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Centre for Economic Policy Research

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Centre for Economic Policy Research
90–98 Goswell Rd
London EC1V 7RR
Tel: (44 171) 878 2900
Fax: (44 171) 878 2999
Email: cepr@cepr.org

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ABSTRACT

Do International Investment Income Flows Smooth Income?*

We explore some empirical properties of gross international investment positions. In order to provide income-smoothing, net investment income should negatively co-vary with GDP. Moreover, to maximize stabilization of GNP in the face of GDP fluctuations, the yield on foreign assets should move counter-cyclically and the yield on foreign liabilities pro-cyclically. In both time-series and panel settings, we reject these hypotheses, suggesting that positive gross international investment positions are not associated with income smoothing at business-cycle frequencies.

JEL Classification: F02, F21, F42, G15

Keywords: international investment positions, international investment income flows, asset trade, income-smoothing

Philip R Lane
Economics Department
Trinity College Dublin
Dublin 2
IRELAND
Tel: (353 1) 605 2259
Fax: (353 1) 677 2503
Email: plane@tcd.ie

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NON-TECHNICAL SUMMARY

International financial integration has received much research attention in recent years. At a theoretical level, the literature has identified significant benefits offered by the internationalization of capital markets. In this paper, we focus on one of these potential gains, namely the smoothing of income that may be provided by cross-ownership of foreign assets and liabilities. Holding foreign assets and liabilities potentially insulates domestic income from domestic output fluctuations by generating income streams that offset shocks to domestic production. In turn, a smooth income stream is helpful in stabilizing consumption and facilitating desired investment plans.

Our goal in this paper is to investigate whether international investment income flows actually smooth income in practice. As a first step, we compare the relative volatilities of national income (GNP) and national output (GDP) for a set of OECD countries. If net international investment income flows is unconditionally stabilizing, GNP will be less volatile than GDP. GNP may be more volatile than GDP, however, yet net international investment income still acts as a stabilizing force if it negatively co-varies with GDP, such that GNP responds less than one-for-one to GDP fluctuations.

Next, we directly inspect the income yields on foreign assets and foreign liabilities. To maximize conditional income stabilization at a cyclical frequency, it is desirable that foreign assets offer yields that negatively co-vary with the domestic business cycle and foreign liabilities pro-cyclical yields. We consider not only the yields on aggregate investment positions but also various subcomponents (debt, FDI, and so on) in order to discover whether various investment categories perform differently in providing income smoothing.

In fact, we find very little evidence in favour of smoothing at a cyclical frequency. For most countries, GNP is more volatile than GDP. Moreover, net factor income does not negatively co-vary with GDP. This result is reinforced by the fact that the yields on foreign assets and liabilities are typically acyclical, although there is some evidence that FDI liabilities offer pro-cyclical returns.

There are several possible interpretations of these results. An absence of cyclical smoothing is not inconsistent with a role for foreign assets and liabilities in stabilizing wealth, dampening longer-term output volatility or smoothing some subcomponents of GDP (e.g. capital income). It may also be the case that capital gains and losses provide a buffer, even if investment income flows do not. An alternative view is that other factors may be more important than the smoothing motive in determining the pattern of foreign assets and liabilities, however. For instance, geographical proximity and

common cultural ties appear to heavily influence the destination of international investments. Moreover, avoidance of domestic tax obligations provides an additional motive to hold foreign assets, independently of any smoothing motive. Finally, it will be important to update the empirical work as time progresses: if current capital flows are more strongly directed at accumulating assets and liabilities that provide smoothing than in the past, the cyclical properties of the yields on gross international investment positions may very well improve in the future.

1 Introduction

International financial integration has received much research attention in recent years. At a theoretical level, the literature has identified significant benefits offered by the internationalization of capital markets.¹ In this paper, we focus on one of these potential gains, namely the smoothing of income that may be provided by cross-ownership of foreign assets and liabilities.

Holding foreign assets and liabilities potentially insulates domestic income from domestic output fluctuations by generating income streams that may offset shocks to domestic production. Our goal in this paper is to investigate whether international investment income flows actually smooth income in practice. A positive answer to this question would suggest that continued international financial integration can further improve income stabilization. In contrast, a negative answer may indicate that the motivation to hold positive gross international investment positions perhaps lies elsewhere.

In addressing international financial integration at an empirical level, researchers have pursued several strands. Following Feldstein and Horioka (1980), many authors have studied net capital flows but there is a consensus that net flows are far smaller than gross capital flows. In studying the gross data, one approach has been to study the composition of financial portfolios, in order to measure the extent and composition of international diversification. The standard finding is that portfolios are excessively biased towards domestic assets, in view of the diversification opportunities provided by the imperfect correlation between the returns on domestic and foreign asset markets.² However financial portfolios composed of publicly-traded assets represent only a fraction of the international investments that take place, excluding the trade undertaken by private corporations, multinationals and governments, and as such this approach is incomplete at best. Also the focus in these studies is on wealth stabilization and thereby on the correlation between the return on foreign assets

¹ See Svensson (1988), Lewis (1995) and Obstfeld and Rogoff (1996).

² See French and Poterba (1991), Tesar and Werner (1995), Rowland and Tesar (1997) and Lewis (1998) on home bias.

and the return on domestic assets, rather than the role of the income yields on foreign assets and liabilities in smoothing GNP relative to GDP.

Another approach is to examine international consumption correlations. Under certain conditions, international financial integration implies that consumption growth should be perfectly correlated across countries. Again, this prediction is not borne out in the data.³ However, it is difficult to pinpoint the source of this empirical failure since many auxiliary assumptions underly the prediction and theory is not specific on the mechanism by which international risk-sharing should take place, whether via explicit contingent claims contracts, transfer mechanisms or insurance arrangements. As such, it is of interest to know whether cross-ownership of foreign assets and liabilities is a mechanism that actually works, in the sense of contributing to the delinking of domestic income and production.

