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Risk Sharing and Portfolio Allocation in EMU [*]

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Abstract

This paper investigates whether risk sharing, measured as income and consumption smoothing, among countries in the EU and the European Economic and Monetary Union (EMU) has increased since the adoption of the euro. We ask: Have the recent increase in foreign equity and debt holdings been associated with more risk sharing? Do certain classes of assets (debt, equity, foreign direct investment) provide relatively more or less risk sharing? Do liabilities provide risk sharing differently from assets? Do investments in EMU countries provide more or less risk sharing per euro invested compared to investments in non-EMU countries? Has increased banking integration improved risk sharing? Due to the short span of years since the introduction of the euro, our results are tentative, but they indicate that the monetary union has facilitated risk sharing, although the level of risk sharing is still much below the level found among U.S. states.

Executive Summary

This paper investigates whether risk sharing in Europe has increased since the adoption of the euro. We consider the effect on risk sharing of diversified financial ownership for both EMU countries and EU countries outside the monetary union.

Diversified financial ownership may lead to better risk sharing if the income flows from foreign asset holdings help separate a country's income growth rate from the growth rate of its output, so-called "income risk sharing." If a country can issue any kind of assets that makes its income proportional to aggregate EMU output, perfect risk sharing among EMU members will have been accomplished. In principle, this could be achieved by issuing liabilities that transfer the right to domestic output to foreign investors, while using the proceeds to purchase rights to aggregate EMU output.

While perfect income risk sharing is unlikely to be achieved, a country may achieve a high degree of risk sharing if the return on foreign assets is highly correlated with EMU output growth and the return on foreign liabilities is highly correlated with domestic output growth. Such correlations would help smooth a country's income relative to its output and the level of income risk sharing would be roughly proportional to the quantities of foreign assets held and liabilities issued. We therefore consider the effect of EMU countries' portfolio diversification on risk sharing.

We measure the amount of "consumption risk sharing" obtained beyond income risk sharing, that is, the degree to which the growth rate in consumption is detached from output growth. Consumption risk sharing is determined by income risk sharing and by patterns of saving. Simplified, one may think of the way people share risk as a situation where people first attempt to insure their income as much as possible by holding a diversified portfolio, and conditional on income, decide how much to further smooth consumption by adjusting saving.

We also consider the effect of banking market integration on risk sharing. Banks may affect risk sharing through their lending behavior and hence banking integration may work as a channel of risk sharing in addition to that of financial asset ownership. Both domestic and foreign banking consolidation may be associated with improved risk sharing and we consider the effect of both.

Our empirical results are as follows. We document that overall income risk sharing has been higher in the five years following the introduction of the euro than during the previous five year period, and that the improvement has been higher for the group of EMU members. In the same period, however, overall consumption risk sharing has decreased,

except among EMU members. Our results imply that financial integration between the EMU countries, and financial globalization in general, has facilitated the smoothing of income. We suggest that temporary shifts in consumption in response to, e.g., taste shocks or increased availability of credit, are responsible for the dis-smoothing of consumption.

We further show that international portfolio diversification has increased for both EU and EMU members. We find evidence that increased holdings of foreign assets have been associated with increased income risk sharing. The estimates are somewhat imprecise which may reflect that significant international integration of asset markets is very recent and still on-going. The effect of diversification on risk sharing is approximately similar whether one considers assets held against foreign residents (domestic assets) or foreigners' assets holdings against domestic residents (domestic liabilities). Our results show, however, that assets and liabilities invested outside the EMU have the largest effect on risk sharing per euro invested, which indicates that such securities may have returns that are less correlated with the output of the EMU countries and therefore better able to smooth income. Increasing international asset holdings have been correlated with declining consumption risk sharing. We believe that these are transitory patterns due to, for example, simultaneously high consumption growth and improved availability of credit in some countries.

Finally, we investigate the effect of banking market integration on risk sharing. Income risk sharing has improved following domestic banking consolidation when we focus on country-specific trends in consolidation. However, the countries with a higher average level of banking consolidation do not on average obtain more risk sharing. We do not find any evidence of a similar effect from foreign banking consolidation, but we believe that too little foreign consolidation has yet occurred that one may identify such an effect.

Overall, our results leave little doubt that the process of financial integration among EMU countries has been associated with beneficial welfare effects, in particular in the form of improved smoothing of income. Financial integration, however, is progressing only slowly and the overall level of integration is still lagging behind the level of integration between U.S. states where cross-state investment and securities holdings are much more pervasive.

1 Introduction

Financial markets in the European Union (EU) are becoming better integrated following regulatory convergence and the removal of legal barriers. One advantage of financial integration is that capital-scarce countries may receive funds from countries with higher saving, resulting in higher growth in the capital scarce countries and better returns to saving in countries with high saving. A second, increasingly recognized, advantage of financial integration is that diversified financial ownership promotes risk sharing. Diversification of income sources is, of course, at the core of financial economics; however, the effect on consumption volatility has only recently been researched.[1] Obstfeld and Taylor (2004) refer to the growth and risk sharing benefits of financial integration as "development finance" and "diversification finance," respectively, and point out that developed countries have obtained large increases in diversification finance in later years.

We examine whether the advent of the euro has led to better international asset diversification among countries in the Economic and Monetary Union (EMU). In our analysis, we also consider EU countries which are not in the EMU—if the euro has deepened liquidity in financial markets and lowered transaction costs, this might have benefitted financial integration also for non-EMU countries.

