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# Multi-Country Empirical Investigation into International Financial Integration

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**ABSTRACT** *This paper focuses on the dynamics of international financial integration for a set of 13 industrial countries including Australia over the period 1990 to 2003 by analysing data on the level and composition of foreign assets and liabilities. The study provides insights into the broad trends on cross-country holdings and investigates the correlation of international asset positions with various 'explanatory variables' such as the degree of financial restrictions, the depth of financial markets, the openness to international trade, etc. The results show that the growth in goods trade and stock market capitalization are the main determinants of the growth in the scale of international balance sheets.*

**KEY WORDS:** International financial integration, external assets and liabilities

**JEL CLASSIFICATIONS:** F31, F32

## Introduction

The rapid increase in international capital flows (foreign direct investment and portfolio investment) is one of the most significant developments in the global economy in recent decades. During the last decade, the global financial landscape has experienced a continued process of integration across global financial markets, which has brought about a surge in cross-border trading. Global financial integration is an important issue, since both economic theory and empirical findings suggest that the integration and development of financial markets are likely to contribute to economic growth by removing frictions and barriers to exchange, and by allocating capital more efficiently.

Generally speaking the benefits to individual investors from investing in international portfolios come about through the opportunities local investors are offered to insulate their portfolios from a downturn in local asset prices via investing in global markets. From a country perspective, benefits from international diversification may also be captured via diversification across trade and investment (debt and equity). For instance when a country's major trading partner experiences a decline in demand for

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traded goods this may be compensated by a corresponding upturn in the performance of that country's international investment position (IIP).<sup>1</sup>

Research by scholars in the area of international financial integration generally accepts that greater financial integration should allow a better allocation of capital. The complete elimination of barriers to trading, clearing and settlement platforms will allow firms to choose the most efficient trading, clearing and/or settlement platforms. In addition, investors will be permitted to invest their funds wherever they believe these funds will be allocated to the most productive use. More productive investment opportunities will therefore become available to some or all investors and a reallocation of funds to the most productive investment opportunities will take place.

Financial integration should offer additional opportunities to share risk and to smooth consumption inter-temporally. Kalemli-Ozcan *et al.* (2001) provide empirical evidence which demonstrates that sharing of risk across regions enhances specialization in production, thereby resulting in well-known benefits. The increase in the set of financial instruments and in the cross-ownership of assets resulting from financial integration should offer additional possibilities to diversify portfolios and share idiosyncratic risk across regions. From theoretical models of risk-sharing, we know that when agents in an area fully share risk, the consumption of agents in one region co-moves with that of agents located in other regions of that area, while consumption does not co-move with region-specific shocks.

Until recently, data on the level and geographical pattern of international portfolio investment has been inadequate. In recognition of this fact the International Monetary Fund (IMF) commenced, in the mid 1990s, a pioneering comprehensive survey of the geographic structure of the foreign portfolios (equity and long-term bonds) entitled 'Coordinated Portfolio Investment Survey' (CPIS 1997 and 2001). The first publication covered the 1997 position of foreign portfolios held by the residents of 29 countries, including Australia (IMF, 2000), and data from a follow up survey relating to 2001 international portfolio holdings were made available in 2003.

This study provides an analysis of capital flows from the prospective of risk, liquidity, tradability, reversibility, expropriability and tax treatment. The composition of capital (i.e. foreign direct investment *versus* equity investment) can have appreciable different affects on productivity growth in the host country. For instance, direct investment in developing countries can involve a transfer of technology and entrepreneurial skills, and financial operation, while international portfolio equity flows may stimulate the stock market development and improve corporate governance. Understanding a country's relative position with respect to the composition of foreign assets and liabilities is important for a number of reasons. First, the composition of foreign assets and liabilities may affect an economy's macroeconomic adjustment to shocks. In particular, countries holdings of foreign assets and liabilities may reduce the volatility of national income by generating investment income streams that are imperfectly correlated with domestic output fluctuations. Secondly, the size of a country's gross international investment position can be regarded as a volume-based measure of

financial openness or the level of integration into international capital markets. Here, the level of financial openness may be important in the diffusion of new financial technologies and in determining the level of productivity in the domestic financial sector (Grossman & Helpman, 1991). Thirdly, a high volume of international asset trade may constrain a country's ability to tax mobile capital and the financial sector. Fourthly, the importance of globalization forces in shaping domestic politics may vary across countries in line with variation in the level of exposure to international capital markets (Rodrik, 1997).

The study characterizes the salient features of the increase in international financial integration for a period from 1990 to 2003, by addressing questions such as whether the composition of country portfolios has changed over time. We also analyse time series and cross-sectional patterns in the levels and composition of foreign assets and liabilities to potential drivers of integration, namely global trade in goods and services, output per capita, domestic financial development, tax and capital controls.

The paper is structured as follows. The next section describes the motivation and literature review. The section after describes the data and stylized facts, while the fourth section describes the empirical specification. The results are described in the fifth section. Finally, the last section provides concluding remarks and policy implications.