Our approach in this paper is more narrow and more direct in that we empirically examine the properties of the income flows associated with outstanding gross international investment positions. Ownership of foreign assets and liabilities can smooth income if net international investment income offsets volatility in GDP. Moreover, GNP responds less than one-for-one to GDP fluctuations if the yields on foreign assets and foreign liabilities have the appropriate cyclical characteristics. Accordingly, a key empirical goal is to investigate whether the yields on foreign assets and liabilities display the requisite cyclical properties to provide income smoothing. As such, the strategy is a positive one and we do not attempt to test any normative theory of international investment decisions. We consider not only aggregate investment positions but also various subcomponents (debt, FDI, and so on) in order to discover whether various asset categories perform differently in providing income smoothing.

This paper is most closely related to the contributions of Golub (1990) and Sorensen and Yosha (1998). Golub (1990) documents the extent of gross capital flows between industrial countries. However, his interest in the data on gross flows was in testing the extent of capital mobility and, as such, he did not inspect the properties of the associated investment income

³See Obstfeld (1994) and Lewis (1996).

flows. Sorensen and Yosha (1998) study the cyclical behavior of net factor income flows for a panel of OECD countries over 1960-95 and find that net factor income flows on average do not appear to provide any smoothing. However, in the absence of information on gross international investment positions, it is hard to interpret the mechanics underlying their results since the stream of net factor income payments necessarily varies over time and across countries in line with differences in holdings of foreign assets and liabilities. For instance, their finding that net factor income flows are acyclical may be because countries hold inadequate amounts, or an improper composition, of foreign assets and liabilities or, alternatively, because the yields on these assets and liabilities do not have the appropriate cyclical properties.

By focusing on one particular international smoothing mechanism, our approach can be viewed as complementary to the accounting exercises of Asdrubali (1997) and Sorensen and Yosha (1998) that attempt to decompose overall consumption smoothing into the various subchannels (private capital markets, government budgets, transfers, savings and investment rates) by which fluctuations can be dampened. Finally, there exists an earlier literature on modelling international investment income flows (see, for instance, Prachowny 1969 and Bond 1977). However that literature did not address the potential income-smoothing role of cross-holdings of foreign assets and liabilities.

The rest of the paper is organized as follows. Section 2 lays out the theoretical framework and section 3 the empirical strategy. The actual empirical analysis begins in section 4 which analyzes the relationships among GDP, GNP and net investment income. In section 5, we examine the time series evidence on the cyclical behavior of the income flows and yields associated with international investment positions for two countries — the United Kingdom and Canada — for which there exist comprehensive data on international investment positions. Some panel evidence is also presented in this section. Section 6 discusses the empirical findings and offers some conclusions.

2 Income Smoothing

Income smoothing is just one mechanism by which fluctuations in consumption can be minimized. Alternative channels include international transfer schemes, international borrowing/lending and adjusting the domestic savings rate. Transfer schemes operate to some degree across regions within federal states but not even the European Union has as yet developed a significant scheme that operates across nations. The role of borrowing is also limited, by virtue of repudiation risk and moral hazard problems. Limited power to enforce repayment, especially on international debt contracts, implies that lenders will impose a debt ceiling on any borrower.⁴ Similarly, creditors also recognize that an excessive debt burden adversely alters a borrower's behaviour and limit lending accordingly. For instance, a debt overhang means that a high fraction of any increment in production will go to creditors, reducing the borrower's incentives to generate output growth.⁵

An alternative strategy for long-horizon agents would be to accumulate a buffer stock of net foreign assets which can be drawn upon in bad times. However, this option is costly since it requires a protracted period of deferred spending in order to accumulate the net foreign assets necessary for this strategy to operate. Finally, consumption can be smoothed by redirecting domestic spending from investment projects to consumption. Again, this is a costly strategy since capital accumulation plans must be interrupted.

Aside from its role in contributing to smoothing consumption, a stable income stream is also important for investment, if firms face financing constraints. The literature on international smoothing typically assumes that GDP is a stochastic endowment or that Fisherian separation applies to consumption and investment decisions. If, rather, firms are constrained by cash flow or net worth considerations, as is indicated by the firm-level microeconomic evidence, a smooth income flow is additionally helpful in relaxing constraints on investment decisions.⁶

⁴See Eaton and Gersowitz (1981) and Marcet and Marimon (1992). Kehoe and Perri (1997) argue such borrowing constraints are relevant in explaining international business cycles in the OECD.

⁵See Krugman (1988) and Lamont (1995) for applications to countries and individual firms respectively.

⁶See Bernanke, Gertler and Gilchrist (1998) and Gilchrist and Himmelberg (1998) for recent work on

As such, liquidity constraints make current income an important determinant of current spending plans. For households, consumption can be smoothed relative to income only if agents can freely borrow and lend. Similarly, firms are restricted in their investment decisions if current cash flows are insufficiently healthy. Finally, governments may also have to modify their spending plans or alter tax rates over the economic cycle if interest rate premia make even temporary debt-financing excessively expensive. These costs can be minimized by taking steps to smooth out fluctuations in income.

It is also worth noting that holding positive amounts of foreign assets and liabilities has the attractive feature that, unlike a borrowing/lending strategy, an increase in net external liabilities is not required in order to receive a positive income inflow. Rather, inflows derive from outstanding ownership of foreign assets and liabilities that generate regular income streams. Finally, holding fixed investment income flows, a portfolio of foreign assets can also smooth consumption if the pattern of capital gains and losses boosts net worth in states in which the marginal utility of consumption is high. As is discussed further below, due to data limitations, we do not examine this channel in this paper.

3 Empirical Strategy

In order to examine the role of gross international asset and liability positions in smoothing income, we develop our empirical strategy as follows. Write GNP as

$$y_t = q_t + nfi_t \quad (1)$$

where y_t denotes GNP, q_t GDP and nfi_t net factor (investment) income.⁷ In turn, the variance of GNP is given by

$$\text{Var}(y_t) = \text{Var}(q_t) + \text{Var}(nfi_t) + 2\text{Cov}(q_t; nfi_t) \quad (2)$$

the role of financial frictions in determining investment behaviour.