The first part of this article examines if risk sharing has increased since the creation of the EMU and analyzes the connection between the amount of cross-border asset holdings and risk sharing. Sørensen, et al. (2007) find that larger holdings of foreign assets are associated with better risk sharing for countries in the EU and the OECD. For EU countries, they also find a trend in risk sharing that is not explained by foreign asset holdings. We suspect this trend is explained by features of financial integration that work through other channels than equity and bond markets. Bank intermediated finance is a likely candidate for such a channel. Several EU-initiatives with the aim of furthering integration of European banking markets have been launched both prior to and during the period we consider. In the second part of the article, we therefore study whether integration of EU banking markets help explain increasing risk sharing. We proceed in a manner similar to recent work by Demyanyk, Ostergaard, and Sørensen (2007) who find that risk sharing between U.S. states improved significantly following various types of banking deregulation—even branching deregulation *within* states had a significant impact on risk sharing. We consider the impact of both foreign bank entry and domestic bank consolidation.

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[1]Early papers are Mace (1991), Obstfeld (1994), and Asdrubali, Sørensen, and Yosha (1996), who study data at the individual, country, and state level, respectively.

Our work has relevance for current EU policies and regulations because the welfare benefits of increased international asset holdings depend partly on how effectively financial diversification may insure income and consumption against adverse output shocks. It therefore has implications for initiatives aimed at removing regulations that limit the diversification of asset ownership of households, firms, and financial intermediaries. For example, restrictions on pension fund management such as minimum holdings of certain asset classes or limitations on assets with relatively risky returns may be detrimental to the extent that they limit households' ability to share risk. The conclusions from the banking integration analysis have implications for the current debate over the benefits and drawbacks of foreign bank ownership and banking consolidation.

2   Risk sharing: Income smoothing and consumption smoothing

The situation where consumption growth rates in all countries in a group, such as the EMU, are identical is denoted "full (or perfect) consumption risk sharing." This will be an equilibrium allocation if consumers have identical Constant Relative Risk Aversion utility functions and access to a complete set of Arrow-Debreu markets—see Obstfeld and Rogoff (1996) for a textbook treatment of risk sharing.[2]

The simple characterization of the equilibrium allocation makes it obvious that the existence of a full set of Arrow-securities is not necessary for reaching the optimal consumption allocation.[3] If a country can issue any kind of asset that makes its income proportional to aggregate output, perfect risk sharing will have been accomplished. In a textbook world this could be achieved by issuing liabilities that transfer the right to aggregate domestic output to foreign investors, while using the proceed to purchase rights to aggregate (EMU) output. Robert Shiller (1998), in his book "Macro Markets Creating Institutions for Managing Society's Largest Economic Risks," suggests that countries establish markets in such output-linked assets; however, such assets do not currently exist.

In the national accounts, "income" of a country, Gross National Income (GNI), equals

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[2]The implication of the model is that consumption in each country is a constant share of aggregate consumption, but the empirical literature, following Mace (1991), typically test the implication that growth rates should be identical.

[3]Adding physical investment to the model leads to the result that each country consumes a constant fraction of aggregate consumption rather than aggregate output, see Obstfeld and Rogoff (1996), and this is the prediction that is usually tested. If a labor-leisure choice is added to the model consumption growth rates will not be exactly identical but they are likely to be very similar; see Backus, Kydland, and Kehoe (1992).

"output," Gross Domestic Product (GDP), plus income from investments in foreign countries minus payments on liabilities while consumption roughly equals income minus saving.[4] Consider the identity:

$$\text{GNI} \;=\; \text{GDP} \;+\; \text{Net Factor Income}\,. \tag{1}$$

If Net Factor Income equals the country's share in aggregate EMU output growth minus growth in domestic output, the perfect risk sharing allocation will be obtained.[5] We may split foreign assets into three broad types: Debt (bonds or bank loans), equity, and direct investment (FDI). We can write

$$\begin{aligned}
\text{Net Factor Income} \;=\; & r_{debt,\text{D}}\text{B}_\text{D} - r_{debt,\text{F}}\text{B}_\text{F} + r_{eqt,\text{D}}\text{E}_\text{D} - r_{eqt,\text{F}}\text{E}_\text{F} \\
& + r_{fdi,\text{D}}\text{FDI}_\text{D} - r_{fdi,\text{F}}\text{FDI}_\text{F}\,,
\end{aligned} \tag{2}$$

where B is holdings of debt, E is equity, and FDI is foreign direct investment. r denotes the realized rates of return on debt, equity, and FDI, respectively, as indicated by the first part of the subscript. Subscript "F" denotes investments in the relevant country by foreigners (i.e., liabilities) and "D" denotes foreign assets held by domestic residents.

Typically, high risk sharing will be achieved if the return on foreign assets is highly correlated with EMU output growth and the return on foreign liabilities is highly correlated with domestic output growth. The logic is that income will be smoothed if payments on foreign liabilities are high when output growth is high and if income from foreign assets is high when domestic output growth is low. The latter is often hard to achieve but as long as payments from liabilities are tied more closely to domestic output than income from foreign assets, income with be smoother than output. If the *rates of return* of international assets have such beneficial correlations, then the amount of risk sharing obtained will be proportional (roughly speaking) to the *quantities* of foreign assets and liabilities held. Good measures of realized rates of returns on foreign assets are not easily available but we will

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[4]In the national accounts, GNI equals GDP (the value of domestic production) plus net factor income from the rest of the world. Net factor income from the rest of the world is net asset income plus domestic residents' wage income from foreign countries minus wage income of foreign residents from the domestic country. Since the latter type of factor income is based on residency rather than citizenship, it is typically small. Subtracting depreciation and net indirect business taxes from GNI gives *national income.* Subtracting corporate profits and net personal interest payments and adding transfers gives *personal income.* Subtracting personal taxes gives *disposable personal income* and subtracting personal saving gives *personal consumption.* The major part of the difference between GNI and consumption is gross saving which consists of depreciation and net saving (by governments, corporations, and individuals). Sørensen and Yosha (1998) and Balli and Sørensen (2007) examine the contribution of the various components of GDP to international risk sharing in much more detail.