## Literature Review

Several authors have studied certain aspects of international financial integration. Bekaert & Harvey (2000) used an asset-pricing model to integrate the emerging market stock exchanges into the global market. Henry (2000), Beck *et al.* (2000), Edison *et al.* (2002), Edison & Warnock (2003) and O'Donnell (2002) examined the impact of international financial integration on various indicators. Obstfeld & Taylor (2002) provided a wide-ranging historical overview, including analysis of long run changes in gross asset trade. Adam *et al.*, (2002) explored a wide range of measures of international financial integration for Europe. Hummels *et al.* (2001) and Yi (2003) studied the growth in world trade, while Lane (2000) provided some evidence on the change in gross cross-holding positions over time for OECD countries. Lane & Milesi-Ferretti (2002) explored the determinants of net foreign asset positions over time. Lane & Milesi-Ferretti (2003) studied international financial integration for 14 countries using portfolios of external assets and liabilities for the years 1982 to 2001. In the study, they employed broad measures of financial integration, namely trends in the ratio of total external assets and liabilities to GDP, ratio of portfolio equity and FDI assets (liabilities) to GDP, and the ratio of external assets and liabilities to the sum of imports and exports (financial openness). Some empirical work has been done on the rates of return earned on foreign assets and liabilities. Bond (1977), Sorensen & Yosha (1998), Lane & Milesi-Ferretti (2002, 2003) found that the rates of return on both assets and liabilities tended to be high, easily exceeding countries' growth

rates; cross-country differences in rates of return were substantial and some countries exhibited substantial differences between returns on external assets and liabilities.

Although the above-mentioned authors have considered aspects of the geography of international investment patterns, data limitations have meant that these contributions have been quite narrowly focused; for example, only considering a single source country (most often, the US). In this project, we make use of the CPIS dataset on international portfolio positions in order to explore this topic in a comprehensive manner. The data provide a geographical breakdown of international portfolio holdings at the end of 1997 and 2001 for some 67 source countries, which include virtually all major international investors.

Internationally there is a rapidly increasing literature trying to explain international patterns of bilateral investment. Typically, this literature has used empirical methods borrowed from the traditional gravity models of international goods trade, and has focused on direct investment and bank lending, for which data are readily available (from the OECD and BIS, respectively). A number of papers have also focused more emphasis on the pattern of bilateral equity investment. For example, Portes & Rey (2003) use portfolio equity flows to show that proxies for informational asymmetries, together with the size of host countries' stock markets, are key determinants of the pattern of international equity flows. Other studies on the geography of the stock of portfolio equity investment have focused primarily on a single source country: the United States (Ahearne *et al.*, 2004). An exception is a recent paper by Yildirim (2003) that also exploits the 2001 CPIS data, employing a methodology different from ours. She examines the role of various corporate governance indicators in determining investment patterns, employing a subset of the CPIS data (23 source countries, 49 host countries) for which such data are available.

### Data and Trends

Until recently, data on the level and the geographical pattern of international portfolio investment has been inadequate (see below). In recognition of this fact, the International Monetary Fund (IMF) commenced in the mid 1990s a pioneering comprehensive survey of the geographic structure of foreign portfolios (equity and long-term bonds). The data employed in this study come from the IMF's Coordinated Portfolio Investment Survey (CPIS)<sup>2</sup> for 1997 and 2001. Previously, the Balance of Payments data employed in economic modelling related to flows of assets not about valuation changes. The flow data provide little information about the determinants of international asset holdings (Lane, 2000; Warnock, 2001). In 1993, the IMF Committee on Balance of Payments decided to undertake<sup>3</sup> an internationally coordinated benchmark survey of long term portfolio investment holdings to facilitate cross-country comparisons, permit data exchanges, and encourage standardization and best practice. The CPIS was conducted at the end of December 1997 with 29 countries<sup>4</sup> participating and again in 2001 with 64 countries involved. The results for both these surveys were

published by the IMF, with the publication of the 1997 results<sup>5</sup> appearing in 2000, with up-to-date survey results now being published regularly by the IMF.<sup>6</sup>

#### *External assets and liabilities – stylized facts*

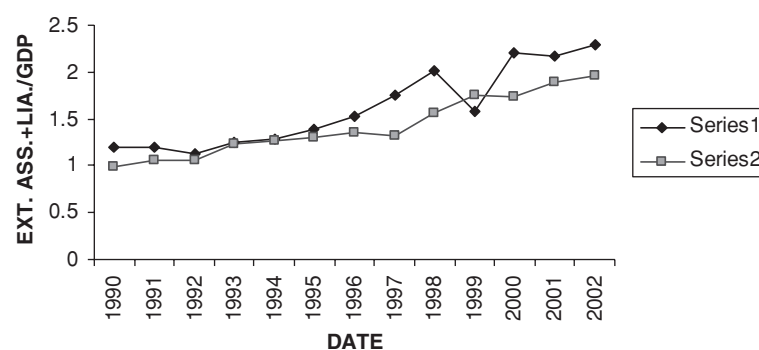
This paper involves the construction of several proxies to measure international financial integration covering the period 1990 to 2003 for a group of countries across a range of measures commonly used as indicators of international financial integration, in an attempt to compare Australia's relative performance with a representative group of countries considered to be at a similar stage of economic development.

Equation (1) indicates a volume-based measure of international financial integration.

$$IFI_{it} = \frac{FA_{it} + FL_{it}}{GDP_{it}} \quad (1)$$

where  $IFI_{it}$  = volume-based measure of international financial integration,  $FA_{it}$  = stock of foreign assets,  $FL_{it}$  = stock of foreign liabilities and  $GDP_{it}$  = gross domestic product.

