Financial Integration and Economic Welfare

Sebnem Kalemli-Ozcan, University of Houston and NBER

Bent Sørensen, University of Houston and CEPR

Contents

1 Introduction

Across the world financial markets are becoming increasingly more integrated. Economists usually consider this a good thing while to the general public "globalization" sometimes has

a sinister ring. Obstfeld and Taylor (2004) provide an excellent account of the many issues surrounding global capital markets. Financial integration is likely to have positive effects on growth and risk sharing for most countries, although the quantification of these effects is elusive for researchers. A recognized draw-back of—maybe sudden—financial liberalization is the higher potential for financial crises when capital is footloose. In this survey, we attempt to consider how financial integration may increase economic welfare with little mentioning of potentially destabilizing effects. Financial crises can result from a range of factors and due the length of our short survey we refer the reader to Obstfeld and Taylor (2004) for a readable introduction to this issue.

Financial assets allow individuals to disentangle consumption from income. This heuristically takes two forms: i) saving and borrowing (or running down savings), which allows individuals to separate the timing of consumption from the timing of income and 2) income insurance (diversification) which allows individuals to maintain their usual level of consumption in the face of calamities such as job-loss, fire, or natural disasters—although individuals also want to insure against small misfortunes such as less than expected income during recessions.

At the international level the channelling of savings from (developed) countries with high saving to (developing) countries with low savings is referred to as "development finance" by Obstfeld and Taylor (2004). The clearest example of development finance may have been the financing of colonial infrastructure by British savers in the late 19th century. Development finance increases welfare for savers, who get a higher return, and investors who obtain physical investments faster than would otherwise occur without dramatic temporary declines in consumption to finance investment (as was forced upon the Russians during Stalin's industrialization in the 1930s). The bulk of developed country capital flows in recent years seems, however, to be better described as "diversification finance" where gross flows of capital are large while net flows are small. The benefits of diversification is that income from investments becomes less sensitive to local economic misfortunes.

It is tempting to think of development finance as a reflection of individuals' desire to smooth consumption intertemporally (associated with saving and dis-saving) and diversification finance as a reflection of individuals' desire to insure against unforeseen shocks (associated with assets with state contingent returns). Insurance contracts are, of course, explicitly

2

state contingent but assets such as equities and, more clearly, derivatives has returns that depends on future contingencies. In reality, things are less clear-cut: individuals save for retirement and decide to diversify their life-cycle saving and even a fire insurance has a temporal aspect as premiums are paid up front while pay-outs, if they occur, come later.

Allen and Gale (1997) formulate a model where inter-temporal smoothing can be defined precisely as the aggregate amount of physical assets carried over from time period to time period but in the real world it can be hard to clearly identify inter-temporal smoothing from pure insurance. Nonetheless, in section 2, we will start this survey by discussion net capital flows and potential growth and welfare effects from better international allocation of capital. Our survey of this area is very selective relative to the very large literature and the interested reader will have no trouble locating more comprehensive surveys of this literature. In section 3, we discuss international risk sharing and the size of potential gains from risk sharing. Section 4 focus on determinants of risk sharing.

2   Net Capital Flows: Financial Integration and the Allocation of Capital

The most powerful argument in favor of international capital mobility, voiced by Stanley Fischer, Maurice Obstfeld, Kenneth Rogoff, and Larry Summers, is that it facilitates an efficient global allocation of savings by channelling financial resources to their most productive uses, thereby increasing economic growth and welfare around the world. Other prominent academics such as Joseph Stiglitz, Dani Rodrik, and Jagdish Bhagwati are among the skeptics who argue that capital account liberalization does not result in a more efficient allocation of world wide capital because international capital flows are driven by animal spirits and have little connection to real economic activity. There is extensive research on both costs and benefits of international financial integration. We will mostly focus on the benefits as we summarize below.

2.1 Capital allocation in neoclassical growth models

Closed economy neoclassical growth models—such as those associated with Solow and Ramsey—highlights the importance of saving, technological progress, and population growth. One robust prediction of these models is that the differences in output per worker across countries can be due to differences in saving rates and population growth. Another prediction is that countries exhibit slow convergence to their steady-state levels of output per worker due to the fact that new investment must be financed by domestic savings.

In the context of an integrated global economy these models imply that world wide capital gets allocated in the most efficient way and that cross-country differences in rates of return to capital disappear. For the Solow model, where countries use the same technology, this implies instantaneous convergence of returns and the equalization output per worker in all countries. In reality, there are frictions in international capital markets and the more severe these are the slower the convergence of returns.

Barro, Mankiw, Sala-i-Martin (1995) investigate capital mobility in a neoclassical growth model with one particular kind of frictions. They assume that capital market imperfections arise due to moral hazard problems. The key idea is that creditors can seize physical capital but not human capital and, therefore, human capital cannot serve as collateral. Although the reality of these assumptions is debatable, this model has been used as a workhorse model since it delivers more realistic speed-of-convergence rates. The inability to borrow against human capital slows down the accumulation of physical capital in an open economy and provides an explanation for the slow convergence in per capita output even across regions linked by integrated financial markets.[1] Obstfeld and Rogoff (1995) develop an alternative small open economy Overlapping Generations (OLG) model where borrowing is limited to be at most a fraction of current output and shows that this model also may explain slow convergence.

These type of models rely on the differences in cross-country capital stocks to explain cross-country income and welfare differences. In reality technological progress is endogenous and can contribute to the explanation of cross-country income differences and slow diffusion

---

[1] Barro and Sala-i-Martin find a convergence rate of 2% for U.S. states and Japanese prefectures—rates similar to those found at the country level.

of technology might contribute to slow convergence.

2.2 Endogenous productivity

Endogenous growth models focus on endogenizing productivity and thus can offer various channels through which global integration can affect integrating countries' growth rates and welfare. The pioneering work of Romer (1986), and Lucas (1988) started the era of endogenous growth models. The basic AK model underlines the importance of learning-by-doing in generating persistent growth. The open economy version of the AK model is a very good illustration of the fact that international capital market integration can raise the world output level by channelling the world capital to its most productive global use. The raise in the steady-state growth rate will hold even when countries have identical riskless autarky interest rates. This is simply because with capital market integration individuals will put a larger fraction of their wealth into high yielding but risky investments, which in turn raises growth as argued in detail by Obstfeld (1994).