⁷We use net factor income and net investment income interchangeably. Overseas labour earnings are relatively unimportant for OECD economies. In the analysis in section 5, we directly measure net investment income.

or

$$\frac{\text{Var}(y_t)}{\text{Var}(q_t)} = 1 + \frac{\text{Var}(nfi_t)}{\text{Var}(q_t)} + 2 \frac{\text{Cov}(q_t; nfi_t)}{\text{Var}(q_t)} \quad (3)$$

It follows that a necessary condition for GNP to be more stable than GDP is $\text{Cov}(q_t; nfi_t) = \text{Var}(q_t) < 0$. However, even if net factor income negatively covaries with GDP, GNP will still be more volatile than GDP if the orthogonal component of net factor income is sufficiently volatile. In section 4, we compare the unconditional variances of GNP and GDP for a large range of OECD countries — if net factor income has indeed played a stabilizing role, we expect that the unconditional variance of GNP should be smaller.

We are also interested in the conditional response of GNP to GDP fluctuations. Our working assumption is that GDP is an exogenous random variable that is subject to cyclical disturbances. As such, we do not study trend-shocks nor distinguish between different sources of GDP shocks — be they demand shocks, factor-neutral technology shocks or factor-biased technology shocks. By cross-holding foreign assets and liabilities, GNP can be partially insulated from a GDP disturbance if yields on outstanding gross international investment positions respond in a stabilizing fashion. To see this, we can calculate the impact of a change in GDP on GNP by

$$\frac{\partial y_t}{\partial q_t} = 1 + \frac{\partial nfi_t}{\partial q_t} \quad (4)$$

It follows that income is less sensitive to output fluctuations if $\partial nfi_t / \partial q_t < 0$.

We can make further progress by decomposing net investment income into its constituent parts

$$nfi_t = inc_{pt} - inc_{mt} \quad (5)$$

where inc_{pt} and inc_{mt} denote investment income payments on foreign assets and foreign liabilities respectively. These investment income flows equal the yields earned on foreign assets and liabilities times the outstanding stocks, so we can rewrite the preceding equation as

$$nfi_t = R_{At} F_{At, t-1} - R_{Lt} F_{Lt, t-1} \quad (6)$$

where R_{At} and R_{Lt} denotes the yields and $F_{At, t-1}$ and $F_{Lt, t-1}$ the stocks of foreign assets and

liabilities at the beginning of period t .⁸ We can thereby calculate the impact of a change in GDP on GNP by

$$\frac{\partial nfi_t}{\partial q_t} = \frac{\partial R_{At}}{\partial q_t} F_{At_{i-1}} - \frac{\partial R_{Lt}}{\partial q_t} F_{Lt_{i-1}} \quad (7)$$

since $F_{At_{i-1}}$ and $F_{Lt_{i-1}}$ are predetermined. It follows that net factor income responds negatively to output fluctuations, the more countercyclical is the yield on foreign assets ($\partial R_{At} = \partial q_t < 0$) and the more procyclical is the yield on foreign liabilities ($\partial R_{Lt} = \partial q_t > 0$).⁹

In terms of the data, we measure the yield from an asset i in period t as

$$R_{it} = \frac{INC_{it}}{B_{it_{i-1}}} - INF_{Lt} \quad (8)$$

where INC_{it} is the income earned on the holdings of asset i in period t , $B_{it_{i-1}}$ is the outstanding stock of asset i at the end of period t_{i-1} and INF_{Lt} is the inflation rate in period t . In terms of the data, INC_{it} is taken from the factor income payments component of the current account and B_{it} from estimates of gross international investment positions.

Clearly, the yield is an incomplete measure of the overall rate of return since capital gains/losses on the holdings of asset i are excluded. However, our interest here is in passive income-smoothing, for which the yield is the relevant concept, rather than in wealth. Moreover, the realization of capital gains/losses involves liquidation costs, which may be substantial in the case of some illiquid investment categories, such as FDI. That said, revaluation effects are potentially important in lending models that emphasize collateral or net worth as determinants of access to credit (Kiyotaki and Moore 1997, Bernanke et al 1998). For this reason, it would be desirable to further investigate this component of

⁸Of course, the yields R_{At} and R_{Lt} are only one component of the overall rates of return on assets and liabilities, since capital gains/losses ideally should also be incorporated. We discuss this point further below.

⁹Here we separately consider foreign assets and liabilities. This is appropriate if asset and liability accumulation decisions are not taken jointly (as in a decentralized economy) or if we want to know the likely impact of a marginal impact in an increase in a country's foreign asset or foreign liability position. Clearly, in the case of a balanced position, some smoothing is performed so long as the yield on foreign assets is less procyclical (or more countercyclical) than the yield on foreign liabilities. To allow for this, we look at the behavior of relative yields in the empirical section.

returns but we lack the data to do so.

In addition to aggregate foreign assets and liabilities, we also study the yields on individual subcomponents (foreign direct investment (FDI), portfolio equity, and so on) in order to investigate whether various investment categories behave in different ways. For instance, Milesi-Ferretti and Razin (1996) suggest that FDI liabilities may be preferable to debt for the reason that the income outflow associated with FDI may be procyclical whereas it is insensitive to domestic conditions in the case of external debt servicing.

We analyze the cyclical properties of the yields on foreign assets and liabilities in two ways. First, we report the time series properties of Hodrick-Prescott filtered yields and their cross-correlation with output. This provides us with some business cycle “stylized facts” about the behavior of these yields. Second, we also compute regressions of yields on the deviation of domestic output growth from world output growth. This allows us to investigate whether yields are sensitive to idiosyncratic output fluctuations and obtain a sense of how much of the variation in yields is explained by cyclical factors. We also perform regressions in which the yield differential $D(R_{At} - R_{Lt})$ is the dependent variable. This is worthwhile since some smoothing is achieved, in the case of a balanced investment position, so long as the yield differential is countercyclical.