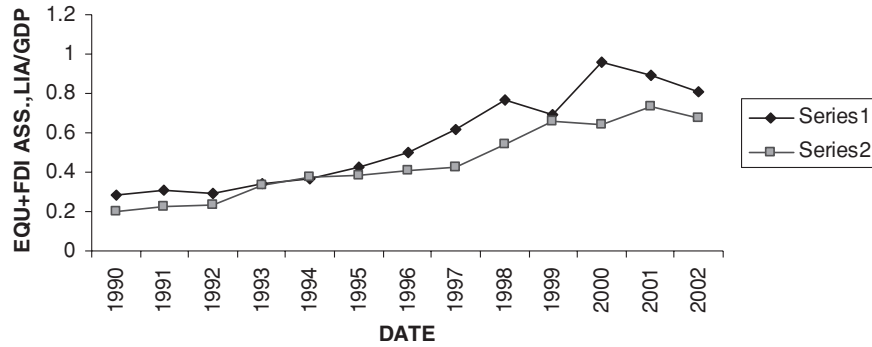
Figure 1 illustrates a broad indicator of international financial integration based on a volume measure to compare the representative group of countries with that of Australia. Over the time period from 1990 to 2002, our measure of international financial integration has increased by approximately 93 percent for the representative group of countries and by 97 percent for Australia. Noteworthy is the depression in the aggregate international financial integration ratio for the year 2001 coinciding with the steep fall in international stock market prices.



**Series 1:** Countries are US, UK, Canada, Japan, Germany, France, Italy, Sweden, Switzerland, Spain, New Zealand, and Netherlands

**Series 2:** Australia.

**Figure 1.** International financial integration, 1990–2002.



**Series 1:** Countries are US, UK, Canada, Japan, Germany, France, Italy, Sweden, Switzerland, Spain, New Zealand, and Netherlands

**Series 2:** Australia.

**Figure 2.** International equity integration, 1990–2002.

Equation (2) indicates the equity-based (portfolio and FDI) measure of international financial integration.

$$EQ_{it} = \frac{PQA_{it} + FDIA_{it} + PQL_{it} + FDIL_{it}}{GDP_{it}} \quad (2)$$

where

$EQ_{it}$  = the indicator of the level of equity (portfolio and FDI) cross-holdings,

$PQA(L)$  = portfolio equity assets (liabilities),

$FDIA(L)$  = FDI assets (liabilities).

Figure 2 provides us with an indication of the level of equity cross-holdings, which illustrates the changes in international equity integration over the period 1990 to 2002, the noticeable feature here is the increase in this ratio by approximately 185 percent for 12 countries' and about 236 percent for Australia. This ratio has increased much faster than the increase in  $IFI_{it}$  measure reported above in Figure 1. The rise in the international financial asset holdings may be due to the substantial increase in the international trade over this period.

#### *Empirical specification*

International Parity theory suggests that in a world with no borders, the allocation of international asset holdings would take place with no transactions costs; here it is assumed that complete global financial market integration exists. Each country would hold a very high level of foreign assets and liabilities, in line with full diversification. However, in the actual world, there are implicit and explicit barriers to full integration



and in the gains to international diversification. In a recent study, Martin & Rey (2000, 2001), develop a theoretical model that assumes that investors are risk averse, the number of financial assets are endogenous, assets are imperfect substitutes, and cross-border asset trade entails transactions costs. Under these assumptions, a reduction in international transaction costs stimulates an increase in the demand for (and supply of) assets and an increase in asset prices, leading to higher cross-border diversification.

To complement the conceptual issues and graphical analysis of the trends in international financial integration, the basic panel specification is provided in equations (22) to (25) below;

$$\Delta(IFI_{it}) = \alpha_i + \gamma * X_i + \beta * \Delta(Z_{it}) + \varepsilon_{it} \quad (3)$$

$$\Delta(EQ_{it}) = \alpha_i + \gamma * X_i + \beta * \Delta(Z_{it}) + \varepsilon_{it} \quad (4)$$

$$\Delta(EQSHARE_{it}) = \alpha_i + \gamma * X_i + \beta * \Delta(Z_{it}) + \varepsilon_{it} \quad (5)$$

$$\Delta(FELSTK_{it}) = \alpha_i + \gamma * X_i + \beta * \Delta(Z_{it}) + \varepsilon_{it} \quad (6)$$

where  $X_{it}$ ,  $Z_{it}$  are a set of country and time-varying determinants. This paper uses first differences of the data to take into account the non-stationarity of the levels of dependence and some of the regressors. Accordingly, this paper employs pool panel data analysis using fixed effect least squares estimation with white corrected standard errors. Finally, this paper incorporates a dependent variable suggested by Engel (2003),<sup>7</sup> which accounts for the effect of foreign equity liabilities as the ratio of stock market capitalisation ( $FELSTK_{it}$ ).