Another implication of Romer type endogenous growth models is that when two economies integrate their steady state growth rate will raise since they can exploit scale economies better (Rivera-Batiz and Romer, 1991). It is also possible to have a lower level of growth after opening to trade as shown in Grossman and Helpman (1990) (via differences in the relative prices of the goods). Other dynamic stochastic general equilibrium models show that an increase in the productivity in the home country shifts the world investment towards the home country which then will increase growth—see Obstfeld and Rogoff (1995) for further details.

2.3 Composition of capital flows

Productivity can also effect the composition of capital flows. Wei (2000) and Wei and Wu (2002) show that countries with better public institutions and less corruption are likely to attract more FDI relative to bank loans. Albuquerque (2003) finds that countries with low investor protection receives disproportionately large flows of foreign direct investment relative to portfolio investments. He interprets this finding as the result of direct investment being hard to expropriate by host governments and he shows that a calibrated general equilibrium

model with this feature can mimic some of the observed patterns.

2.4   Growth and welfare

Financial integration could lead to an increase in country's growth rate and welfare thorough a number of channels. The direct channels that work via net flows are 1) allowing investment to be higher (or lower) than domestic savings, 2) reducing cost of capital via a more efficient allocation of capital (Henry, 2000; Stulz, 1999), 3) transferring technology (Grossman and Helpman, 1991), 4) stimulating domestic financial development (Levine, 2005; Bekaert, 2001). An indirect channel that can operate through either net flows or gross flows is an increase in specialization due to financial market integration which may lead to higher growth and welfare (Kalemli-Ozcan, Sørensen, and Yosha, 2003; Imbs and Wacziarg, 2003; Obstfeld, 1994; Acemoglu and Zilibotti, 1997). However, as noted by Obstfeld and Taylor (2004), one-way net development flows from rich to poor countries have stayed at low levels since the 1970s in spite of the large increase in two-way gross diversification flows. In fact net flows have not yet reached the levels that were attained at the start of the twentieth century. Capital may not be entering poor countries due to factors such as weak property rights as shown by Alfaro, Kalemli-Ozcan, Volosovych (2005). There is an extensive empirical literature that shows that international capital flows are not consistent with the predictions of standard neoclassical model in the sense that capital is not flowing from capital abundant countries to capital scarce countries but just the opposite.[2] We return to the discussion of barriers to capital flows in the next section.

We have learned from the last 20 years growth research that two-thirds of the variation in cross-country output per worker is accounted by total factor productivity (TFP) and only one-third is accounted by capital. Does this imply that if a country opens up its capital account, it can raise its capital so that one-third of the gap in its income and welfare compared to rich countries will be permanently erased? The answer is no since the domestic saving would reach the level where the capital stock is at the steady state and the gain an immediate convergence of the capital stock is therefore transitory compared to the situation where the convergence would occur slowly from savings. There is also the additional service on foreign

---

[2]For recent contributions and a survey of the literature see Alfaro, Kalemli-Ozcan, Volosovych (2005) and Reinhart and Rogoff (2005).

debt and, maybe more importantly, the optimal capital stock itself depends on TFP and TFP likely depends on institutional factors such as protection of property rights—the same factor that are important for capital flows. As shown by Blomstorm, Lipsey and Zejan (2000) and Clark and Feenstra (2003) in a world of completely mobile capital, the amount of physical capital installed in a country, relative to the world average, is fully explained by total factor productivity. Building on this Kalemli-Ozcan, Reshef, Sørensen, and Yosha (2005) and Ekinci, Kalemli-Ozcan and Sørensen (2005) show that capital flows between regions *within* countries such as the United States and Germany are consistent with the predictions of neoclassical models while those *between* European countries are not.

Standard estimates of production function parameters and TFP imply that although poor countries steady state level of capital stock is far below that of rich countries they themselves are not that far away from their own steady state. Thus even instantaneous convergence to the steady state as a result of opening up the capital account might deliver small welfare gains. This is particularly true, if the steady state reflects the same domestic distortions and institutional weaknesses that deter foreign capital inflows in the first place. Gourinchas and Jeanne (2005) calculated the welfare gains resulting from gaining access to foreign capital as a means to speed convergence. They use a Ramsey growth model for their calibration exercise and find very small welfare gains. The welfare gains they find are equivalent to the welfare gain from a 1-3% permanent increase in consumption, at most. One reason for this low number is that for a country that is very close to its steady state opening up the capital account does not mean much since the cost of foreign borrowing is close to the return. Another reason is that Ramsey model delivers very convergence rates—about 11%—which is at odds with the empirical estimates of convergence rates of about 2%. The faster the convergence, the less gains there are from integrating. A final reason Gourinchas and Jeanne (2005) find small welfare gains from capital market integration lies in the high discount rate they choose (a combination of the discount rate and population growth rate). This puts relatively less weight on the immediate future where the capital gap really matters. They note that increasing TFP could lead to welfare gains that are an order of magnitude higher than the gains obtained from financial integration. Thus, the main implication of their result is that if a country can find a way to increase future TFP, maybe by permanent institutional reforms, then an open capital account can enhance welfare.

7

One reason why some investment in some countries is below the level predicted by neo-classical models is that price distortions and transaction costs can drive a wedge between domestic and world price of capital. Hence, cost distortions can reduce long-run growth and diminish the welfare gains from financial opening. There is extensive research on the cross-country variation of relative cost of capital and the distortions that lead to this price variation. Financial and trade openness seem to be the two important factors in reducing the size of distortions. We turn to a brief summary of the empirical literature on these topics.

2.5 Empirical evidence

Young (1995) shows that the East Asian experience is fully consistent with an exogenous growth model with diminishing returns to capital. On the other hand, recent research highlights the importance of TFP as opposed to factor accumulation in explaining international differences in output per worker (Hall and Jones (1999); Klenow and Rodriquez-Clare (1997)). In general, the empirical growth literature points to political and institutional factors as the main determinants of growth; however, identifying causality has always been a sticky issue.

Many researchers look at the effects of financial development on growth. We refer the reader to the recent article by Levine (2005)—or the shorter summary by Aghion elsewhere in this volume—that does an excellent job of surveying this vast literature. Other researchers look at the effect of trade openness and financial openness on growth. There is little controversy regarding the effect of trade openness (Sachs and Warner (1995), Frankel and Romer (1999), Rodriquez and Rodrik (2001)) on growth, but this cannot be said for the potential effects of financial openness on growth. In fact, the empirical estimates of the growth effect of financial openness varies from large effects to absolutely no effect. Prasad et al. (2003) provide an excellent survey on this topic.

