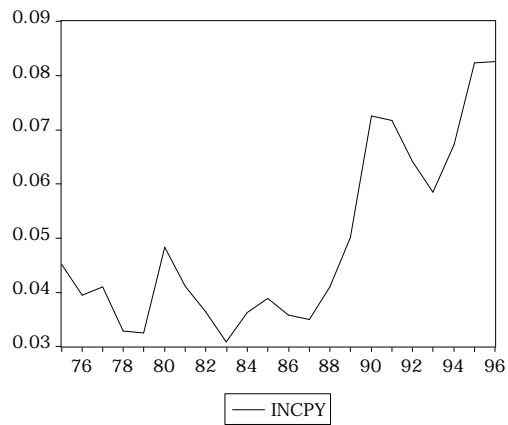

Fig. 4: International Investment Income Inflow as a ratio to G.D.P. Source: OECD Economic Outlook.

Fig 5: Net Factor Income Flow as a ratio to G.D.P. Source: OECD Economic Outlook.

Fig 6 Plot of G.N.P./G.D.P. Source: OECD Economic Outlook.

Fig. 7: Rate of Return on Net Foreign Liabilities. Source:
OECD Economic Outlook.

Fig. 8: Plot of international bond issues and bank loans of
domestic borrowers as a ratio to GDP. Source: OECD Interna-
tional Capital Markets Statistics, 1950-95.

Fig. 9: Plots of Rate of Return and GDP growth rate. Source: OECD Economic Outlook.

Table 1: International Investment Positions
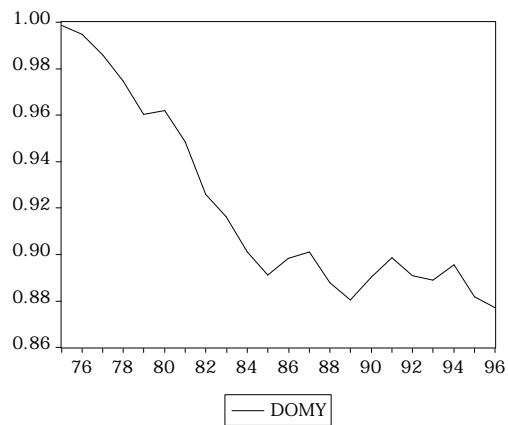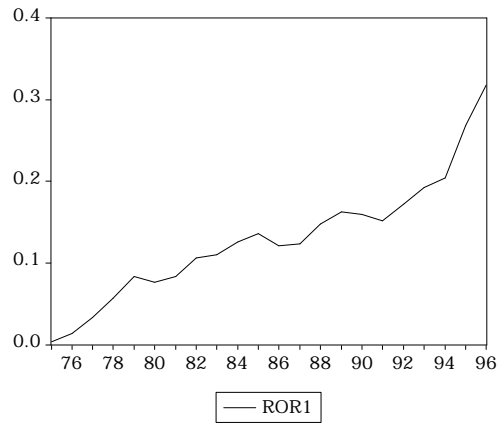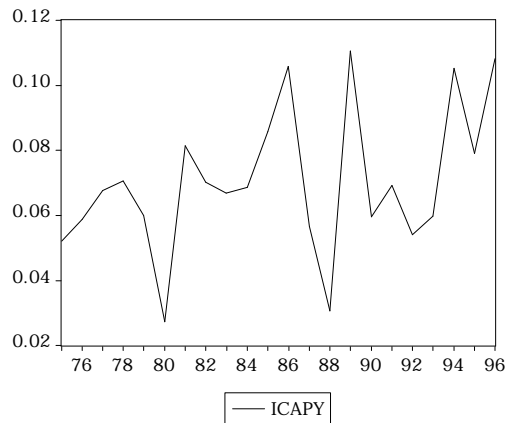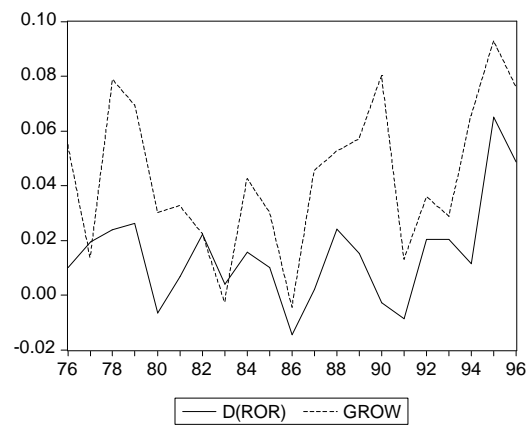
	CAY	EXTY	INCMY	INCPY	NFIY	ROR1
1975	-0.093	-0.390	0.047	0.045	-0.001	0.003
1976	-0.014	-0.383	0.045	0.039	-0.005	0.014
1977	-0.049	-0.427	0.055	0.041	-0.014	0.033
1978	-0.050	-0.445	0.058	0.033	-0.025	0.057
1979	-0.062	-0.477	0.072	0.032	-0.040	0.083
1980	-0.108	-0.497	0.086	0.048	-0.038	0.077
1981	-0.137	-0.618	0.093	0.041	-0.052	0.083
1982	-0.096	-0.700	0.110	0.036	-0.074	0.106
1983	-0.061	-0.762	0.115	0.031	-0.084	0.110
1984	-0.056	-0.787	0.135	0.036	-0.099	0.126
1985	-0.038	-0.801	0.148	0.039	-0.109	0.136
1986	-0.032	-0.837	0.137	0.036	-0.102	0.121
1987	-0.002	-0.802	0.134	0.035	-0.099	0.123
1988	0.000	-0.761	0.153	0.041	-0.112	0.148
1989	-0.016	-0.734	0.170	0.050	-0.119	0.163
1990	-0.008	-0.686	0.182	0.073	-0.110	0.160
1991	0.007	-0.668	0.173	0.072	-0.101	0.151
1992	0.011	-0.635	0.173	0.064	-0.109	0.172
1993	0.039	-0.578	0.170	0.059	-0.111	0.192
1994	0.029	-0.512	0.172	0.067	-0.104	0.204
1995	0.028	-0.439	0.201	0.082	-0.118	0.268
1996	0.020	-0.387	0.205	0.083	-0.123	0.318