[5]Kalemli-Ozcan, Sørensen, and Yosha (2001) derive a formula for the equilibrium share of aggregate output going to each country in the case of endowment economies with log-normal output fluctuations.

examine in our empirical work if risk sharing increases with the quantities of foreign assets traded and we will consider which categories of assets or liabilities provides better risk sharing.

The formation of a monetary union is likely to increase financial integration in the sense that member countries will hold more foreign assets. On the other hand, the creation of a monetary union may lower the amount of risk sharing obtained *per euro* invested abroad, if it makes the returns of assets issued by different countries more similar. Convergence of EMU rates of returns have been documented by Baele, et al. (2004).

Convergence of returns have been particularly strong for risk free government bonds within the EMU. With the elimination of currency risk, interest rates become identical, and if, for example, French households swap French government bonds for German government bonds, this will not contribute to risk sharing between those countries. The returns on corporate bonds may also become more similar but the realized return paid on, say, Spanish corporate bonds are likely to have a higher correlation with Spanish output than risk free Spanish government bonds if, for example, Spanish firms default more often in bad times when Spanish aggregate output is declining. Hence, the credit risk embedded in corporate bonds may contribute to international risk sharing if the ownership of corporate bonds is internationally diversified. A similar logic applies to the bank loan component of debt, where domestic holdings of foreign debt B_D include cross-border loans of domestic banks to foreign residents and foreign holdings of domestic debt B_F include foreign banks' cross-border loans to domestic residents.

Financial integration may also increase the correlation of equity returns, for example if equity returns become more affected by global risk tolerance, liquidity preference, discount rates for future dividends, etc. Stock market returns, however, will also reflect the country-specific performance of listed firms and equity returns are therefore likely to be positively correlated with the output of the issuing country.

Finally, FDI returns are likely to be more directly tied to the earnings of foreign owned establishments, because sales are often correlated with the output of the host country and earnings are not subject to as many fluctuations as returns on traded equity. Therefore income streams associated with FDI assets and liabilities may be particularly effective in providing risk sharing.

For each category of assets, EMU countries can invest in other EMU countries or in the rest of the world. If market integration makes the rates of return on EMU assets more similar, more risk sharing may be obtained from investing in non-EMU countries.[6]

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[6]In this case there may be a trade-off between lower trading costs of within-EMU investment and the

While the returns on non-EMU assets may be less correlated with aggregate EMU output and, therefore, not able to bring the EMU countries to the perfect risk sharing allocation, such assets may nevertheless provide effective diversification benefits and help lower the correlation between income and domestic output.

Perfect income smoothing is likely an illusive goal because of moral hazard (if income is fully insured, why work hard?) and costs of gathering information and trading assets. However, economic agents derive utility from consumption and the perfect risk sharing benchmark involves consumption. A slightly simplified view of how people share risk is one where people insure their income as much as possible and, conditional on income, decide how to further smooth consumption by adjusting their level of saving. Consider the (simplified) identity:

$$\text{CONS} \;=\; \text{GNI} \;-\; \text{Gross National Saving.} \tag{3}$$

Procyclical saving has the potential of smoothing fluctuations in income: Individuals may save in "good" years and dissave in "bad" years. Forward-looking risk-averse consumers will attempt to keep a smooth path of consumption; however, rational expectation models of consumption, such as the permanent income hypothesis, do not necessarily predict significant consumption smoothing as we measure it—if shocks are highly persistent, the optimal behavior involves little saving in response to shocks. In other words, simple benchmark models are not necessarily informative about whether consumption should be more or less smooth than income.[7] Recent models stress that precautionary saving, credit rationing, and developments in housings markets may affect consumption.[8] Consider a country where mortgage markets have historically been undeveloped and credit generally scarce. A relaxation in credit availability is typically followed by a rapid increase in consumption simultaneously with a rapid expansion in output. According to our measures of consumption risk-sharing, this situation reflects "dis-smoothing" as both consumption and output jump to new higher levels. Such temporary volatility in consumption, however, is clearly

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amount of diversification obtained per euro invested.

[7]In econometric jargon "high persistence of shocks" refers to the situation where a positive income shock typically signals more positive income shocks to follow. Campbell and Deaton (1988) showed that U.S. aggregate shocks tend to be so persistent that consumers according to the standard permanent income model of Hall (1978) ought to dissave following positive shocks. The prediction is not satisfied by the consumption data and this mismatch between consumption patterns and the predictions of Hall's model is denoted "excess smoothness of consumption."

[8]The buffer-stock model of consumption, popularized by Carroll (1997), assumes that agents are impatient (having a discount rate higher than the interest rate) and credit-constrained. While this model also have some problems fitting consumption data, extensions that include housing (an illiquid asset that can only be bought and sold at a cost) have the potential of explaining why aggregate consumption reacts sluggishly to income as shown by Luengo-Prado and Sørensen (2008).

associated with beneficial developments and countries that have experienced a relaxation of credit-constraints will likely also improve their ability to insure output risks, such as productivity shocks. Because such economies are not close to a steady-state, our stylized consumption measures will pick up dis-smoothing during the period of adjustment and will not catch that risk sharing opportunities have in fact improved. Consumption may also fluctuate due to "taste shocks"—that is, changes in desired consumption not explained by income—examples could be changing fashions or changes in relative prices (electronics, energy, etc.). Such desired consumption fluctuations may also make the consumption outcomes differ from the benchmark of stable growth rates across countries.