To summarize briefly, Bekaert et al. (2001) find equity-market liberalization leads to a 25-45% increase in financial development (as measured by domestic credit relative to GDP) and Henry (2000) finds that equity-market liberalization leads to investment booms. Henry (2003) and Stulz (1999) also discuss the evidence on decreasing cost of capital and more efficient capital allocation follow stock market liberalization. Empirical work on these issues are complicated by problems such as dating effective liberalization correctly and properly coding changes capital—see Quinn (1997). A deeper objection to empirical work on this

issue changes in policy towards liberalization are likely to be endogenous and reflecting the "institutions" of the country, where "institutions" are broadly defined to include the quality of markets, courts, government, etc. In recent work Klein (2003) shows that financial integration leads to the biggest gain in economic performance and welfare for developing countries when they achieved a minimum level of institutional development.

3 Gross Capital Flows: Risk sharing. Disentangling Consumption from Output

The idea that people trade assets in order to hedge themselves against future contingencies has been integrated in rigorous economic analysis following Arrow (1964) and Debreu (1959). Their—now standard—paradigm of complete markets allows us to think about risk allocation in the same way we think about the allocation of commodities over time or a cross section. The economic literature on risk sharing departs from the benchmark model of perfect markets, which in a setting of endowment economies under standard assumptions implies that consumption growth rates are equalized ("perfect risk sharing"). The assumption of endowment economies totally ignores the motivation behind development finance and, in reality, net capital flows are determined by both diversification and development motives. Among countries at similar levels of development it is likely that diversification motives matters most and Obstfeld and Taylor (2004) point out that the recent increase in gross capital flows indeed is mainly a "rich-rich" country story. While development finance may partly explain capital flows to accession countries we ignore this issue in the present sub-section. A country with large net flows of saving will, obviously, also want to diversify. However, it takes a large amount of foreign investment to provide income flows at an order of magnitude large enough to help stabilize average income significantly and most countries do not possess such large holdings of net foreign assets although this situation may describe small oil states. For the more common situation of small net international savings, countries need to sell large amounts (say, several times the level of GDP) of domestic assets to foreigners and it can then use the proceeds to purchase foreign assets whose returns will be less correlated with domestic output. This is the reason why we identify diversification with gross flows.

Macroeconomists typically focus on consumption smoothing. Consumption smoothing

relative to endowment shocks can be thought of as involving two steps: the smoothing of income relative to the endowment (for countries, the overall output can be considered the endowment) and smoothing of consumption relative to income which involves borrowing and lending or transfers. Although economists generally agree that risk sharing isn't perfect, a strikingly large amount of risk is shared (Mace, 1991; Nelson, 1994; Cochrane, 1991; Attanasio and Davis, 1996; Hayashi, Altonji, Kotlikoff, 1996). Risk is often shared on anonymous financial markets with individuals in distant locations. This in turn leads to the insurance of consumption of entire regions (states or provinces) against idiosyncratic income shocks (Crucini, 1999; Hess and Shin, 1998; Lewis, 1996; Kalemli-Ozcan, Sørensen, and Yosha, 2003; Mélitz and Zumer, 1999). However, financial integration between countries is still quite rudimentary to insure country level consumption much against aggregate shocks (Backus, Kehoe, and Kydland, 1992; Sørensen and Yosha, 1998) although Kalemli-Ozcan, Sørensen, and Yosha (2005) find positive income smoothing among EU countries for the most recent period and Sørensen, Wu, Yosha, and Zhu (2005) find that consumption also is less sensitive to output shock in the OECD since the mid 1990s.

The financial literature typically focusses on whether investors can obtain better risk-return trade-offs from investing in international markets using return distributions estimated from actual market returns. Grubel (1968) points out that international diversification can improve the mean-variance trade-off compared to holding a purely domestic portfolio and Lewis (1999) shows that this still seems to hold. Nonetheless, countries typically hold less foreign assets than seems optimal. Asdrubali, Sørensen, and Yosha (1996)—in an application to U.S. states—combine the estimation of income and consumption smoothing in a common framework that also quantified the role of federal net transfers in risk sharing. The role of international transfers in risk sharing is, however, quite modest, even within the European Monetary Union, see Balli and Sørensen (2006).

3.1 Potential welfare gains from risk sharing

How important is risk sharing for welfare? The literature demonstrates that the welfare gains from risk sharing, assuming exogenous output, are quite substantial. van Wincoop was the first to quantify potential welfare gains from risk sharing in a general equilibrium model. van Wincoop (1994) finds for OECD countries that *further* consumption smoothing (i.e., moving

10

from the actual consumption distribution to the perfect risk sharing allocation) would improve welfare by the same amount as would a permanent increase in consumption of 3%. Tesar (1995) explores the sensitivity of estimates of country-level welfare gains from risk sharing and found estimates that varied from near zero, in the case where output shocks are transitory, to about 2% when shocks are close to random walk. Baxter and Crucini, using a calibrated general equilibrium model, find that having access to a bond market, with returns that are not contingent on economic outcomes, is sufficient for smoothing consumption similarly to the perfect markets case in the face of transitory shocks, while state-contingent securities are necessary in the face of permanent shocks. Kalemli-Ozcan, Sørensen, Yosha (2001) build on these papers and construct a closed form expression for risk sharing under random walk shocks and constant relative risk aversion preferences.[3] They estimate potential welfare gains from risk sharing for U.S. states and European Union countries. They find potential welfare gains for countries at the same order of magnitude as van Wincoop and similar magnitudes for U.S. states, except that the gains can be much larger for oil states such as Wyoming and Alaska. The potential gains from risk sharing are based on a counterfactual thought experiment: moving from autarkic (rather than actual) consumption to perfect risk sharing.[4] Consumption often is subject to large taste-shocks (broadly defined) and if a researcher is not able to identify movements in consumption due to taste shocks he or she will mistake them for welfare reducing volatility. We, therefore, think that a more robust way of estimating the welfare improvement from risk sharing is to calculate the potential amount of risk sharing moving from autarky to perfect risk sharing and then combine this with a measure of how much risk sharing is actually obtained rather than attempting to construct measures based on the volatility of consumption.

---

[3]Obstfeld (1994b) provides a closed form solution for the welfare gains due to a reduction in consumption variability in a partial equilibrium setting.

[4]Kalemli-Ozcan, Sørensen, Yosha (2001) utilize the potential welfare gain as a measure of asymmetry of output shocks.