Having laid down the groundwork, we now turn to the empirical analysis in sections 4 and 5.

4 GDP, GNP and Net Investment Income

In this section, we empirically consider the relationships among GDP, GNP and net investment income. For a set of OECD economies, we first compare the unconditional variances of GDP and GNP. For income smoothing, it is desirable that GNP be less volatile than GDP. Second, we ask whether net investment income negatively covaries with GDP fluctuations. If this is the case, net factor income hedges GDP volatility, reducing the impact on GNP.

In Table [1], we present ratios that measure the volatility of GNP relative to GDP. The

time interval is 1970-97 in columns (1)-(2) and 1980-97 in columns (3)-(4). In columns (1) and (3), we examine the variances of the first differences of $\log(\text{GNP})$ and $\log(\text{GDP})$; in columns (2) and (4), it is the variances of HP-filtered data. For most countries, GNP is in fact unconditionally more volatile than GDP.

The overall pattern in Table 1 is that the volatility ratio is in most cases above unity: GNP tends to be unconditionally more volatile than GDP. The ratio is consistently below unity only in the case of Australia and even then the ratio is still very close to unity. These data clearly indicate that, for a broad range of countries, GNP is not a smoother series than GDP. This indicates that either net factor income does not offset GDP fluctuations and/or net factor income generates significant additional independent volatility.

Indeed, if there is sufficient independent variation in net factor income, GNP may be unconditionally more volatile than GDP and yet net factor income could still act to offset GDP fluctuations. Accordingly, in Table [2], we ask whether net investment income negatively covaries with GDP. On a country-by-country basis, we run the regression

$$\Delta \log(\text{GNP}_t - \text{GDP}_t) = \alpha + \beta \Delta \log(\text{GDP}_t) + \epsilon_t \quad (9)$$

and we expect $\beta < 0$ if net factor income negatively covaries with GDP. The results do not support this notion. In no case is the coefficient significantly negative. Indeed, the covariance between net factor income and GDP is significantly positive for the UK and Portugal, amplifying income fluctuations.

We present panel results in Table [3].¹⁰ Here the specification is

$$\Delta \log(\text{GNP}_{it} - \text{GDP}_{it}) = \alpha_i + \Delta_t + \beta \Delta \log(\text{GDP}_{it}) + \epsilon_{it} \quad (10)$$

In row (1), the intercept α_i is common across countries; in column (2), we allow for

¹⁰This is very similar to the panel specification used by Sorensen and Yosha (1998) for the subperiods 1966-80 and 1981-90. Those authors did not present country-by-country results. Since there are strong grounds to believe that the β coefficient will vary across countries, it is in fact not clear that a homogeneous panel approach is justified. Most obviously, the potential for net investment income to offset GDP fluctuations depends on the scale and type of foreign assets and liabilities held by each country. See Melitz and Zumer (1999) on this point.

Table 1: Volatility Ratios

	1970-97	1970-97	1980-97	1980-97
	(1)	(2)	(3)	(4)
Australia	0.99	0.96	0.98	0.92
Austria	1.01	1.01	1.06	1.03
Belgium	0.94	1.04	0.85	0.95
Canada	0.99	1.06	1.00	1.05
Denmark	1.08	1.07	1.15	1.00
Finland	1.02	1.05	1.04	1.08
France	1.02	1.06	0.97	1.08
Germany	1.05	1.01	1.17	1.01
Greece	1.02	1.11	1.26	1.11
Iceland	1.13	1.19	1.16	1.18
Ireland	1.25	1.33	1.43	1.45
Italy	2.76	0.95	0.82	0.81
Japan	1.01	0.94	1.05	0.87
Netherlands	1.42	1.13	1.3	1.24
Norway	2.84	2.37	1.47	1.49
New Zealand	2.05	1.41	2.58	1.66
Portugal	1.74	1.92	3.68	2.66
Spain	2.49	1.29	1.37	1.36
Sweden	1.21	1.19	1.00	1.19
Switzerland	1.11	1.02	0.99	0.93
UK	1.24	1.11	1.16	1.08
US	1.14	0.97	1.14	0.8

In columns (1) and (3), ratio of variance of log difference in GNP to variance of log difference in GDP. In columns (2) and (4), ratio of variances of HP-filtered GNP and GDP.

Table 2: GNP and GDP

	$\phi \log(\text{GDP})$	DW	R^2	SE	Period	Country
(1)	0.037 (0.028)	1.86	0.054	.007	1970-97	US
(2)	0.059 (0.031)	1.95	0.245	0.005	1970-96	UK
(3)	0.001 (0.001)	2.14	0.20	0.002	1970-95	Austria
(4)	-0.044 (0.04)	2.17	0.088	0.003	1970-97	Belgium
(5)	0.007 (0.03)	2.08	0.058	0.005	1970-97	Denmark
(6)	-0.009 (0.018)	1.84	0.085	0.002	1970-96	France
(7)	0.015 (0.011)	1.95	0.041	0.003	1970-95	Germany
(8)	-0.54 (0.53)	1.06	0.105	0.058	1970-96	Italy
(9)	0.01 (0.06)	2.12	0.163	0.01	1970-96	Netherlands
(10)	-0.075 (0.183)	2.0	0.004	0.025	1970-97	Norway
(11)	0.078 (0.07)	1.92	0.10	0.007	1970-95	Sweden

	$\Phi \log(\text{GDP})$	DW	R ²	SE	Period	Country
(12)	0.018 (0.021)	2.12	0.082	0.006	1970-95	Switzerland
(13)	-0.007 (0.023)	2.02	0.03	0.003	1970-97	Canada
(14)	-0.002 (0.024)	2.01	0.003	0.003	1970-96	Japan
(15)	0.007 (0.013)	2.0	0.005	0.001	1970-96	Finland
(16)	0.001 (0.007)	2.11	0.192	0.005	1970-97	Greece
(17)	0.059 (0.035)	1.79	0.132	0.006	1970-97	Iceland
(18)	0.009 (0.082)	1.89	0.027	0.003	1970-96	Ireland
(19)	0.079 (0.03)	1.98	0.012	0.025	1970-96	Portugal
(20)	0.258 (0.18)	0.73	0.107	0.012	1970-96	Spain
(21)	-0.025 (0.032)	1.67	0.225	0.003	1970-96	Australia
(22)	0.195 (0.175)	2.02	0.075	0.011	1970-96	New Zealand

Least squares estimation, with Newey-West standard errors. Regression of $\Phi \log(\text{GNP}=\text{GDP})$ on $\Phi \log(\text{GDP})$ plus a constant. AR(1) correction included.