NFIY is ratio of net factor income to GDP. INCMY is ratio of international factor income outflows to GDP. INCPY is ratio of international factor income inflows to GDP. EXTY is ratio of the cumulative current account deficit to GDP. ROR = NFIY/EXTY(-1). Data Source: OECD Economic Outlook.

Table 2: Bilateral Investment Income Flows: Ireland and the UK

	INCPY	INCMY
1988	3.3	3.4
1989	3.4	3.3
1990	3.1	4.7
1991	3.2	5.6
1992	2.5	4.1
1993	3.2	4.8
1994	3.0	3.9
1995	3.3	3.5
1996	4.0	4.2

INCPY is ratio of investment income inflows from UK to GDP. INCMY is ratio of investment income outflows to UK to GDP. Data Source: United Kingdom Balance of Payments "Pink Book", 1997 edition, Office of National Statistics.

Table 3: Bilateral Investment Income Flows: Ireland and Germany

	INCPY	INCMY	DIRPY	DIRMY	PORTPY
1993	0.87	2.34	0.06	0.85	0.25
1994	1.11	2.56	0.15	1.06	0.52
1995	1.06	2.25	0.09	0.63	0.47
1996	1.11	1.53	0.06	0.50	0.45

	PORTMY	BONDPY	BONDMY	LOANPY	LOANMY
1993	0.75	0.24	0.66	0.55	0.73
1994	0.79	0.49	0.63	0.44	0.71
1995	0.72	0.45	0.65	0.50	0.85
1996	0.42	0.44	0.36	0.59	0.61

INCPY are investment income inflows from Germany. INCMY are investment income outflows to Germany to GDP. DIRPY are investment income inflows on Irish direct foreign investment in Germany. DIRMY are investment income outflows from German direct foreign investment in Ireland. PORTPY are investment income inflows on Irish portfolio investment in Germany. PORTMY are investment income outflows on German portfolio investment in Ireland. BONDPY are investment income inflows on Irish holdings of German bonds. BONDMY are investment income outflows on German holdings on Irish bonds. LOANPY are investment income inflows on Irish loans to Germany. LOANMY are investment income outflows on German loans to Ireland. All variables are expressed as a ratio to GDP. Data Source: Bundesbank Balance of Payments by Region, Special Statistical Publication 11, September 1997.