3.2 Empirical estimates of potential welfare gains from risk sharing in the 2005 expanded European Union

We display results from a resent application of these methods that is of particular relevance for Europe. Kalemli-Ozcan, Sørensen, and Yosha (2001) find that under simple assumptions, including logarithmic utility and iid normally distributed growth-rates, the welfare gain for country i from moving from autarky to perfect risk sharing with a group of countries can be expressed as,

$$\frac{100}{\delta} \left(\frac{1}{2} \sigma^2 + \frac{1}{2} \sigma_i^2 - \text{cov}^i \right) . \tag{1}$$

Here δ is the common intertemporal subjective discount rate which we set to 0.02 and σ^2 is the variance of the growth rate of per capita "real" aggregate GDP (in terms of purchasing power; i.e., deflated by the consumer price index) of the group of countries, σ_i^2 is variance of per capita real GDP of country i in autarky, and cov^i is the covariance of country-i GDP with aggregate GDP.[5]

The measure is calculated as the utility equivalent of a permanent increase in consumption expressed in percent. In any empirical implementation, the parameters σ^2, σ_i^2, and cov^i are estimated using regional and aggregate output data.

Demyanyk and Volosovych (2005) apply this method to evaluate the potential risk sharing benefits that would accrue to the 2005 European Union accession countries. In Table 1 we display their numbers for each accession country as well as for the longer standing members of the European Union. For large countries, such as Germany and the U.K., the potential welfare gains are minor at about one tenth of a percent, while the estimated gains for the accession countries can be very large. The largest estimate is 18.5% for Lithuania, which is very much a result of Lithuania's output being negatively correlated with aggregate output such that output pooling can decrease their volatility steeply. Likely, the actual welfare gain is going to be significantly smaller since perfect risk sharing is unlikely to obtain but also because the output composition of Lithuania is likely to change as its goods market gets integrated further with the European Union. Nonetheless, the numbers indicate that risk sharing benefits for the accession countries of joining the European Union can be large if

---

[5]Strictly speaking aggregate GDP cannot be log-normally distributed if each region's GDP is log-normally distributed but this standard approximation will not affect our results strongly.

they obtain sufficient financial integration.

4   Determinants of Risk Sharing

In the stylized Arrow-Debreu model contingent contracts can be written at no cost and full risk sharing will obtain. In the real world there are costs involved in "writing" contracts and contracts will only be written if the benefits exceeds the costs. The benefits are the gains from risk sharing which depends on the volatility of the output endowment and how much this volatility can be reduced from diversification.

The costs from establishing risk sharing contracts take many forms. Obstfeld and Rogoff (1995) provide a textbook treatment. A central result from their analysis is that even if financial markets are not perfect, financial markets will still be very important in facilitating risk sharing and intertemporal trade.

With the possible exception of family connections, financial assets are traded through financial intermediaries such as banks or exchanges and the amount of risk sharing obtained is determined by the amount and type of foreign assets hold. We next turn to a discussion of factors that may limit foreign asset holdings.

4.1   Home bias and barriers to international contracting: Moral hazard, asymmetric information, and sovereign risk

In the more developed world, financial intermediation is typically well developed within countries while cross-border intermediation has lagged behind. "Financial integration," therefore, typically refers to the lowering of barriers (or costs) of cross-border financial intermediation. International financial intermediation poses particular problems. These can be grouped in terms of a) higher costs associated with international assets trade, b) lower information transparency for foreign investors, c) limits to enforcement of international contracts, d) and currency risk.

The portfolio holdings of most countries exhibit "home bias." Home bias refers to the observation that countries hold much less foreign assets than predicted by standard models such as the CAPM-model. Some of the first papers to discuss this issue are those of French and Poterba (1991) and Tesar and Werner (1995). Recent studies include Ahearne, Griever,

and Warnock (2004) who study U.S. foreign equity holdings and Sørensen, Wu, Yosha, and Zhu (2005) who study home bias in foreign bond and equity holdings for OECD countries. Buch, Driscoll, and Ostergaard (2005) show that banks' asset portfolios also seem to be bias towards the home country.

Transactions costs associated with international asset trading is another likely candidate for explaining home bias. Domowitz, Glen, and Madhavan (2001) find that such costs are important, especially for emerging markets although Cooper and Kaplanis (1994) find that with reasonable level of risk aversion, observable costs of holding foreign equity do not explain home bias in equity holdings—they also show that inflation hedging is an unlikely explanation. Tesar and Werner (1995) find that foreign equity is being turned over at a higher rate than domestic equity which is hard to reconcile with higher trading costs of foreign equity. Warnock (2002) argues that the measurement of turnover rates may be problematic although he, similarly, finds no direct effect of transactions costs on home bias, while Mann and Meade (2002) find small but statistically significant effects of (directly measured) transactions costs. Overall, it seems that transactions costs may have a small effect on home bias but on their own cannot fully explain home bias.

Informational barriers. Another class of potential explanations of home bias centers on the role of information. Specifically, lack of information adding to the riskiness of foreign investment—see for example Gehrig (1993). Kang and Stulz (1997) demonstrate that Japanese investors overinvest in large firms, consistent with a role for informational costs and, in a recent article, Ahearne, Griever, and Warnock (2004) show that patterns of U.S. equity investments in foreign countries are consistent with informational asymmetries. Edison and Warnock (2004) find that equities that are cross-listed on a U.S. exchange do not seem to be subject to suffer from home bias in U.S. portfolios. Portes and Rey (2005) find that informational variables, such as telephone traffic, help explain home bias, consistent with a role for informational asymmetry. Coval and Moskowitz (1999) and Huberman (2001) even suggest that informational asymmetry may explain intranational investment patterns within United States.

Moral hazard and sovereign risk. The standard theory assumes there are no restrictions on the range of financial contracts people can sign and defaulting is not an option. In the real world moral hazard (Gertler and Rogoff, 1990) and sovereign risk (Eaton and Gersovitz,

14

1981; Bulow and Rogoff, 1989) create enforcement problems and this can significantly affect international investment and even the ability of the government of countries that are considered unstable to smooth transitory shocks through borrowing. Within the OECD defaults on government bonds are unlikely events, but tax and other policy variables can be tailored to fall disproportionally on foreign investors.

International risk sharing via multinational corporations. International diversification might be obtained indirectly through multinational corporations. Jacquillat and Solnik (1978) demonstrate that this channel is not able to provide much diversification for investors who attempt to lower their exposure to domestic shocks by purchasing stock of multinationals. Cai and Warnock (2004) find that taking into account "indirect" foreign investment via multinationals brings foreign investment closer to standard benchmarks, i.e., it makes apparent home bias smaller. Rowland and Tesar (2004) look at returns and find weak evidence that investing in multinationals helps provide diversification, but that further gains can be obtained from holding international assets. Looking at the returns to investors may, however, underestimate the role of multinational corporations in international risk sharing. Budd and Slaughter (2004), Budd, Konings, and Slaughter (2005) and Scheve and Slaughter (2005) find that risk often is shared between units of multinational firms through profit sharing or equalization of wages across units. For example, if a Canadian parent company enjoys high profits this is typically associated with higher wages in U.S. subsidiaries according to Budd and Slaughter (2004). protection it is not likely to the reverse the impact.