Table 3: GNP and GDP: Panel Data

	$\Phi \log(\text{GDP})$	DW	R^2	SE	Period
(1)	0.005 (0.008)	1.96	0.093	0.017	1970-97
(2)	0.007 (0.008)	1.95	0.119	0.017	1970-97

GLS. Regression of $\Phi \log(\text{GNP}=\text{GDP})$ on $\Phi \log(\text{GDP})$ plus time fixed effects. Row (2) also includes country fixed effects. AR(1) correction included.

country fixed effects. Consistent with the country-by-country results and the evidence of Sorensen and Yosha (1998), the panel evidence also fails to support a significant role for net investment income in smoothing output fluctuations.

From this analysis, the basic national accounts data do not provide much support for the notion that net investment income flows act to stabilize GNP. However, net investment income is an aggregate that depends on the stocks of foreign assets and liabilities and the behavior of the yields on these investment positions. In the next section, we explore the properties of these yields in order to discover the source of non-smoothing in the data.

5 Yield Behavior

5.1 Country Studies

In this subsection, we analyze time series data for two countries — the United Kingdom and Canada — for which there exist comprehensive data on foreign assets and liabilities. As a first step, we review the evolution of international investment positions and international investment income flows over the 1970-96 period. Table [4] shows that the United Kingdom has accumulated larger gross international investment positions over time but its net posi-

tion remains quite small. All privately-held asset and liability categories have experienced strong growth, particularly the portfolio subcomponent, but government-owned foreign assets and liabilities have declined in importance and official reserves similarly comprise only a small fraction of total foreign assets.

The corresponding international investment income flows are presented in Table [5]. In line with the growth in foreign assets and liabilities, investment income inflows and outflows have also been rising over time. FDI income flows have been relatively stable but portfolio income flows have been growing sharply (albeit from a low base). In contrast, income payments on loan assets and liabilities have actually fallen since the early 1980s, even though total loan holdings have remained steady, indicating a reduction in the yields in this investment subcategory. Finally, income flows on government-owned assets and liabilities and on reserves are small in magnitude.

As shown in Table [6], Canadian foreign assets and liabilities have also grown relative to GDP during the 1970-96 period. As a result of a long sequence of current account deficits, the stock of foreign liabilities is almost twice the corresponding stock of foreign assets. Interestingly, although FDI assets have almost trebled, FDI liabilities have actually declined since the early 1970s.

For both countries, we first compare the business cycle properties of international investment income flows relative to other components of the current account. Next, we report the same statistics for the yields on international investment positions. In section 5.1.2, we relate cyclical fluctuations in yields to country-specific cyclical fluctuations in output, via some basic regression analysis.

5.1.1 Business Cycle Statistics

United Kingdom Taking first the United Kingdom, the Office of National Statistics publishes comprehensive data on the United Kingdom's international investment position and the associated international investment income flows in its United Kingdom Balance of Payments Pink Book. Table [8] reports the autocorrelation, the standard deviation, and

Table 4: International Investment Positions: the United Kingdom

	1970-75	1976-80	1981-85	1986-90	1991-96
Total Assets	0.827	1.004	1.592	1.733	2.063
FDI Assets	0.171	0.165	0.196	0.217	0.261
Portfolio Assets	0.100	0.067	0.196	0.340	0.598
Loan Assets	0.487	0.688	1.135	1.103	1.138
Government Assets	0.035	0.028	0.023	0.020	0.021
Reserves	0.034	0.056	0.043	0.052	0.045
Total Liabilities	0.766	0.944	1.411	1.600	2.029
FDI Liabilities	0.105	0.110	0.121	0.169	0.199
Portfolio Liabilities	0.073	0.059	0.065	0.177	0.379
Loan Liabilities	0.535	0.747	1.212	1.237	1.440
Government Liabilities	0.052	0.028	0.013	0.016	0.012

All variables are expressed as ratios to GDP. Source: Office of National Statistics United Kingdom Balance of Payments Pink Book dataset.

Table 5: International Investment Income Flows: the United Kingdom

	1970-75	1976-80	1981-85	1986-90	1991-96
Total Income Inflow	0.052	0.077	0.150	0.129	0.124
FDI Income Inflow	0.023	0.022	0.021	0.027	0.029
Portfolio Income Inflow	0.003	0.003	0.009	0.013	0.023
Loan Income Inflow	0.024	0.048	0.118	0.085	0.069
Government Income Inflow	0.001	0.001	0.001	0.000	0.000
Reserves Income Inflow	0.001	0.003	0.002	0.003	0.002
Total Income Outflow	0.039	0.072	0.142	0.121	0.116
FDI Income Outflow	0.008	0.015	0.019	0.016	0.014
Portfolio Income Outflow	0.004	0.004	0.005	0.010	0.019
Loan Income Outflow	0.025	0.051	0.118	0.093	0.082
Government Income Outflow	0.002	0.002	0.001	0.001	0.001

All variables are expressed as ratios to GDP. Source: Office of National Statistics United Kingdom Balance of Payments Pink Book dataset.

Table 6: International Investment Positions: Canada

	1970-75	1976-80	1981-85	1986-90	1991-96
Total Assets	0.300	0.306	0.371	0.382	0.497
FDI Assets	0.067	0.074	0.111	0.136	0.185
Portfolio Assets	0.029	0.027	0.033	0.052	0.099
Total Liabilities	0.610	0.650	0.735	0.755	0.928
FDI Liabilities	0.271	0.208	0.194	0.191	0.208
Portfolio Liabilities	0.162	0.214	0.250	0.303	0.434

All variables are expressed as ratios to GDP. Source: Statistics Canada CANSIM CD-ROM.