A significant part of consumption smoothing is due to the behavior of governments. In this paper we treat government consumption as a perfect substitute for private consumption and our main measure of consumption ("final consumption") is the sum of government and private consumption. Fluctuations in government consumption may be considered a form of taste shocks: Governments may increase government consumption, for example due to wars or hurricane damage or political expediency. If government saving is procyclical it will smooth consumption because the saving could alternatively have been used for government consumption or rebated to the private sector and used for private consumption. In the same fashion, private saving smooth consumption if it is procyclical. Government and private saving are available from the national accounts, and we estimate the contribution to risk sharing of each in order to examine if consumption risk sharing is particularly affected by government or private saving.

It is our experience that measures of income risk sharing tend to reveal trends in risk sharing more clearly than consumption-based measures—the income-based measures are relatively less likely to be affected by adjustments toward new steady-states or taste shocks.

3   Measuring risk sharing: Income smoothing and consumption smoothing

As it is common in the literature we construct measures of the degree of consumption risk sharing among groups of countries, e.g. the EMU, that takes a value of unity (100 percent) if the growth rates of country-level consumption are identical, and, therefore, equal to the growth rate of aggregate EMU consumption.

Denote country i's year t (per capita real, government plus private) final consumption, c_{it}, and denote EMU aggregate consumption in year t, c_t. Similarly, denote country i's

year t (real per capita) output, GDP_{it}, and aggregate output of the EMU in year t, GDP_t. Our measures build on the observation that the correlation of country-specific consumption, $\Delta \log \text{c}_{it} - \Delta \log \text{c}_t$, with country-specific output shocks, $\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t$, is zero under perfect risk sharing. We consider country-specific growth rates because aggregate shocks cannot be eliminated by the sharing of risk, and the aggregate component is therefore deducted from the individual countries' growth rates. A correlation of unity has the natural interpretation of zero percent risk sharing.

We also consider income smoothing and say that income risk sharing is perfect if country-specific (real per capita) gross national income, $\text{GNI}_{it} - \text{GNI}_t$, is uncorrelated with country-specific output, where GNI_{it} and GNI_t are the year t per capita aggregate gross national income of country i and the EMU, respectively. We do not present actual correlations, but follow Mace (1991) and rely on regression coefficients (these are proportional to correlation coefficients in the simplest case, but allow for more flexibility).

3.1 Year-by-year measures of risk sharing: Specification

Our empirical approach builds on the decomposition of Sørensen and Yosha (1998). We specify regressions that quantify deviations from perfect income and consumption risk sharing, respectively.

Consider a group of countries and the following set of cross-sectional regressions—one for each year t:

$$\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t \; = \; \text{constant} \; + \; \beta_{K,t} \; (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) \; + \; \epsilon_{it} \, . \qquad (4)$$

The coefficient $\beta_{K,t}$ measures the average co-movement of country-specific GNI growth with country-specific GDP growth in year t. Under perfect risk sharing, the left-hand side of equation (4) will be zero implying that $\beta_{K,t}$ is zero. The smaller the co-movement of idiosyncratic GNI with GDP, the more GNI is buffered against GDP fluctuations and the smaller the estimated value of $\beta_{K,t}$. Since GNI equals GDP plus net factor income from abroad, this regression measures the amount of income risk sharing provided by net factor income flows—the lower $\beta_{K,t}$, the higher is income risk sharing in year t. The estimated coefficients, $\beta_{K,t}$, measure the evolution of risk sharing over time. Often it is more instructive to look at the equivalent series $1 - \beta_{K,t}$. This series will take the value one if risk sharing is perfect and the value zero if GNI moves one-to-one with output.

In a similar manner, we estimate year-by-year the relation

$$\Delta \log \mathrm{C}_{it} - \Delta \log \mathrm{C}_t \;=\; \mathrm{constant} \,+\, \beta_{C,t} \left(\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t\right) + \epsilon_{it}\,, \qquad (5)$$

where C_{it} is country i's year t per capita final consumption, and C_t is the year t per capita aggregate final consumption for the group of countries in the regression. The coefficient $\beta_{C,t}$ measures the average co-movement of the countries' idiosyncratic consumption growth with their idiosyncratic GDP growth in year t. The smaller the co-movement, the more consumption is buffered against GDP fluctuations. Therefore, this regression provides a measure of the extent of consumption risk sharing.

3.2 Year-by-year measures of risk sharing: Plot

Figure 1 displays the series of risk sharing measures for EMU and EU countries in order to see if any "trend" is immediately obvious (the series are smoothed to highlight the trend). More precisely, we display the estimated values of $100 \cdot (1 - \beta_{K,t})$ which we interpret as the percentage of income risk sharing obtained, and $100 \cdot (1 - \beta_{C,t})$, which we interpret as the percentage of consumption risk sharing.

Income risk sharing improved in the late 1990s but has declined in the EMU since then. Sørensen, et al. (2007) similarly found an increase in income risk sharing in the late 1990s while Sørensen and Yosha (1998) robustly found no income risk sharing before 1990. Our interpretation is that financial integration has improved risk sharing over time although the level of income risk sharing is still quite modest. The decline in the point estimates is likely "noise"—the low dispersion of output shocks among the EMU countries ("little risk to share") has the effect of making the estimated risk sharing estimates somewhat fragile. Consumption risk sharing has declined during our sample period. We strongly believe that this does *not* reflect a *decline* in the ability of EMU citizens to share risk but rather patterns of consumption preferences that are determined by factors such as, for example, expectations or financial innovation that cause consumption growth to deviate from output growth in the short run. On the other hand, the results do indicate that the *level* of risk sharing between EMU countries is far from perfect. The picture for the EU is quite similar, although the decline in consumption risk sharing is even steeper than for EMU. Estimated income risk sharing is very similar to that of the EMU countries.