Further suggested explanations for home bias include Obstfeld and Rogoff (2000), who suggest that home bias is caused by high *costs of trading goods* internationally while Strong and Xu (2003) find that fund managers' *subjective expectations* are such that they are relatively more optimistic about high future returns for their home markets.

Hedging of currency risk may be another explanation for home bias: the international version of the CAPM alluded to above implicitly assumes Purchasing Power Parity (PPP). In the absence of PPP, investors may optimally want to deviate from the aggregate world portfolio in order to hedge currency risk as detailed by Adler and Dumas (1983). However, Cooper and Kaplanis (1994) do not find that inflation hedging is a likely explanation of home bias.

4.2 Evidence: Risk sharing and institutions

In this section we provide simple suggestive evidence that institutions broadly defined are important determinants of risk sharing. We limit ourselves to income insurance and we measure the amount of income insurance in, say, Germany, by one minus the coefficient in a regression of the annual growth of German Gross National Income (GNI) on the annual growth of German Gross Domestic Product (GDP) where both variables are in terms of deviations from world growth. This country-by-country measure of risk sharing is quite noisy and it is best considered a random variable centered around the true value.

In Figures 1 to 6 we plot the estimates of risk sharing currently obtained for European Union countries and potential entrants on the y-axis against various indicators of institutional development. We use numbers from Volosovych (2005) in our illustration and refer the reader to Volosovych (2005) or Sørensen, Wu, Yosha, and Zhu (2005) for details on the calculation of the risk sharing measure. We show how various country characteristics such as the output level, the distance to the London etc. correlates with the amount of income insurance obtained by showing 6 scatter plots. Table 2 provides a list of the countries considered.

Figure 1 shows that distance to the European financial center of London is inversely related to risk sharing obtained while Figure 2 reveals that risk sharing obtained is positively correlated with the ICRG index of investor protection.[6] Figure 3 shows that richer countries obtain more risk sharing while Figure 4 confirms the finding of Sørensen, Wu, Yosha, and Zhu (2005) that risk sharing obtained correlates negatively with home bias which we here measure simply as the amount of foreign portfolio equity holdings relative to GDP. Figures 5 and 6 show that high risk sharing also correlates positively with openness to trade and with the share of of banks with foreign ownership—an alternative measure of financial integration. Volosovych (2005) finds similar results for a larger sample. The natural question is which of these indicators of "good institutions" (including financial and trade openness) is the main determinant(s) of positive risk sharing. We do not supply results from multiple regressions here but it turns out to be hard to answer this question through country level regressions.

---

[6]This index is from International Country Risk Guide (ICRG) and reflects a combination of factors that affect the risk to foreign investment. It ranges from 0 to 4 , where 4 indicates very low risk. The subcomponents of the index are "Contract Viability/Expropriation", "Profits Repatriation" and "Payment Delays." It is rescaled from 0 to 10 where higher score means low risk and higher protection.

There is no doubt, as can be seen from the figures, that wealthy, financially integrated countries with good institutions obtain more risk sharing but there are not enough degrees of freedom to pin down the determinants in a more detailed fashion.[7]

To some extent this reflects that our indicators of good institutions may be caused by the same underlying factors which we speculate to be: absence of explicit or implicit barriers to trade in goods and securities, which includes investor protection, readily available information, and low costs of trading. We expect that financial integration in Europe will continue leading to non-negligible welfare gains along the dimensions described in the present survey.

---

[7]Volosovych (2005), using a larger sample, finds that investor protection seems to the most important institutional variable.

References

Acemoglu, Daron and Fabrizio Zilibotti (1997), "Was Prometheus Unbound by Chance? Risk, Diversification, and Growth," *Journal of Political Economy* 105, 709–751.

Adler, Michael and Bernard Dumas (1983), "International Portfolio Choice and Corporation Finance: A Synthesis," *Journal of Finance* 38, 925–84.

Ahearne, Alan G., William L. Griever and Francis E. Warnock (2004), "Information Costs and Home Bias: An Analysis of U.S. Holdings of Foreign Equities," *Journal of International Economics* 62, 313–336.

Albuquerque (2003), "The Composition of International Capital Flows: Risk Sharing Through Foreign Direct Investment," *Journal of International Economics* 61, 353-383.

Alfaro, Laura, Sebnem Kalemli-Ozcan and Vadym Volosovych (2005), "Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation," mimeo.

Allen, Franklin, and Douglas Gale, 1997, Financial Markets cycles and the asset structure of foreign trade, *International Economic Review* 36, 821–854.

Arrow, Kenneth (1964), "The Role of Securities in the Optimal Allocation of Risk Bearing," *Review of Economic Studies* 31, 91–96.

Asdrubali, Pierfederico, Bent E. Sørensen, and Oved Yosha (1996), "Channels of Interstate Risk Sharing: United States 1963–90," *Quarterly Journal of Economics* 111, 1081–1110.

Attanasio, Orazio, and Steve Davis (1996), "Relative Wage Movements and the Distribution of Consumption," *Journal of Political Economy* 104, 1227–1262.

Backus, David, Patrick Kehoe, and Finn Kydland (1992), "International Real Business Cycles," *Journal of Political Economy* 100, 745–775.

Balli, Faruk and Bent E. Sørensen (2006), The Impact of the EMU on Channels of Risk Sharing between Member Countries. Mimeo., University of Houston.

Barro, Robert, J. N. Gregory Mankiw, and Xavier Sala-i-Martin (1995), "Capital Mobility in Neoclassical Models of Growth," *American Economic Review* 85, 103–115.

Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad (2005), " Does financial liberalization spur growth?" *Journal of Financial Economics* 77, 3–55.

Blomstrom, Magnus, Lipsey, Robert E. and Zejan, Mario (2000), "Is Fixed Investment the Key to Economic Growth?," *Quarterly Journal of Economics* 111, 269–276.

Budd, John W. and Matthew J. Slaughter (2004), "Are Profits Shared Across Borders? Evidence on International Rent Sharing," *Journal of Labor Economics* 22, 525–552.