## Results

Table 1 illustrates the pool panel data analysis by taking the growth in international financial integration  $IFI_{it}$  as the dependent variable for the years 1990 to 2003. The first regressor, trade openness, defined as the sum of exports plus imports relative to GDP (Trade), is significant throughout. The overall explanatory power of 0.43 is encouraging; the average trade openness coefficient in columns (1) to (5) is 3.50. This indicates that a 10-percentage point increase in the trade openness increases  $IFI_{it}$  by 35 percent. The results here are in accordance with theoretical insights, which posit a direct relationship between trade and financial integration. In the next regression we introduce GNI per capita as a proxy for the systematic relationship between cross-border financial activity and the level of development; this variable shows a negative but not significant relationship across columns (2) to (5). Next we add financial depth and stock market capitalization variables to the set of regressors, the results indicate that both variables are positive throughout. Not surprising is the mechanical result arising from an increase in stock market capitalization and the value of foreign equity liabilities. The addition of a tax rate variable appears to be insignificant in explaining the variation in the level of international financial integration. Finally, the

**Table 1.** Panel analysis of international financial integration, 1990–2003

|                             | (1)              | (2)              | (3)              | (4)              | (5)              |
|-----------------------------|------------------|------------------|------------------|------------------|------------------|
| Trade Openness              | 4.26<br>(10.47)* | 4.26<br>(10.52)* | 2.98<br>(5.88)*  | 2.97<br>(5.92)*  | 3.05<br>(5.99)*  |
| Log GNI per capita          |                  | -1.34<br>(-1.39) | -1.20<br>(-1.36) | -1.29<br>(-1.47) | -1.17<br>(-1.29) |
| Financial Depth             |                  |                  | 0.17<br>(0.78)   | 0.20<br>(0.96)   | 0.15<br>(0.74)   |
| Stock Market Capitalization |                  |                  | 0.20<br>(1.93)** | 0.16<br>(1.58)   | 0.18<br>(1.72)** |
| Tax Rate                    |                  |                  |                  | -0.35<br>(-1.64) | -0.34<br>(-1.57) |
| Capital control             |                  |                  |                  |                  | -0.11<br>(-1.04) |
| Adjusted $R^2$              | 0.43             | 0.44             | 0.27             | 0.28             | 0.29             |
| Number of observations      | 182              | 182              | 156              | 156              | 156              |

*Note:* Fixed effect panel estimation. t-statistics in parentheses. Dependent variable is first difference of  $IFI_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.1, 0.05 and 0.01 confidence level, respectively. Countries: USA, UK, Japan, Germany, Canada, France, Italy, Switzerland, Sweden, Spain, New Zealand, Netherlands, Australia.

capital control variable is added in column (5) which turns out to be negative and insignificant.

Table 2 provides results for the pool panel data analysis for the cross-border equity holdings measure, with  $EQ_{it}$  as the dependent variable for the years 1990 to 2003.

**Table 2.** Panel analysis of cross border equity holdings, 1990–2003

|                             | (1)              | (2)              | (3)               | (4)              | (5)              |
|-----------------------------|------------------|------------------|-------------------|------------------|------------------|
| Trade Openness              | 2.12<br>(10.81)* | 2.13<br>(10.65)* | 1.19<br>(4.96)*   | 1.20<br>(4.99)*  | 1.22<br>(5.02)*  |
| Log GNI per capita          |                  | 0.10<br>(0.21)   | 0.04<br>(0.09)    | 0.03<br>(0.07)   | 0.004<br>(0.01)  |
| Financial Depth             |                  |                  | -0.005<br>(-0.06) | 0.02<br>(0.19)   | 0.02<br>(0.24)   |
| Stock Market Capitalization |                  |                  | 0.26<br>(5.56)*   | 0.24<br>(5.04)*  | 0.24<br>(5.06)*  |
| Tax Rate                    |                  |                  |                   | -0.12<br>(-1.28) | -0.12<br>(-1.29) |
| Capital control             |                  |                  |                   |                  | 0.03<br>(0.63)   |
| Adjusted $R^2$              | 0.48             | 0.47             | 0.38              | 0.38             | 0.37             |
| Number of observations      | 182              | 182              | 151               | 151              | 151              |

*Note:* Fixed effect panel estimation. t-statistics in parentheses. Dependent variable is first difference of  $EQ_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.1, 0.05 and 0.01 confidence level, respectively. Countries: USA, UK, Japan, Germany, Canada, France, Italy, Switzerland, Sweden, Spain, New Zealand, Netherlands, Australia.

From these results, it is evident that trade openness is both a positive and highly significant variable in explaining cross-border equity holdings. The variable output per capita in columns (2) to (5) is marginally positive. Financial depth and stock market capitalization variables are introduced in columns (3) to (5). The former variable is just positive for columns (4) and (5) while the stock market capitalisation variable is positive and highly significant throughout, indicating a strong positive influence on cross-border equity holdings. For instance, a 10-percentage point increase in stock market capitalization is associated with a 2.4 percentage point increase in cross-border equity holdings. The tax rate variable is negative and insignificant throughout while the capital control variable is again insignificant in column (5). Countries less open to trade, with shallow domestic financial markets, have smaller international cross holdings.