3.3 Panel data regressions: Specification

We estimate panel data regressions of the form:

$$\Delta \log \mathrm{GNI}_{it} - \Delta \log \mathrm{GNI}_t = \mu_i + \kappa \ (\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t) + \epsilon_{it} \,. \tag{6}$$

This regression is similar to (4) except that it is now a panel obtained by pooling the years in the sample. In this specification, suggested by Asdrubali, Sørensen, and Yosha (1996), $(1-\kappa)$ is a scalar that measures the average amount of income risk sharing during the time-period considered. The coefficient κ measures the average co-movement of the countries' idiosyncratic GNI-growth with their idiosyncratic GDP-growth over the sample period. The symbol μ_i indicates the inclusion of a dummy variable for each country—usually referred to as a country fixed effect. The inclusion of country fixed effect is, in OLS regressions, mathematically equivalent to subtracting the country averages over the sample period for each variable and then running the regression without a constant. Alternatively, we can run the regression without country fixed effects:

$$\Delta \log \mathrm{GNI}_{it} - \Delta \log \mathrm{GNI}_t = \mathrm{constant} + \kappa \ (\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t) + \epsilon_{it} \,. \tag{7}$$

The difference between the two specifications is that the regression with country fixed effects has removed the country averages $\Delta \log \mathrm{GNI}_{i.} = \frac{1}{T}\Sigma_{t=1}^{T}\Delta \log \mathrm{GNI}_{it}$ and $\Delta \log \mathrm{GDP}_{i.} = \frac{1}{T}\Sigma_{t=1}^{T}\Delta \log \mathrm{GDP}_{it}$. If there is high risk sharing at longer intervals (in our samples T would be six years) then $\Delta \log \mathrm{GNI}_{i.}$ will not be highly correlated with $\Delta \log \mathrm{GDP}_{i.}$.[9] Usually the focus is on short-term patterns in discussions of risk sharing and we will show results of panel data regressions that include country fixed effects.[10] In order to highlight the relation between the time averaged variables, such as $\Delta \log \mathrm{GDP}_{i.}$, we tabulate their values in Table 1.[11]

3.3.1 Risk sharing from government versus private saving

We provide measures of the contribution from channels of saving to risk sharing similar to Sørensen and Yosha (1998). Consider (real per capita) government saving GS_{it} in country

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[9]Notice that for any variable X, $\Sigma_{t=1}^{T}\Delta X_t = X_T - X_1$. Therefore, the subtraction of the country fixed effects remove the impact of changes from year 1 to year T—in other words, the regression results will capture only short term changes after country fixed effects have been included in the panel regression.

[10]There are several reasons for the focus on shorter frequencies: Risk sharing at longer horizons may be harder to accomplish, although insurance against long lasting shocks may be more important, or long run trends in consumption may capture factors such as demographic trends rather than risk.

[11]One could test for the significance of the dummy variables but, as we verified, they are all insignificant due to the short samples. The important issue is, however, that the inclusion of country fixed effects changes the interpretation of the results to short-term risk sharing.

i at time t. Government and private saving are determined simultaneously, but we may get an estimate of the contribution to risk sharing from government saving by making the thought experiment that private saving is zero. In this case consumption is $\text{NNDI}_{it} - \text{GS}_{it}$ (where NNDI is net national disposable income). The smoothing of consumption, relative to income, in this situation is the difference between $\Delta \log \text{NNDI}_{it}$ and $\Delta \log(\text{NNDI}_{it} - \text{GS}_{it})$. We may then measure the contribution of government saving to risk sharing as the coefficient γ in the panel data regression

$$\Delta \log \text{NNDI}_{it} - \Delta \log(\text{NNDI}_{it} - \text{GS}_{it}) = \mu_i + \gamma \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t\right) + \epsilon_{it}. \quad (8)$$

In this regression, γ directly measures the amount of risk sharing. If government saving is procyclical $\text{NNDI}_{it} - \text{GS}_{it}$ will co-vary less with output fluctuations than NNDI_{it} and the estimated value of γ will be positive, indicating positive risk sharing from government saving.

Correspondingly, we may run a similar regression substituting private for government saving to get an estimate of the contribution to risk sharing from private saving.

4 Does higher foreign asset holdings in the EU lead to better income and consumption risk sharing?

We follow Mélitz and Zumer (1999) and Sørensen et al. (2007) and impose structure on κ. We allow κ to change over time and across countries as follows:

$$\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{FA}_{it} - \overline{\text{FA}}\right), \quad (9)$$

where $\text{FA}_{it} \equiv$ is a measure of foreign assets or liabilities of country i at time t. As a technical matter, we deduct the mean value of FA because this keeps the interpretation of κ_0 unchanged.[12] The term, FA, is generic and may refer to, e.g., total foreign assets relative to GDP and $\overline{\text{FA}}$ is the average across countries and years. The estimated value of $1 - \kappa_0$ corresponds to the average amount of income risk sharing within the group and

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[12]When FA is not included in the regression, κ_0 measures (approximately) the amount of risk sharing for a country with an average amount of financial assets. In a regression in which FA is included and $\overline{\text{FA}}$ is not subtracted, the interpretation of κ_0 is the amount of risk sharing for a country with no foreign assets. Typically, if $\hat{\kappa}_0$ is the estimate of κ_0 from the former regression and $\tilde{\kappa}_0$ is the estimate from the latter regression, one would find $\tilde{\kappa}_0 = \hat{\kappa}_0 - \hat{\kappa}_2\overline{\text{FA}}$ while the estimated value of κ_0 will be approximately invariant when the average has been subtracted from foreign assets. The estimated value of κ_2 is mathematically identical in the two regressions.