Budd, John W. Jozef konings and Matthew J. Slaughter (2005), "Wages and International Rent Sharing in Multinational Firms," *Review of Economics and Statistics* 87,73–84.

Bulow, Jeremy I. and Kenneth Rogoff (1989), "Sovereign Debt: Is to Forgive to Forget?" *American Economic Review* 79, 43–50.

Cai, Fang and Francis E. Warnock (2004), "International Diversification at Home and Abroad," Federal Reserve Board, International Finance Discussion Papers no. 793.

Clark, Gregory and Robert Feenstra (2003), "Technology in the Great Divergence," In: *Globalization in Historical Perspective,* National Bureau of Economic Research Conference Report.

Cochrane, John (1991), "A Simple Test of Consumption Insurance," *Journal of Political Economy* 99, 957–976.

Cooper, Ian A. and Evi Kaplanis (1994), "Home Bias in Equity Portfolios: Portfolios, Inflation Hedging, and International Capital Market Equilibrium," *Review of Financial Studies* 7, 45–60.

Coval, J. and T. Moskowitz (1999), "Home Bias at Home: Local Equity Preference in Domestic Portfolios," *Journal of Finance* 54, 2045–2074.

Crucini, Mario J. (1999), "On International and National Dimensions of Risk Sharing," Review of Economics and Statistics 81, 73–84.

Dahlquist, Magnus, Lee Pinkowitz, René M. Stulz and Rohan Williamson (2003), "Corporate Governance and the Home Bias," *Journal of Financial and Quantitative Analysis* 38, 87–110.

Debreu, Gerard (1959), *"Theory of Value."* (Yale University Press, New Haven).

Demyanyk, Yuliya and Vadym Volosovych (2005), 'Macroeconomic Asymmetry in the European Union: The Difference Between New and Old Members," CEPR Working Paper no. 4847.

Domowitz, Ian, Jack Glen and Ananth Madhavan (2001), "Liquidity, Volatility and Equity Trading Costs across Countries and over Time," *International Finance* 4, 221–255.

Eaton, Jonathan and Mark Gersovitz (1981), "Debt with Potential Repudiation: Theory and Estimation," *Review of Economic Studies* 48, 289–309.

Edison, Hali J. and Francis E. Warnock (2004, "U.S. Investors' Emerging Market Equity Portfolios: A Security-Level Analysis," *Review of Economics and Statistics* 86, 691–704.

19

Ekinci, Mehmet, Sebnem Kalemli-Ozcan, and Bent Sørensen (2005), "Capital Flows and across Europe: Do Regions Differ from Countries?," mimeo, University of Houston.

Frankel, Jeffrey A. and David Romer (1999), "Does Trade Cause Growth?" *American Economic Review* 89, 379–399.

French, Kenneth and Jim Poterba (1991), "Investor Diversification and International Equity Markets," *American Economic Review: Papers and Proceedings* 81, 222–226.

Gehrig, Thomas (1993), "An Information Based Explanation for the Domestic Bias in Foreign Exchange and Stock Markets," *Scandinavian Journal of Economics* 95, 97–109.

Gertler, Mark and Kenneth Rogoff (1990), "North-South Lending and Endogeneous Domestic Capital Market Inefficiencies," *Journal of Monetary Economics* 26, 245–266.

Gourinchas, Pierre-Olivier and Olivier Jeanne (2005), "The Elusive Gains from International Financial Integration," *Review of Economic Studies*, forthcoming.

Grossman, G., and E. Helpman, (1991), *Innovation and Growth in the Global Economy*. Cambridge: MIT Press.

Grubel, Herbert L. (1968), "Internationally Diversified Portfolios: Welfare Gains and Capital Flows," *American Economic Review* 58, 1299–1314.

Hall, Robert E. and Charles I. Jones, (1999), "Why Do Some Countries Produce So Much More Output per Worker than others?," *NBER Working Paper 6564* .

Hayashi, Furimo, Joseph Altonji, and Lawrence Kotlikoff (1996), "Risk Sharing Between and Within Families," Econometrica 64, 261–94.

Henry, Peter Blair (2000), "Stock Market Liberalization, Economic Reform, and Emerging Market Equity Prices," *Journal of Finance* 55, 529–564.

Henry, Peter Blair (2003), "The Cost of Capital and Economic Growth," *American Economic Review* 93, 91–96.

Hess, G.D. and K. Shin (1998), "Intranational Business Cycles in the United States," *Journal of International Economics* 44, 289–313.

Huberman, G. (2001), "Familiarity Breeds Investment," *Review of Financial Studies,* 14, 659–680.

Jacquillat, Bertrand and Bruno Solnik (1978), "Multinationals Are Poor Tools for Diversification," *Journal of Portfolio Management* 4, 8–12.

Kalemli-Ozcan, Sebnem, Bent E. Sørensen, and Oved Yosha (2001), "Regional Integration, Industrial Specialization and the Asymmetry of Shocks across Regions," *Journal of International Economics* 55, 107–137.

Kalemli-Ozcan, Sebnem, Bent E. Sørensen, and Oved Yosha (2003), "Risk Sharing and Industrial Specialization: Regional and International Evidence," *American Economic Review* 93, 903–918

Kalemli-Ozcan, Sebnem, Bent E. Sørensen, and Oved Yosha (2005), "Asymmetric Shocks and Risk Sharing in a Monetary Union: Updated Evidence and Policy Implications for Europe," In Harry Huizinga and Lars Jonung, eds. *The Internationalisation of Asset Ownership in Europe*, Cambridge University Press, New York.

Kalemli-Ozcan, Sebnem, Ariell Reshef, Bent E. Sørensen, and Oved Yosha (2005), "Capital Flows and Productivity: Evidence from U.S. States," mimeo, University of Houston and New York University.

Kang, Jun-Koo and René M. Stulz (1997), "Why Is There a Home Bias? An Analysis of Foreign Portfolio Equity Ownership in Japan," *Journal of Financial Economics* 46, 3–28.

Klenow, Peter J. and Rodriguez-Clare (1997), "The NeoClassical Revival in Growth Economics: Has It Gone Too Far?," *NBER Macroeconomics Annual* 73–114.

Levine (2005), "Finance and Growth: Theory and Evidence," In: Philippe Aghion and Steven Durlauf, eds. *Handbook of Economic Growth*, Amsterdam: Elsevier Science.

Lewis, K. (1996) "What Can Explain the Apparent Lack of International Consumption Risk Sharing?" Journal of Political Economy 104, 267–297.

Lewis, Karen (1999), "Trying to Explain Home Bias in Equities and Consumption," *Journal of Economic Literature* 37, 571–608.