Table 3 indicates the pool panel data analysis by taking the measure of cross-border equity share in total external holdings,  $EQSHARE_{it}$  as the dependent variable, for the years 1995 to 2003. The results here are generally weaker than the aggregate volume measure in the previous Tables 1 and 2. For example, trade openness does not exert a significant influence on  $EQSHARE_{it}$ . Introducing financial depth and stock market capitalization variables does not explain the overall change in cross border equity share in total external holdings. The negative value of financial depth variable implies that it increases international trade in debt instruments. The tax variable introduced in columns (4) and (5) is negative and insignificant. Finally, the capital control variable entered in column (5) is insignificant.

**Table 3.** Panel analysis of gross equity share, 1995–2003

|                             | (1)            | (2)             | (3)               | (4)               | (5)               |
|-----------------------------|----------------|-----------------|-------------------|-------------------|-------------------|
| Trade Openness              | 0.04<br>(0.76) | 0.05<br>(1.03)  | 0.06<br>(1.23)    | 0.06<br>(1.17)    | 0.06<br>(1.12)    |
| Log GNI per capita          |                | 0.48<br>(4.99)* | 0.49<br>(5.14)*   | 0.49<br>(5.03)*   | 0.48<br>(4.9)*    |
| Financial Depth             |                |                 | −0.014<br>(−0.71) | −0.013<br>(−0.65) | −0.016<br>(−0.79) |
| Stock Market Capitalization |                |                 | 0.018<br>(1.94)   | 0.017<br>(1.83)   | 0.019<br>(1.93)   |
| Tax Rate                    |                |                 |                   | −0.01<br>(−0.42)  | −0.013<br>(−0.51) |
| Capital control             |                |                 |                   |                   | 0.01<br>(0.75)    |
| Adjusted $R^2$              | 0.32           | 0.52            | 0.57              | 0.56              | 0.55              |
| Number of observations      | 117            | 117             | 94                | 94                | 94                |

*Note:* Fixed effect panel estimation. t-statistics in parentheses. Dependent variable is first difference of  $EQSHARE_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.1, 0.05 and 0.01 confidence level, respectively. Countries: USA, UK, Japan, Germany, Canada, France, Italy, Switzerland, Sweden, Spain, New Zealand, Netherlands, Australia.

**Table 4.** Panel analysis of equity liabilities as a share of stock market capitalization, 1995–2003

|                        | (1)             | (2)              | (3)              | (4)             | (5)             |
|------------------------|-----------------|------------------|------------------|-----------------|-----------------|
| Trade Openness         | 0.65<br>(3.2)** | 0.64<br>(2.93)** | 2.60<br>(8.09)*  | 2.64<br>(8.19)* | 2.76<br>(8.61)* |
| Log GNI per capita     |                 | 0.44<br>(1.63)   | 0.70<br>(1.13)   | 0.75<br>(1.18)  | 0.83<br>(1.23)  |
| Financial Depth        |                 |                  | 0.28<br>(3.16)** | 0.29<br>(3.23)* | 0.26<br>(2.92)* |
| Tax Rate               |                 |                  |                  | 0.04<br>(0.35)  | 0.04<br>(0.32)  |
| Capital control        |                 |                  |                  |                 | 0.061<br>(0.86) |
| Adjusted $R^2$         | 0.09            | 0.09             | 0.50             | 0.51            | 0.52            |
| Number of observations | 113             | 113              | 91               | 91              | 91              |

*Note:* Fixed effect panel estimation. t-statistics in parentheses. Dependent variable is first difference of  $FELSTK_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.1, 0.05 and 0.01 confidence level, respectively. Countries: USA, UK, Japan, Germany, Canada, France, Italy, Switzerland, Sweden, Spain, New Zealand, Netherlands, Australia.

Table 4 illustrates the panel data analysis by taking the ratio of foreign equity liabilities to stock market capitalisation denoted by  $FELSTK_{it}$  as the dependent variable, for the years 1995 to 2003. Trade openness is positive and significant throughout. The average value of this variable is 1.85. A 10-percentage point increase in the trade openness increases  $FELSTK_{it}$  by 18.5 percentage points. Columns (2) to (5) introduce output per capita, this variable is positive throughout with an average value of 0.68. The financial depth variable is introduced in columns (3) to (5) where the effect in explaining foreign equity liability growth is both positive and significant throughout. The overall explanatory power rises from 0.09 to 0.50, on introducing this variable. The average value of the variable is 0.28 indicating that a 10 percentage point increase in the financial depth increases the  $FELSTK_{it}$  by 2.8 percentage points. Finally introducing tax in columns (4) and (5) indicates a positive but insignificant relationship with growth in foreign equity liabilities while the capital control variable in column (5) is also insignificant. The motivation for including the latter regression derives from Engel's (2003) comment with respect to Lane & Milesi-Ferretti (2003), where he states that the foreign equity liabilities as a fraction of total market capitalisation provides an appropriate measure of depth in equity markets.