Table 4: International Capital Market Activity

	ICAPY	BONDY	LOANY
1975	0.052	0.005	0.048
1976	0.059	0.007	0.052
1977	0.068	0.010	0.058
1978	0.071	0.008	0.063
1979	0.060	0.013	0.047
1980	0.027	0.013	0.014
1981	0.081	0.027	0.054
1982	0.070	0.031	0.039
1983	0.067	0.054	0.013
1984	0.068	0.048	0.021
1985	0.086	0.076	0.009
1986	0.106	0.085	0.021
1987	0.057	0.031	0.026
1988	0.031	0.017	0.014
1989	0.111	0.045	0.066
1990	0.060	0.022	0.038
1991	0.068	0.035	0.035
1992	0.054	0.043	0.011
1993	0.060	0.056	0.004
1994	0.105	0.040	0.065
1995	0.079	0.038	0.041
1996	0.108	0.091	0.017

TOTAL is the sum of bond issues and bank loans by domestic borrowers. BONDY is total international bond issues. LOANY is total bank loans incurred by domestic borrowers. All variables are expressed as ratios to GDP. Source: OECD International Capital Markets Statistics, 1950-95 and OECD Financial Statistics Monthly (October 1997).

Table 5: International Consumption and Output Correlations

		1951-90	1951-72	1973-90
(1)	$\rho(C;Y)$	0.717	0.758	0.678
(2)	$\rho(Y;Y_{ROW})$	0.476	0.645	0.363
(3)	$\rho(C;C_{ROW})$	0.532	0.63	0.608
(4)	$\rho(Y;Y_{EU15})$	0.346	0.563	0.27
(5)	$\rho(C;C_{EU15})$	0.408	0.439	0.511
(6)	$\rho(Y;Y_{EU12})$	0.35	0.571	0.281
(7)	$\rho(C;C_{EU12})$	0.419	0.434	0.537
(8)	$\rho(Y;Y_{EMU})$	0.294	0.39	0.316
(9)	$\rho(C;C_{EMU})$	0.237	0.087	0.481
(10)	$\rho(Y;Y_{UK})$	0.263	0.553	0.081
(11)	$\rho(C;C_{UK})$	0.264	0.286	0.255

Correlations of per capita consumption and output. ROW is a 40 country aggregate, consisting of all countries in Penn World Tables with continuous data over 1950-90 of quality grade C- or higher. EU15 is the aggregate of the ...fteen current EU members. EU12 is the aggregate of the 12 EU members before 1996 EMU is the aggregate of the eleven likely founding members of EMU. In each case, Ireland is excluded from the aggregate. Data source: Penn World Tables version 5.6

Table 6 International Investment Positions

	(1)	(2)	(3)	(4)	(5)	(6)
C	-0.003	-0.001	0.002	0.002	0.001	0.001
	(.006)	(.008)	(.007)	(.007)	(.002)	(.002)
$\Delta \text{Log}(Y)$	0.406	0.42	0.404	0.434	0.341	0.3
	(.118)	(.126)	(.127)	(.143)	(.113)	-0.13
$\Delta \text{Log}(Y^{ROW})$		-0.101		-0.165		0.176
		(.245)		(.344)		(.243)
DW	1.62	1.61	1.49	1.45	1.54	1.58
adj.R^2	0.34	0.311	0.481	0.45	0.277	0.26
Period	1975-96	1975-96	1976-96	1976-96	1975-96	1975-96

Dependent variable is the rate of return on net foreign assets. In columns
(1)-(2), it is in ...rst di¤erences; in columns (3)-(4), it is HP (100) ...ltered; in
columns (5)-(6), it is HP (10) ...ltered. Y is domestic GDP growth rate in
columns (1)-(2); it is the HP (100) ...ltered log of GDP in columns (3)-(4);
and the HP (10) ...ltered log of GDP in columns (5)-(6). Y^{ROW} is similarly
de...ned growth rate for the rest of the OECD. In columns (3)-(4), the
regression includes an AR (1) correction term.