$1 - \kappa_0 - \kappa_1 t - \kappa_2(\text{FA}_{it} - \overline{\text{FA}})$ measures the amount of income risk sharing obtained in period t by country i. We include a time trend in order to guard against the trend in asset holdings spuriously capturing trend changes in risk sharing that may be caused by other developments in national economies. In the specification implied by (6) and (9), the amount of income risk sharing is allowed to change across countries with foreign asset holdings. The estimate of $-\kappa_2$ measures how much a unit change in FA increases the amount of income risk sharing obtained.

We will obtain a positive significant value of $-\kappa_2$ if countries that hold more foreign assets (liabilities) obtain higher risk sharing, but the coefficient will also be positive if increasing asset holdings over time have been associated with more risk sharing—in other words, the interaction term may primarily capture either the trend or country-by-country differences.[13] Sometimes we want to ask only if increasing asset holdings over time leads to higher risk sharing while controlling for average differences in asset holdings across countries. In this case we use the specification

$$\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{FA}_{it} - \overline{\text{FA}}_{i.} \right), \tag{10}$$

where the country-specific averages over time of the interaction term FA have been subtracted. In this specification the estimate of κ_2 reflects the time series variation in foreign asset holdings in the average country while differences in the level of asset holdings between, say, Ireland and Germany, will not affect the result.

4.1 Data

We use data for GDP (Gross Domestic Product), GNI (Gross National Income), NNDI (Net National Disposable Income), Government Revenue, Government Expenditure, Population, Final Consumption, and Consumer prices from Eurostat. We calculate Government Saving as Government Revenue minus Government Expenditure. We calculate Private Saving as the difference between Total Saving (NNDI minus Total Final Consumption) and Government Saving. We calculate the growth rate of per capita real GDP, GNI, and (Final) Consumption by calculating per capita values and deflating all series by the Consumer Price Index of the corresponding country. We obtain portfolio equity and debt holdings by issuing country from the IMF Coordinated Portfolio Investment Surveys. These data record which foreign countries a country in the sample have invested in. These surveys were

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[13]The year-by-year risk sharing regressions reflect on the time series pattern and are not affected by average difference between countries.

conducted using consistent guidelines for measuring security holdings across countries and the data are likely to be of high quality. The surveys were conducted for *investor* countries, including most OECD countries. Aggregate foreign equity, debt, and foreign direct investment (FDI) asset and liability data can be obtained from Lane and Milesi-Ferretti (2007). Data on banking integration are from the databases Bankscope and Zephyr, both published by Bureau van Dijk.

5   Empirical findings: Portfolio holdings

In order to get an impression of growth-patterns by country, we display in Table 1 the average growth rates of output, gross national income, and consumption for each country for the sub-samples 1995-1999 and 2000-2006 surrounding the year of the introduction of the euro. The long-term EU-countries such as France, Germany, and Italy have been among the slowest growing countries during the 1995-2006 period while less developed economies such as Estonia and Slovenia have been fast growing. Ireland had such high growth in the 1990s that its output now is clearly above the EU average even if it started below the EU average. As Ireland has reached the level of development of the older EU-countries, growth has slowed down while the growth rates of Estonia and Latvia have accelerated into the double digits after the turn of the millennium. If there is significant risk sharing at the 5-6 year horizon the county-by-country consumption growth rates would not very similar to output growth rates. One quick glance at the table reveals that risk sharing is still very low among the EU countries at the 5-year frequency: Ireland and Estonia have rapid consumption growth and Germany has low consumption growth and those average growth rates are very similar to the output growth rates of the respective countries. Maybe there is more risk sharing at higher frequencies and we turn to that question next.

5.1   Panel data regressions: Risk sharing among EMU and EU countries

Table 2 shows the results of panel risk sharing regressions for the years 1995–1999 and 2000–2006 for different groups of EU countries. In particular, we estimate the degree of risk sharing among EMU member countries in columns (1) and (2), "old" EU countries in columns (3) and (4), "new" EU countries in columns (5) and (6), and all EU countries in columns (7) and (8), for each of the two subperiods. The table displays results for both income and consumption risk sharing. The results are presented with country fixed effects (country dummy variables).

Considering first income risk sharing among the group of EMU countries, we find no risk sharing in the early (1995-1999) sample but 15.7 percent risk sharing in the 2000-2006 sample.[14] For the larger group of long-standing EU countries, columns (3) and (4), income risk sharing has declined in the new millennium. We believe that the underlying amount of income insurance may be increasing but that temporary effects, in particular recessions, can skew the numbers. However, the larger decline in income risk sharing for this group of countries, compared to the EMU group, strongly suggests that financial integration within the EMU has facilitated risk sharing. The new EU countries display positive and increasing income risk sharing. For the full group of EU countries income risk sharing is positive and statistically significant—partly due to lower standard errors that results from the larger sample.[15]

Consider consumption risk sharing.[16] Consumption risk sharing in the EMU is 42.3 percent in the early sample and 52.9 percent in the late sample. Consumption smoothing for the old EU group is similar in 1995-1999 but declined a little for 2000-2006 but these differences are not significant. Consumption risk sharing among the group of new EU countries is very low. Possibly this is due to financial developments making credit more available than in the past and if this results in a consumption surge in some of these countries simultaneously with a surge in output, we will estimate low consumption smoothing. The estimates for 2000–2006 are even lower than income risk sharing, implying that saving didn't contribute to risk sharing at all. Consumption risk sharing for the full group of EU countries is almost as low as for the new EU group.