Turning our attention to the application of the above-estimated regressions at the aggregate multi-country level to that at the individual country level, namely Australia, research here shows how representative the results for a small open economy are as compared to those for the aggregate multi-country case. Table 5 shows the regression results for the international financial integration proxy  $IFI_{it}$  on a range of explanatory

**Table 5.** Analysis of Australia's international financial integration, 1990–2003

|                             | (1)              | (2)               | (3)                 | (4)                 | (5)                 |
|-----------------------------|------------------|-------------------|---------------------|---------------------|---------------------|
| Trade Openness              | 7.83<br>(3.84)** | 6.34<br>(2.45)*** | −1.54<br>(−2.24)*** | −1.72<br>(−2.90)*** | −1.84<br>(−3.22)*** |
| Log GNI per capita          |                  | 2.79<br>(0.93)    | −2.57<br>(−3.88)**  | −1.84<br>(−2.79)*** | −0.88<br>(−0.93)    |
| Financial Depth             |                  |                   | 5.14<br>(7.27)*     | 4.78<br>(7.65)*     | 4.12<br>(5.31)**    |
| Stock Market Capitalization |                  |                   | 0.53<br>(2.84)**    | 0.44<br>(2.71)***   | 0.29<br>(1.55)      |
| Tax Rate                    |                  |                   |                     | −1.38<br>(−2.10)*** | −2.14<br>(−2.53)*** |
| Capital control             |                  |                   |                     |                     | −2.56<br>(−1.34)    |
| Adjusted $R^2$              | 0.51             | 0.51              | 0.9816              | 0.9866              | 0.9878              |

Note: t-statistics in parentheses. Dependent variable is  $IFI_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.01, 0.05 and 0.1 confidence level, respectively.

variables similar to those in Table 1 above over the period 1990 to 2003. In column (1), the trade openness variable is significant and the overall explanatory power is 0.51. A 10 percent increase in trade openness increases  $IFI_{it}$  by about 78 percent. Column (2) adds output per capita variable, which turns out to be positive and insignificant. Column (3) adds financial depth and stock market capitalization variables. Trade Openness and Output per capita variables remain significant but change sign. Financial Depth and Stock Market Capitalisation variables are both positive and significant. A 10 percent increase in Financial Depth increases  $IFI_{it}$  by about 51 percent and a 10 percent increase in Stock Market Capitalisation increases  $IFI_{it}$  by 53 percent. Column (4) introduces the Tax Rate variable, which appears to be negative and significant. A 10 percent increase in Tax Rate decreases  $IFI_{it}$  by about 13.8 percent. Other variables have similar sign and significance as in column (3). Column (5) introduces a Capital control variable, which is negative and insignificant. This implies that Capital control has no direct impact on  $IFI_{it}$ .

Table 6 shows the regression results of taking the cross-border equity holdings measure  $EQ_{it}$  as the dependent variable for the years 1990 to 2003. Trade openness is positive and significant in columns (1) and (2) but loses significance in columns (3) to (5). Output per capita variable is positive in column (2) but changes sign in column (3). Both financial depth and stock market capitalization variables are positive and significant throughout. A 10 percent increase in Financial Depth increases  $EQ_{it}$  on average, by about 15 percent and a 10 percent increase in Stock Market Capitalization increases  $EQ_{it}$ , on average, by about 36 percent. Tax Rate and Capital control variables are negative and insignificant, implying that these variables have no direct impact on  $EQ_{it}$ .

**Table 6.** Analysis of Australia's international equity integration, 1990–2003

|                             | (1)             | (2)              | (3)                 | (4)                 | (5)               |
|-----------------------------|-----------------|------------------|---------------------|---------------------|-------------------|
| Trade Openness              | 4.53<br>(4.92)* | 3.72<br>(3.23)** | 0.18<br>(0.57)      | 0.16<br>(0.48)      | 0.08<br>(0.26)    |
| Log GNI per capita          |                 | 1.52<br>(1.15)   | −0.89<br>(−2.92)*** | −0.81<br>(−2.17)*** | −0.22<br>(−0.41)  |
| Financial Depth             |                 |                  | 1.68<br>(5.17)*     | 1.64<br>(4.63)*     | 1.23<br>(2.86)*** |
| Stock Market Capitalization |                 |                  | 0.40<br>(4.67)**    | 0.39<br>(4.20)*     | 0.30<br>(2.83)*** |
| Tax Rate                    |                 |                  |                     | −0.14<br>(−0.39)    | −0.61<br>(−1.31)  |
| Capital control             |                 |                  |                     |                     | −1.57<br>(−1.49)  |
| Adjusted $R^2$              | 0.64            | 0.65             | 0.98                | 0.98                | 0.98              |

Note: t-statistics in parentheses. Dependent variable is  $EQ_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.1, 0.05 and 0.01 confidence level, respectively.

Table 7 shows the regression results for Australia, by taking the cross-border equity holdings measure  $EQSHARE_{it}$ , as the dependent variable for the years 1990 to 2003. Table 7 introduces Trade Openness as an independent variable, which appears positive and significant throughout. The average value of Trade Openness is 0.99. A 10-percentage point increase in the Trade Openness is associated with a 9.9 percentage point increase in  $EQSHARE_{it}$ . The overall explanatory power is 0.82 in column (1).