Table 7: International Investment Income Flows: Canada

	1970-75	1976-80	1981-85	1986-90	1991-96
Total Income Inflow	0.02	0.024	0.031	0.024	0.026
FDI Income Inflow	0.005	0.007	0.008	0.008	0.009
Portfolio Income Inflow	0.002	0.001	0.001	0.002	0.004
Total Income Outflow	0.047	0.06	0.069	0.061	0.061
FDI Income Outflow	0.024	0.027	0.018	0.016	0.011
Portfolio Income Outflow	0.01	0.016	0.023	0.028	0.035

All variables are expressed as ratios to GDP. Source: Statistics Canada CANSIM CD-ROM.

the correlation with output for various components of the current account over the period 1970-96.¹¹ As is typical, exports and imports of goods and services are procyclical and, for the United Kingdom, the trade balance and the current account are weakly countercyclical or acyclical.¹²

It is interesting to note that investment income inflows and outflows are far more volatile than exports and imports of goods and services and both inflows and outflows are weakly countercyclical. Net investment income is much less volatile than the trade balance and is weakly procyclical, stabilizing the overall current account position. However, the finding that net investment income is not countercyclical is at odds with an income-smoothing role for gross international investment positions.

In Table [9], we present the business cycle statistics for yields on the various subcomponents of the foreign assets and liabilities positions: foreign direct investment, portfolio investment, loans, government holdings and reserves.¹³ As was discussed above, yields are more informative about the income-smoothing properties of gross international investment

¹¹The data are annual and Hodrick-Prescott filtered. The current account is measured as the sum of the trade balance in goods and services plus the net international investment income flow.

¹²See Backus, Kehoe and Kydland (1995) and Baxter (1995) for recent surveys of the international business cycle literature.

¹³The category loans includes both bank and non-bank holdings of international loans and deposits.

Table 8: Business Cycles and the Current Account: the United Kingdom

	AC	SD	$\frac{1}{2}_y$
Exports	0.473	0.032	0.143
Imports	0.541	0.048	-0.007
Income Inflow	0.488	0.166	-0.102
Income Outflow	0.395	0.179	-0.096
GDP	0.115	0.013	1.0
TB/GDP	0.596	0.015	-0.05
NFI/GDP	0.261	0.004	0.096
CA/GDP	0.652	0.013	-0.027

Data are HP(100) filtered. AC is autocorrelation coefficient; SD is standard deviation; $\frac{1}{2}_y$ is correlation with output. Source: Office of National Statistics United Kingdom Balance of Payments Pink Book dataset.

Table 9: Business Cycles and Yields: the United Kingdom

	AC	SD	$\frac{1}{2}_y$
RA	0.681	0.035	0.077
RDIRA	0.433	0.041	0.053
RPORTA	0.748	0.034	0.192
RLOANA	0.689	0.039	0.062
RGOVA	0.68	0.035	0.239
RRES	0.749	0.03	0.306
RL	0.725	0.036	0.069
RDIRL	0.732	0.051	0.048
RPORTL	0.784	0.028	0.215
RLOANL	0.708	0.037	0.07
RGOVL	0.785	0.03	0.243

Data are HP(100) filtered. AC is autocorrelation coefficient; SD is standard deviation; $\frac{1}{2}_y$ is correlation with output. Source: Office of National Statistics United Kingdom Balance of Payments Pink Book dataset.

positions than are the raw investment income flows. Yields on both foreign assets and liabilities are quite volatile and it is interesting to note that yields on foreign direct investment positions are more volatile than for other international investment categories. Yields on foreign assets are overall acyclical but returns on portfolio and government foreign asset positions are more strongly procyclical. From rows (6)-(10), a similar pattern is evident for foreign liability positions. That the yields on foreign assets are not countercyclical is again evidence against the provision of income-smoothing by these assets. Indeed, the procyclical yields on portfolio and government assets actually act to exacerbate income fluctuations.

Canada The Canadian statistics are reported in Tables [10] and [11]. The Canadian data are available in the Statistics Canada CANSIM database. As in the United Kingdom data, investment income flows are far more volatile than trade in goods and services but net investment income is less volatile than the trade balance. In the Canadian case, however, net investment income is significantly countercyclical, as is desirable from an income-smoothing perspective.

The Canadian data provide less detailed information on subcategories of investment income flows. In Table [11], we report business cycle statistics for aggregate yields and the yields on foreign direct investment and portfolio investment positions. For Canada, the aggregate yield on foreign assets is acyclical but the yield on foreign portfolio assets is countercyclical, as is required for income-smoothing (Table [11]). Moreover, the aggregate yield on foreign liabilities and, in particular, on foreign direct investment liabilities is appropriately procyclical. However, the yield on foreign portfolio liabilities actually moves in the contrary direction.

In summary, as in the United Kingdom case, the business cycles statistics for Canada do not provide much support for an income-stabilization role for gross international investment positions, with the exception of the behavior of the yields on FDI liabilities. In the next subsection, we turn to regression analysis to see if these negative results also hold under this alternative empirical approach.

Table 10: Business Cycles and the Current Account: Canada

	AC	SD	$\frac{1}{2}_y$
Exports	0.587	0.069	0.44
Imports	0.525	0.071	0.723
Income Inflow	0.184	0.195	0.141
Income Outflow	0.466	0.103	0.458
GDP	0.641	0.023	1
TB/GDP	0.556	0.011	-0.4
NFI/GDP	0.054	0.004	-0.382
CA/GDP	0.341	0.012	-0.492

Data are HP(100) filtered. AC is autocorrelation coefficient; SD is standard deviation; $\frac{1}{2}_y$ is correlation with output. Source: Statistics Canada CANSIM CD-ROM.