Lucas, Robert (1988), "On the Mechanics of Economic Development," *Journal of monetary Economics* .

Mace, Barbara, (1991), "Full Insurance in the Presence of Aggregate Uncertainty," *Journal of Political Economy* 99, 928–956.

Mann, Catherine and Ellen Meade (2002), "Home Bias, Transactions Costs, and Prospects for the Euro: A More Detailed Analysis," Working Paper. Centre of Economic Performance, London School of Economics.

Mélitz, J., Zumer, F., (1999) Interregional and international risk sharing and lessons for EMU. *Carnegie-Rochester Conference Series on Public Policy* 51, 149–188.

Nelson, J. A. (1994) On Testing for Full Insurance using Consumer Expenditure Survey Data. *Journal of Political Economy* 102, 384–394.

Obstfeld, Maurice, (1994), "Are Industrial-Country Consumption Risks Globally Diversified?" in: L. Leiderman and A. Razin (eds.): *Capital Mobility: The Impact on Consumption, Investment and Growth*. New York: Cambridge University Press.

Obstfeld, Maurice (1994a), "Risk-Taking, Global Diversification, and Growth," *American Economic Review* 84, 1310–1329.

Obstfeld, Maurice (1994b), "Are Industrial-Country Consumption Risks Globally Diversified?," in: Leonardo Leiderman and Assaf Razin, eds., *Capital Mobility: The Impact on Consumption, Investment, and Growth* (Cambridge University Press, New York).

Obstfeld, Maurice and Kenneth Rogoff (2000), "The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?" *NBER Macroeconomics Annual 2000.*

Obstfeld, Maurice and Kenneth Rogoff (1995), *Foundations of International Macroeconomics*, MIT Press.

Obstfeld, Maurice and Alan M. Taylor (2004), *Global Capital Markets: Integration, Crisis, and Growth*, New York: Cambridge University Press.

Paul, Romer (1986), " Increasing Returns and Long-Run Growth," *Journal of Political Economy* 94, 1002–1037.

Portes, Richard and Hélène Rey (2005), "The Determinants of Cross Border Equity Flows," *Journal of International Economics* 65, 269–296,

Prasad,Eshwar, Kenneth Rogoff, Shang-Jin Wei and M. Ayhan Kose (2003), "Effects of Financial Globalization on Developing Countries: Some Empirical Evidence," *IMF Occasional papers.*

Reinhart, Carmen and Kenneth Rogoff (2004), "Serial Default and the "Paradox" of rich to poor Capital Flows," *American Economic Review* 94, 53–58.

Rivera-Batiz and Paul Romer (1991), "Economic Integration and Economic Growth," *Quarterly Journal of Economics* 106, 531–555.

Rodrik, Dani and Francisco Rodriguez (2001), "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence," *Macroeconomics Annual 2000.* Ed. Ben Bernanke and Kenneth S. Rogoff.

Rowland, Patrick F. and Linda L. Tesar (2004), "Multinationals and the Gains from International Diversification," *Review of Economic Dynamics* 7, 789–826.

Sachs, Jeffrey and Andrew Warner (1995), " Economic Reform and the Process of Global Integration," *Brookings Papers on Economic Activity* 1, 1–118.

Sørensen, Bent E. and Oved Yosha (1998), "International Risk Sharing and European Monetary Unification," *Journal of International Economics,* 45, 211–238.

Sørensen, Bent E., Yi-Tsung Wu, Oved Yosha, and Yu Zhu (2005), "Home Bias and International Risk Sharing: Twin Puzzles Separated at Birth," mimeo., University of Houston, Binghamton University, and Tel Aviv University.

Strong, Norman and Xinzhong Xu (2003), "Understanding the Equity Home Bias: Evidence from Survey Data," *Review of Economics and Statistics* 85, 307–12.

Stulz (1999), "International Portfolio Flows and Security Markets," In: *International Capital Flows* eds: Martin Feldstein, University of Chicago Press.

Tesar, L. (1995), "Evaluating the Gains from International Risk Sharing," *Carnegie-Rochester Conference Series on Public Policy* 42, 95–143.

Tesar, Linda and Ingrid Werner (1995), "Home Bias and High Turnover," *Journal of International Money and Finance* 14, 467–92.

Warnock, Francis E. (2002), "Home Bias and High Turnover Reconsidered," *Journal of International Money and Finance* 21, 795–805.

Wei, Shang-Jin (2000), "Local Corruption and Global Capital Flows," *Brookings Papers in Economic Activity* 2, 303–346.

Wei, Shang-Jin and Yi Wu (2002), "Negative Alchemy? Corruption, Composition of Capital Flows, and Currency Crises," in *Preventing Currency Crises in Emerging Markets*, Sebastian Edwards and Jeffrey A. Frankel, editors. The University of Chicago Press, Chicago.

van Wincoop, E. (1994), "Welfare Gains from International Risk Sharing," *Journal of Monetary Economics* 34, 175–200.

Volosovych, Vadym (2006), "Financial Market Integration, Risk Institutions: Theory and Evidence," mimeo., University of Houston.

Young, Alwyn (1995), "The Tyranny of Numbers," *Quarterly Journal of Economics* 110, 641–80 .

Table 1: **Potential risk sharing acceding and EU-15 countries, 1994-2001**

	Pot. Risk Sharing G_i	Variance σ_i^2	Covariance cov^i	Correlation $corr^i$
Acceding countries				
Cyprus	1.06	4.61	0.39	0.28
Czech Republic	2.97	11.26	−0.10	−0.05
Estonia	7.80	28.22	−1.28	−0.37
Hungary	0.87	3.31	0.12	0.10
Latvia	6.97	25.81	−0.82	−0.25
Lithuania	18.55	68.95	−2.42	−0.45
Malta	0.49	3.11	0.79	0.69
Poland	1.24	7.06	1.27	0.74
Slovak Republic	3.18	12.88	0.30	0.13
Slovenia	0.96	4.64	0.62	0.44
Arithmetic Mean	4.41	–	–	0.13
Weighted Average	2.73	–	–	0.38
EU-15 Countries				
Austria	0.06	0.95	0.56	0.88
Belgium	0.16	1.21	0.50	0.70
Denmark	0.31	1.41	0.29	0.38
Finland	1.07	5.68	0.90	0.59
France	0.17	0.96	0.35	0.55
Germany	0.08	1.16	0.64	0.91
Greece	0.53	1.33	−0.19	−0.26
Ireland	1.66	7.77	0.77	0.43
Italy	0.12	0.25	0.10	0.32
Luxembourg	2.50	12.17	1.30	0.58
Netherlands	0.26	1.18	0.29	0.41
Portugal	0.22	1.21	0.38	0.53
Spain	0.24	1.20	0.33	0.46
Sweden	0.17	1.88	0.81	0.91
United Kingdom	0.18	0.36	0.04	0.11
Arithmetic Mean	0.51	–	–	0.50
Weighted Average	0.19	–	–	0.49