**Table 7.** Analysis of Australia's gross equity share, 1990–2003

|                             | (1)             | (2)              | (3)              | (4)               | (5)               |
|-----------------------------|-----------------|------------------|------------------|-------------------|-------------------|
| Trade Openness              | 1.58<br>(7.66)* | 1.27<br>(5.63)*  | 0.71<br>(4.78)*  | 0.71<br>(4.46)*   | 0.70<br>(4.09)**  |
| Log GNI per capita          |                 | 0.59<br>(2.27)** | 0.20<br>(1.41)   | 0.20<br>(1.14)    | 0.28<br>(1.01)    |
| Financial Depth             |                 |                  | −0.20<br>(−1.31) | −0.20<br>(−1.19)  | −0.26<br>(−1.12)  |
| Stock Market Capitalization |                 |                  | 0.18<br>(4.57)*  | 0.18<br>(4.16)*   | 0.17<br>(2.99)*** |
| Tax Rate                    |                 |                  |                  | −0.004<br>(−0.02) | −0.07<br>(−0.28)  |
| Capital control             |                 |                  |                  |                   | −0.22<br>(−0.39)  |
| Adjusted $R^2$              | 0.82            | 0.86             | 0.9684           | 0.9644            | 0.9602            |

Note: t-statistics in parentheses. Dependent variable is  $EQSHARE_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.01, 0.05 and 0.1 confidence level, respectively.

Output per capita is introduced in columns (2) to (5), which appears to be positive throughout. This variable is positive and significant in column (2), but it loses size and significance in columns (3) to (5). In column (2), the value of Output per capita is 0.59. A 10-percentage point increase in the Output per capita is associated with a 5.9 percentage point increase in  $EQSHARE_{it}$ . The explanatory power rises from 0.82 to 0.86 upon introducing this variable.

Financial Depth and Stock Market Capitalization variables are introduced in columns (3) to (5). The Financial Depth variable is negative and insignificant throughout, implying that this variable increases international trade in debt instruments. The Stock Market Capitalization is positive and significant throughout. The average value of Stock Market Capitalisation is 0.17. A 10-percentage point increase in Stock Market Capitalization is associated with a 1.7 percentage point increase in  $IFIGDP_{it}$ . The overall explanatory power rises from 0.86 to 0.96, upon introducing these variables.

Tax Rate is introduced in columns (4) and (5). Tax Rate has a negative value and it is insignificant. Capital Control is introduced in column (5). This variable also has a negative value and it is insignificant.

Table 8 shows the results the regression results for Australia by taking the stock market capitalization as share of equity liabilities as the dependent variable, namely  $FELSTK_{it}$ , for the years 1990 to 2003. Trade openness is positive and significant as shown in columns (1) and (2) but changes sign and loses significance from columns (3) to (5). In column (1), a 10 percent increase in Trade Openness increases  $FELSTK_{it}$  by 5.6 percent. The overall explanatory power is poor at 0.28. Column (2) introduces Output per capita, which is negative and insignificant. Trade Openness remains positive and significant. Column (3) introduces Financial Depth variable, which is positive and significant. A 10 percent increase in Financial Depth increases  $FELSTK_{it}$  by 7.3

**Table 8.** Analysis of stock market capitalisation as share of equity liabilities, 1990–2003

|                    | (1)              | (2)               | (3)              | (4)               | (5)                |
|--------------------|------------------|-------------------|------------------|-------------------|--------------------|
| Trade Openness     | 0.56<br>(21.45)* | 0.68<br>(2.08)*** | −0.39<br>(−1.05) | −0.48<br>(−1.4)   | −0.56<br>(−1.63)   |
| Log GNI per capita |                  | −0.01<br>(−0.36)  | −0.01<br>(−0.91) | 0.07<br>(1.27)    | 0.27<br>(1.52)     |
| Financial Depth    |                  |                   | 0.73<br>(3.69)*  | 0.52<br>(2.35)*** | 0.13<br>(0.33)     |
| Tax Rate           |                  |                   |                  | −0.61<br>(−1.73)  | −0.82<br>(−2.1)*** |
| Capital control    |                  |                   |                  |                   | −1.07<br>(−1.18)   |
| Adjusted $R^2$     | 0.28             | 0.23              | 0.62             | 0.68              | 0.69               |

Note: t-statistics in parentheses. Dependent variable is  $FELSTK_{it}$ . \*, \*\*, \*\*\* indicate statistical significance at 0.01, 0.05 and 0.1 confidence level, respectively.

percent. Trade Openness changes sign and significance. Output per capita is negative and insignificant. Column (4) introduces Tax Rate variable, which turns out to be negative and insignificant. Trade Openness and Financial Depth variables have a similar sign and significance as column (3). Output per capita changes sign and becomes positive. Column (5) introduces Capital control, which is negative and insignificant. Tax Rate variable is negative and significant. Other variables have a similar sign and significance as column (4), however Financial Depth variable loses significance.

In summary at both the aggregate country level and the individual Australian level, the above results indicate that variables such as trade openness, Financial Depth and stock market capitalization are reasonably successful in explaining the variation over time in the degree of international financial integration.

### **Concluding Remarks and Policy Implications**

This paper presents theoretical and empirical evidence on policy-induced and market-inherent barriers to financial integration. The magnitudes and persistence of barriers to the integration of financial markets have implications for fiscal and monetary policies. In imperfectly integrated markets, regional factors are important in shaping policy decisions and the structures of financial markets differ across countries. These differences in financial structures affect transmission channels of monetary policy.

The integration of financial markets can be considered a relatively gradual process. Even though some forms of capital are relatively mobile internationally; the bulk of capital tends to be invested locally. These have two implications for policy makers: on the one hand, markets for securitized financial assets punish unsustainable economic policies relatively quickly. On the other hand, policy makers retain quite some leverage, in particular with regard to taxing those forms of capital that cannot easily move across borders.