Overall, the estimates are somewhat noisy. This is to be expected when using short samples, but there is little doubt that income risk sharing is currently positive while it was close to zero in the early 1990s. We believe this is a result of financial globalization which is partly caused by EU integration and the formation of the EMU. However, the data do not indicate any sudden sharp break at the time the common currency was introduced.

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[14]Sørensen and Yosha (1998) robustly found no income risk sharing between EU (and OECD) countries in the 1970s or 1980s. In their regressions Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, and the United Kingdom comprised "the EU." For the EU-countries they found consumption risk sharing of 43 percent during 1966-1980 and 22 percent during the 1980s. They did not include country dummies in their regressions.

[15]The risk sharing estimate for the full groups of EU countries does not equal the average of the estimated risk sharing for the sub-groups although it may often be close. The estimate for the full groups is partly driven by the amount of risk sharing *between* the group of old EU countries and the group of new EU countries. For example, if there is high risk sharing within these two groups but low risk sharing between the groups, the estimate for the full group will be below both of the within-group estimates.

[16]Some authors, such as Sørensen and Yosha (1998), define consumption smoothing to reflect whether consumption is "smoother" than disposable income while consumption smoothing here captures risk sharing from all sources including income smoothing. This choice is mainly one of exposition.

Income risk sharing is mainly a result of countries owning assets in other countries and very large amount of international assets is needed to significantly smooth income. From casual observation it appears that the amount of foreign owned businesses in, say, Germany, are much below the amount of out-of-state asset holdings of typical U.S. states. Therefore, we do not find it surprising that income risk sharing in Europe is much below that found for the United States by Asdrubali, Sørensen, and Yosha (1996). Further, financial integration has harmonized interest rates on safe bonds and international trade in such bonds are now unlikely to provide substantial intra-EMU risk sharing. Overall, we find that procyclical saving is not smoothing consumption much, particularly in the new EU countries. We will briefly consider the contributions to risk sharing from government and private saving, respectively, in order to explore if this finding is due to government fiscal policy.

5.2   The role of government and private saving

Table 3 displays the amount of consumption smoothing due to saving. If saving is procyclical this will help smooth consumption. The results for EMU countries reveal quite erratic patterns of smoothing from saving.[17] In the EMU private saving dis-smooth consumption in the early sample while procyclical government saving helped smooth consumption. In the late sample this pattern is reversed. For the larger EU sample a more systematic pattern is visible. Private saving has contributed significantly at about 35 percent to consumption smoothing while government saving contributed little at 8 percent (but not significant at the 10 percent level) to consumption smoothing in the early sample and not at all in the late sample. In the new EU countries private saving has been countercyclical making consumption more volatile than income.[18] Considering all EU countries together, there has been little contribution to consumption smoothing from either government or private saving. The sum of the contributions from government or private saving do not exactly add up to the difference between income and consumption smoothing in the previous table but the message of these tables are the same: Procyclical saving has not played a large role in consumption smoothing in the EU since 1995. Possibly, this is pattern of saving is perfectly rational according to permanent income theory but it will take us much to far afield to answer that question.

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[17]Of course, our results do not reveal if, say, the levels of government saving are optimal or in-optimal in any sense.

[18]Recall, that our risk sharing regressions are impacted only by country-specific patterns, so in the conventional sense private saving may or may not have been procyclical.

5.3 Foreign asset and liabilities

The simplest measure of the relative importance of foreign asset holdings is the amount of gross assets relative to GDP. We calculate this measure for portfolio equity and debt (bonds). In Table 4, we show foreign equity, debt, and FDI holdings for the years 1995 and 2004 (the last year for which we have data). Equity and debt holdings vary considerably across countries; Ireland holds significantly more assets relative to GDP than most other countries and Luxembourg has a character of an outlier. A trend toward increased diversification is clearly visible. If we take Ireland as an example of a very open economy with significant risk sharing, it is clear from the table that even though most countries have increased their holdings of international assets significantly they still seem too small for significant income smoothing. Another way of thinking of this is as follows. If a country has net foreign assets and liabilities in the order of GDP, then if the return on assets is one percent higher than the return on liabilities this results in net earnings from international assets equal to one percent of GDP. If this happens in a years where GDP growth is 1 percent below the average of the EU, the asset income will have smoothed income perfectly. We suspect a return difference of a full percent is hard to come by, at least for debt, and return differences will not always have the right sign (such as to provide smoothing) relative to output. It is our conjecture that gross asset holdings need to be in an order of 10 times GDP (which is about the level found for Ireland) to provide the level of income smoothing found between U.S. states. This is admittedly a crude calibration but our reading of Table 4 is nonetheless that most EMU countries still have some way to go before the level of financial integration found between U.S. states is achieved.

We examine if risk sharing is correlated differently with the amount invested in EMU countries (where returns are likely to more similar) than with assets invested in other countries.[19] In Table 5, we show how large a fraction of foreign assets EU countries have invested in other EMU and EU countries, respectively. Most EU countries invest the majority of their foreign equity in EMU countries (with the Netherlands and Malta as notable exceptions). On average, EMU equity holdings have increased, although mainly in non-EMU EU countries, perhaps because the euro has lowered trading costs. There has also been an increase in the amount of EU-country equity held by EU countries, but it appears that this increase is no larger than the increase found for EMU-country equity. Overall, the equity investment of EU countries is overwhelmingly (about 60 percent) invested in EU

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[19]The data that allow us to make this breakdown are from the IMF's coordinated portfolio survey which does not have good liability data and this source does not give numbers for FDI.

countries. A similar pattern applies to investments in debt securities. An increase in EMU country debt and an even stronger bias toward EU debt can also be observed.