Table 11: Business Cycles and Yields: Canada

	AC	SD	$\frac{1}{2}_y$
RA	0.158	0.016	-0.033
RDIRA	-0.068	0.034	0.088
RPORTA	0.498	0.024	-0.225
RL	0.353	0.014	0.154
RDIRL	0.526	0.027	0.495
RPORTL	0.526	0.018	-0.215

Data are HP(100) filtered. AC is autocorrelation coefficient; SD is standard deviation; $\frac{1}{2}_y$ is correlation with output. Source: Statistics Canada CANSIM CD-ROM.

5.1.2 Regression Analysis

For individual country regressions, the specification is

$$D(R_{it}) = \alpha_i + \beta_i \Delta Y C_t + \epsilon_{it} \quad (11)$$

where i indexes the investment subcategory under consideration and $\Delta Y C_t$ is the deviation of the country output growth rate from the rest of the world's growth rate.¹⁴ As noted above, we isolate the idiosyncratic component of the growth rate. Smoothing is facilitated by $\beta_i < 0$ for foreign assets and $\beta_i > 0$ in the case of foreign liabilities. As was noted earlier, we also perform regressions in which the yield differential $D(R_{At} - R_{Lt})$ is the dependent variable.

In Tables [12]-[15], we present the regression results for the United Kingdom and Canada respectively. Estimation is by least squares, with an AR(1) correction and Newey-West standard errors. Table [12] shows the United Kingdom results. In rows (1) and (2), the responses of the aggregate yields on foreign assets and liabilities to deviations of domestic growth from world growth are both negative and the point estimate in the case of foreign liabilities is significant at the 10 percent level. However, that the yield on foreign liabilities rises when domestic growth falls below world growth is the opposite of what is required for income smoothing. For most of the investment subcategories, the yields on both assets and liabilities are not sensitive to the idiosyncratic component of the country growth rate. International loans are the only subcategory for which yields significantly respond to idiosyncratic deviations in the output growth rate but, as was the case with aggregate foreign liabilities, the yield on international loan liabilities perversely moves countercyclically.

¹⁴The rest of the world's growth rate is constructed as a GDP-weighted average of the growth rates of the other eighteen countries in the panel studied in section 3. We consider the country-specific component of output growth on the basis that, assuming a similar relationship between yields and output growth in different countries, smoothing is only possible with respect to idiosyncratic fluctuations. This follows Glick and Rogoff (1995) who note that the current account can only respond to country-specific disturbances. It turns out, in practice, that it makes no difference in the regression analysis whether or not we isolate the country-specific component.

Table 12: Yields and Stabilization: the United Kingdom

		CYC	DW	R ²	SE	Period
(1)	D(RA)	-0.342 (0.251)	1.94	0.070	0.046	1972-95
(2)	D(RL)	-0.46 (0.267)	1.88	0.057	0.044	1972-95
(3)	D(RDIRA)	0.704 (0.287)	2.11	0.115	0.057	1972-95
(4)	D(RDIRL)	0.27 (0.414)	1.80	0.06	0.054	1972-95
(5)	D(RPORTA)	-0.004 (0.327)	1.97	0.004	0.043	1972-95
(6)	D(RPORTL)	-0.132 (0.279)	1.96	0.007	0.034	1972-95
(7)	D(RGOVA)	0.023 (0.333)	1.96	0.001	0.044	1972-95
(8)	D(RGOVL)	-0.128 (0.267)	1.97	0.015	0.04	1972-95
(9)	D(RRES)	-0.018 (0.27)	1.77	0.001	0.038	1972-95
(10)	D(RLOANA)	-0.678 (0.342)	1.81	0.113	0.049	1972-95
(11)	D(RLOANL)	-0.584 (0.311)	1.83	0.093	0.048	1972-95

Least squares estimation, with Newey-West standard errors. CYC is deviation of country growth rate from growth rate of the rest of the world.

Table 13: Yields and Stabilization: the United Kingdom

		CYC	DW	R ²	SE	Period
(1)	D(RA-RL)	0.088 (0.048)	2.01	0.243	0.005	1972-95
(2)	D(RDIRA-RDIRL)	0.38 (0.4)	1.96	0.116	0.038	1972-95
(3)	D(RPORTA-RPORTL)	0.158 (0.081)	1.80	0.225	0.011	1972-95
(4)	D(RGOVA-RGOVL)	0.143 (0.15)	1.98	0.107	0.017	1972-95
(5)	D(RLOANA-RLOANL)	-0.08 (.042)	1.71	0.44	0.003	1972-95

Least squares estimation, with Newey-West standard errors. CYC is deviation of country growth rate from growth rate of the rest of the world.

We look at the behavior of the UK yield differentials ($R_{Ai} - R_{Li}$) in Table [13]. If a balanced amount of foreign assets and liabilities is held, some smoothing is achieved so long as the yield differential moves countercyclically. In most cases, the yield differentials are acyclical, in line with the results in Table [12]. The exception is the yield differential on loan assets/liabilities, which does provide smoothing by moving in a countercyclical fashion. Combined with the results on loan assets and liabilities in Table [12], it is evident the yields on both loan assets and liabilities move countercyclically but the yield on loan assets is more countercyclical than on loan liabilities.

The Canadian results are presented in Tables [14]-[15]. As in the United Kingdom case, the results generally do not favour an income-smoothing interpretation of the role of gross international investment positions. The only case for which yields respond significantly to deviations of country growth from the world growth rate is foreign direct investment liabilities and the yield in this case is indeed appropriately procyclical, which is consistent with the result in Table [11]. In the other cases, the cyclical indicator has no significant effect on the yield. The results for yield differentials in Table [15] provide a similar message, with countercyclical behavior of the yield differential on FDI assets and liabilities statistically significant at the 10 percent level.

The broad message provided by the findings in this section is that there is only weak evidence that international cross-holdings of assets and liabilities smooth income. Indeed, several investment subcategories actually exhibit yields that exacerbate income fluctuations. In the next section, we study aggregate yields on foreign assets and liabilities for a larger panel of countries in order to check whether these results hold more broadly.