Notes: Column 1 shows potential risk sharing calculated based on 1994–2001 data as $10^2 \cdot \frac{1}{\delta}\ (\frac{1}{2}\,\sigma^2 + \frac{1}{2}\sigma_i^2 - \mathrm{cov}^i)$, where $\sigma_i^2 = \mathrm{var}(\Delta \log \mathrm{GDP}^i)$, $\mathrm{cov}^i = \mathrm{cov}\,(\Delta \log \mathrm{GDP}^i, \Delta \log \mathrm{GDP})$, σ^2 is the variance of the total EU-25 GDP growth, i.e. $\sigma^2 = \mathrm{var}(\Delta \log \mathrm{GDP})$, $10^4 \cdot \sigma^2 = 0.42$, and $\delta = 0.02$. The potential welfare gain is the gain—in terms of equivalent permanent consumption increases—that a country would obtain from fully diversifying any country-specific variance in output expressed in terms of the percent permanent increase in GDP that would result in the same utility gain. Column 2 is $10^4 \cdot \sigma_i^2$, and Column 3 is $10^4 \cdot \mathrm{cov}^i$. Column 4 is a correlation of each country's GDP growth with the total EU-25 GDP growth, i.e., $corr^i = corr(\Delta \log \mathrm{GDP}^i, \Delta \log \mathrm{GDP})$. Weighted averages are population-weighted.

Table 2: **Country List**

Codes	Names
AUT	Austria
BEL	Belgium
BGR	Bulgaria
HRV	Croatia
CYP	Cyprus
CZE	Czech Rep.
DNK	Denmark
EST	Estonia
FIN	Finland
FRA	France
DEU	Germany
GRC	Greece
HUN	Hungary
ISL	Iceland
IRL	Ireland
ITA	Italy
LVA	Latvia
LTU	Lithuania
LUX	Luxembourg
MDA	Moldova
NLD	Netherlands
NOR	Norway
POL	Poland
PRT	Portugal
ROM	Romania
SVK	Slovak Rep.
SVN	Slovenia
ESP	Spain
SWE	Sweden
CHE	Switzerland
TUR	Turkey
GBR	U.K.

Figure 1: Financial Integration and Distance to Financial Center: 1985-2004
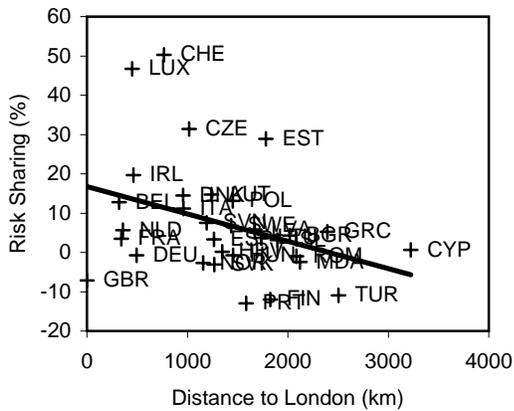
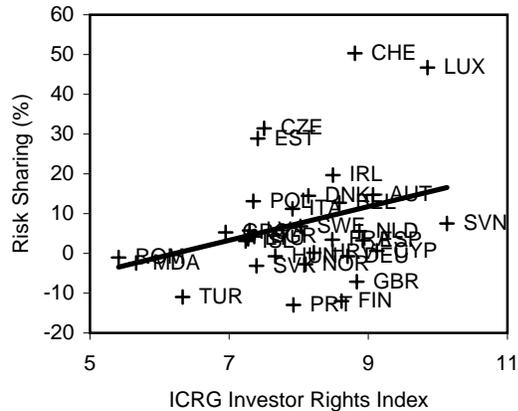Figure 2: Financial Integration and Investor Rights: 1985-2004

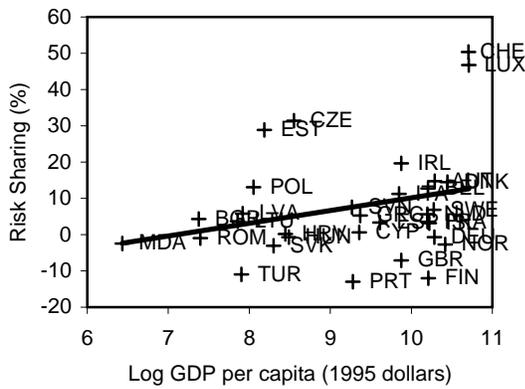Figure 3: Financial Integration and Output: 1985-2004

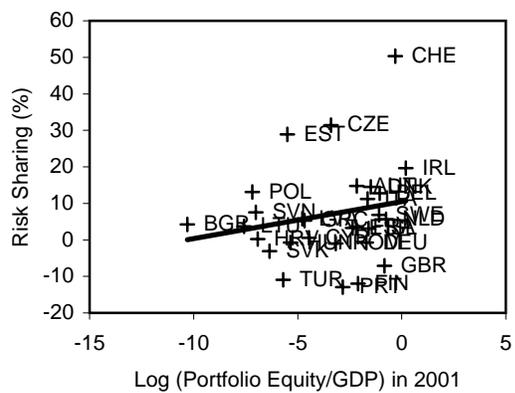Figure 4: Financial Integration and Home Bias: 1985-2004

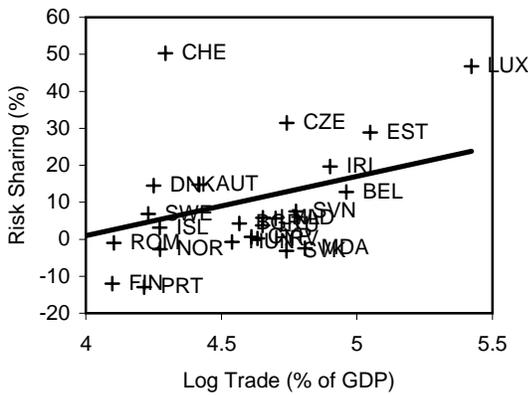
Figure 5: Financial Integration and Openness: 1985-2004

Figure 6: Financial Integration and Foreign Bank Ownersip (EU Only): 1985-2004