This paper provides some insights into the empirical features of the growth in international cross-holdings of foreign assets and liabilities. The results show that the growth in goods trade and stock market capitalization are the key determinants of the growth in the scale of international balance sheets. Taxes and capital controls do not appear as significant variables in explaining movements in dependent variables. The analysis of the properties of the rates of return on foreign assets and liabilities suggest that international cross-holdings provide diversification opportunities against fluctuations in domestic market returns.

Trade openness is a significant explanatory variable in determining the movement in all our dependent variables, namely international financial integration, cross-border equity holdings as a share of external holdings and foreign liability holdings as a ratio of stock market capitalization. Positive and significant trade openness implies that those factors that stimulate trade in goods also stimulate trade in assets and, in addition, trades in goods and in assets are complementary activities.



The dependent variables – namely total foreign assets and liabilities as a ratio of GDP; sum of portfolio equity and FDI assets and liabilities as a ratio of GDP; cross-border equity share in total external holdings – are strongly correlated with stock market capitalization as a share of GDP. In addition, the dependent variables – namely total foreign assets and liabilities as a ratio of GDP; sum of portfolio equity and FDI assets and liabilities as a ratio of GDP and foreign equity liabilities as a share of stock market capitalization – are strongly correlated with financial depth (ratio of M2 to GDP). This implies that, in the process of financial integration, the size of national financial systems should increase (relative to domestic GDP) starting with those countries with less developed financial markets.

Financial integration may be associated with local financial development for various reasons. First, financial integration is likely to increase the efficiency of the financial intermediaries and markets of less financially developed countries by stimulating the demand for funds and for financial services. There will be increased competition with more sophisticated and cheaper foreign intermediaries, associated with financial integration. The competition from these intermediaries may reduce the cost of financial services to the firms and households of countries with less developed financial systems, and thus expand the quantity of the local financial markets. In some cases, the additional supply of financial services may be provided by foreign intermediaries who may enter the local market by acquiring local banks or merging with them. The increase in competition may lead to better credit conditions and hence stimulate investment and economic growth. Second, financial integration may require improvements in national regulation, i.e. accounting standards, securities law, bank supervision and corporate governance to bring it in line with best-practice regulation in the integrating area. This convergence in regulatory standards will result in an improvement in the regulatory standards of less-developed financial markets. This improvement may help promote their development, by reducing adverse selection and agency costs as well as the distortions induced by inadequate regulation.

During the process of financial integration, the most financially developed countries may share the services provided by their financial system with the other integrating countries. The banks of more developed countries may provide cross-border loans to firms of less developed countries. In the case of equity markets, as these become more integrated, firms of less financially developed countries may easily access major financial centres by listing their shares on foreign stock exchanges for various reasons: to overcome equity rationing in the domestic market, to reduce their cost of capital by accessing a more liquid market, to adopt better governance system (Pagano *et al.*, 2001, 2002). By listing their shares abroad, the firms of less financially developed countries add to the stock market capitalization and turnover of those markets, rather than those of their domestic exchanges (Claessens *et al.*, 2002). In a fully integrated market, the total size of the financial market of the integrating area matters, i.e. firms

of a given country may have as equal access to financial services as those of all other countries even if their domestic financial sectors (scaled by GDP) differs from that in other countries.

Financially developed countries favour increased integration for several reasons. First, the efficient financial intermediaries of more advanced countries may expand abroad and gain a large market share at the expense of local institutions. Second, the enhanced competition and the economies of scale in financial intermediation stemming from integration may improve the working of financial markets in relatively developed economies. Finally, since financial market integration often goes along economic integration, more financially and economically developed countries can also reap benefits on this front.

### Notes

1. The IIP is a central concept in international macroeconomics, since it lays out the international balance sheet of foreign assets and liabilities held by Australian residents.
2. The purpose of the CPIS is to improve statistics of holdings of portfolio investment assets, namely equity, long term debt, and short term debt. CPIS collects comprehensive information, with geographical detail on the country of residence of the issuer, on the stock of cross-border equities, long term bonds and notes, and short term debt instruments related to international investment position (IIP).
3. In 1992, an IMF Working Party on the Measurement of International Capital flows found that, at the world level, recorded portfolio liabilities far outweighed portfolio assets by as much as \$US400 billion.
4. The countries were Argentina, Australia, Austria, Belgium, Bermuda, Canada, Chile, Denmark, Finland, France, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Korea, Malaysia, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Thailand, the United Kingdom, the United States, and Venezuela.
5. IMF (2000) *Results of the 1997 Coordinated Portfolio Investment Survey* (Washington, DC: IMF).
6. IMF (2003) *Portfolio Investment: Coordinated Portfolio Investment Survey (CPIS): Metadata* (Washington, DC: IMF).
7. Engel (2003) suggests that 'If we were building an economic model in which depth of equity markets were going to explain something about external holdings, I would guess that the variable we would end up trying to explain is foreign equity holdings as a fraction of total market capitalization. So what might be especially useful are regressions that have foreign equity liabilities divided by stock market capitalization as the dependent variable.'

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