5.2 Panel Analysis

In Table [16], we perform a similar regression analysis of the yields on aggregate foreign assets and liabilities for a panel of industrial countries. The selection criterion is that the IMF's International Financial Statistics publishes estimates of international investment positions for these countries, with at least ten years of data. This generates a sample

Table 14: Yields and Stabilization: Canada

		CYC	DW	R ²	SE	Period
(1)	D(RA)	-0.10 (0.215)	2.0	0.067	0.023	1972-95
(2)	D(RL)	0.144 (0.2)	1.88	0.027	0.019	1972-95
(3)	D(RDIRA)	-0.12 (0.442)	2.27	0.113	0.05	1972-95
(4)	D(RDIRL)	0.76 (0.426)	1.79	0.185	0.028	1972-95
(5)	D(RPORTA)	-0.307 (0.254)	1.84	0.095	0.029	1972-95
(6)	D(RPORTL)	-0.183 (0.22)	1.84	0.058	0.02	1972-95

Least squares estimation, with Newey-West standard errors. CYC is deviation of country growth rate from growth rate of the rest of the world.

Table 15: Yields and Stabilization: Canada

		CYC	DW	R ²	SE	Period
(1)	D(RA-RL)	-0.136 (0.10)	2.47	0.321	0.014	1972-95
(2)	D(RDIRA-RDIRL)	-0.62 (0.373)	2.5	0.301	0.044	1972-95
(3)	D(RPORTA-RPORTL)	-0.28 (0.154)	2.11	0.072	0.018	1972-95

Least squares estimation, with Newey-West standard errors. CYC is deviation of country growth rate from growth rate of the rest of the world.

Table 16: Yields and Stabilization: Panel Data

		CYC	R ²	SE	N	Period
(1)	D(RA)	0.172 (0.175)	0.184	0.017	182	1982-95
(2)	D(RL)	0.111 (0.192)	0.225	0.018	183	1982-95
(3)	D(RA-RL)	0.068 (0.074)	0.046	0.008	182	1982-95
(4)	D(RA)	0.135 (0.334)	0.223	0.018	182	1982-95
(5)	D(RL)	0.13 (0.365)	0.262	0.019	183	1982-95
(6)	D(RA-RL)	0.008 (0.142)	0.089	0.008	182	1982-95

Generalized Least squares estimation, with cross-sectional weights. CYC is country growth rate. Time fixed effects included in columns (1)-(3). Time and country fixed effects included in columns (4)-(6).

of fourteen countries.¹⁵ Only aggregate foreign asset and liability positions are generally available across this sample, so we do not investigate the yields on the various investment subcategories in this section.

For the panel analysis, we consider the specification

$$D(R_{it}) = \alpha_i + \lambda_t + \beta_i CYC_{it} + \epsilon_{it} \quad (12)$$

where CYC_{it} is now just the country growth rate in period t . We include time fixed effects to control for common global shocks and so the variable CYC_{it} reflects the idiosyncratic component of national growth rates. We report results both including and excluding country fixed effects.

¹⁵These data have been published since April 1997. The countries are Australia, Austria, Belgium, Canada, Spain, Finland, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, United Kingdom and United States.

Results are presented in Table [16] for the period 1982-95. In columns (1)-(3), the specification includes time fixed effects; in columns (4)-(6), both time and country fixed effects are included. Estimation is by generalized least squares, in order to control for country-specific heteroscedasticity in the residuals. The panel evidence is very much in line with the earlier findings, with no evidence of any cyclical sensitivity in the yields on foreign assets and liabilities or in the yield differentials.

In summary, the panel evidence backs up the times series results for the United Kingdom and Canada: there is little evidence that the yields on foreign assets and liabilities display the cyclical properties to smooth GNP in the face of GDP fluctuations.

6 Discussion and Conclusions

Our empirical results in sections 4 and 5 indicate that the cross-holding of foreign assets and liabilities do not provide income smoothing at business cycle frequencies. One explanation is that such cyclical smoothing may not be a high priority for industrial countries, since the amplitude of business cycle fluctuations is not very large. For this reason, it would be interesting to investigate whether cross-holdings of foreign assets and liabilities provides smoothing against the longer-term volatility that may be generated by persistent output shocks, along the lines of Athanasoulis and van Wincoop (1997).

Second, it is possible that international investment positions may hedge some subcomponents of GDP, even if not overall GDP. For instance, foreign investment income may offset fluctuations in domestic capital income but positively comove with domestic labor income, if there occur shifts in domestic factor income shares.¹⁶ Third, holding foreign assets may still provide portfolio diversification even if income is not smoothed, so long as the rates of return on foreign assets are imperfectly correlated with the rates of return on domestic assets. Fourth, it is possible that the pattern of capital gains and losses on international investment positions provides smoothing, even if yields do not. Finally, it may be useful to expand the analysis to incorporate developing countries, if the data were avail-

¹⁶See also Golub (1994).

able, since their greater macroeconomic volatility makes international income-smoothing a greater priority.

However, it is also interesting to think about alternative interpretations, in that international investment decisions are heavily influenced by factors other than risk/return and smoothing considerations. For instance, Tesar and Werner (1995) document that the international component of financial portfolios appears to be guided by proximity and common cultural ties rather than a search for the optimal hedging opportunities. Similarly, Ghosh and Wolf (1998) find that, all else equal, outward financial flows from the G-7 economies tend to be allocated to the most geographically proximate emerging markets, suggesting that a gravity model works well for trade in assets, as for trade in goods and services. A desire to avoid domestic tax obligations can also help explain the holding of foreign assets, even if foreign assets do not contribute to income smoothing or portfolio diversification.¹⁷

Finally, it will be important to update the empirical work as time progresses: if current international investment flows are more strongly directed at accumulating assets and liabilities that provide smoothing than in the past, the cyclical properties of the yields on gross international investment positions may very well improve in the future.

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¹⁷See Grilli (1990) and Feldstein (1994).

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