5.4   Foreign asset holdings and risk sharing

Table 6 considers if higher amounts of foreign assets are associated with more income risk sharing. The interpretation of the interaction coefficient is the increase in risk sharing that would result from an increase in foreign asset holdings equal to GDP. Because holdings of, say, equity and debt tend to be highly correlated, with some countries holding large amounts of each while other countries hold few foreign assets of either kind, the results are somewhat tentative.[20] The results for the EMU and the EU are similar, although the EMU results have higher standard errors and some of the coefficients appear noisy. Most of the interaction coefficients are not significant but the interaction terms with asset holdings are all positive which is a strong indicator that there really is a positive effect. The coefficients to assets (whether debt or equity) invested outside the EMU are significant which indicates that such assets may have returns that are less correlated with the output of the investor countries and therefore are better able to smooth income.

Table 7 displays results for consumption risk sharing from regressions similar to those of the previous table. The results of these regressions reveal a negative association of asset holdings with risk sharing. A decrease in consumption smoothing has occurred during this period where asset holdings have been increasing. We do not believe that this finding reflects that countries which increase foreign asset holdings become more exposed to output risk—while a full investigation of this issue is beyond the scope of this study, we think that easier access to credit may have lead to high growth of output *and* consumption in certain countries. This implies that risk sharing is far from perfect but probably not that risk sharing has declined in a deeper sense.

In Table 8 the coefficient to risk sharing is a function of equity, bond, and FDI holdings and liabilities. The results do not appear noisy and the coefficient estimates are quite similar for the EMU and the full EU. The coefficients to all assets and liabilities are positive and significant; however, the asset holdings are so correlated that the coefficient to bonds may be positive not because bond holdings are efficient for risk sharing but because bond holding are correlated with, say, FDI holdings. The estimated coefficients are largest for debt assets as well as liabilities. We doubt that this is due to returns to, for example, debt

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[20]If the sample was substantially larger, we could include interaction terms for equity and debt invested in EMU, EU, and rest-of-the-world in one multiple regression and get a cleaner picture of the relative importance of each term.

assets being more correlated with output. We do not attempt to trace out the mechanisms underlying the results but we point out the underlying mechanisms can be quite indirect. For example, if the government of a country aggressively borrows abroad by issuing bonds during recessions, we will see debt correlated with risk sharing. Or the amount of corporate debt may reflect structural differences between economies.

Table 9 reports on estimates of consumption risk sharing for specifications similar to those of the previous table. Most coefficients are insignificant indicating that the risk sharing effects of saving adds a level of noise to our income based regressions. Only the coefficient of interaction with debt holdings is significant. This may reflect the results of the previous tables or it could reflect that countries with high saving rates hold more debt assets and find it easier to smooth consumption.

Overall, higher stocks of international assets help smooth income and assets held outside the EMU seem to provide better risk sharing per euro invested. Our short samples do not really warrant any further conclusions.

6   Integration of European banking markets through consolidation and foreign entry

An analysis of the impact of European banking market integration on risk sharing may be approached in a similar fashion to the analysis above, investigating the smoothing of income and consumption from the part of net foreign income resulting from bank loans and bank sector FDI. Banks, however, may facilitate risk sharing through channels not considered above. In the following, we therefore use the approach of Demyanyk, Ostergaard, and Sørensen (2007a,b) to analyze these questions. Demyanyk, Ostergaard, and Sørensen have recently showed that deregulation and integration of individual U.S. states' banking markets have entailed welfare gains for, especially, small business owners whose personal income has been smoothed considerably.

Banking integration may smooth households' personal income relative to output fluctuations, i.e., income risk sharing, by increasing the availability of loans to households or by altering the lending pattern of banks. For illustration, consider an owner of a small business that is entirely self-financed (a sole proprietorship). In this case, the small business owner bears all the firm's output risk himself/herself—shocks to the surplus created in the firm will be transferred one-to-one to his or her personal income. When the owner obtains external finance, the linkage between his or her personal finances and those of the business is relaxed

and the covariation of personal income with output may fall. Banks may share risk with the owner by avoiding initiation of formal bankruptcy procedures and liquidation of assets when the business hits hard times, allowing the borrower to fall behind with payments of interest and installments, and renegotiating loan contracts. When businesses default, banks share risk by absorbing part of the losses. Furthermore, the availability of external finance may help small business owners smooth their income to the extent it furthers diversification of the owners' sources of income. It may facilitate accumulation of assets outside the business, e.g., in domestic or foreign financial investments, generating a stream of future income that is less than perfectly correlated with the success of the business.

In the beginning of the 1980s, U.S. banking markets were heavily regulated at the state level: Most states did not allow entry by banks from other states and several states did not permit in-state banks to set up state-wide branch networks. During the 1980s and 1990s, however, most states eliminated these restrictions and two waves of bank mergers and acquisitions ensued. The first wave entailed consolidation *within* states, the second entailed consolidation *across* state borders. Demyanyk, Ostergaard, and Sørensen show that the percentage of states' output shocks smoothed, and therefore not passed on to personal income, increased by twenty percentage points for the group of states with most small businesses. For the average state, the effect of banking deregulation was in the order of ten percentage points.[21] An important conclusion of Demyanyk, Ostergaard, and Sørensen is that both consolidation *within* markets (domestic consolidation) and consolidation *between* markets (cross-border consolidation) are associated with improvements in risk sharing.

Fundamentally, banks' ability to share risk is determined by their ability to assume and bear risk on their balance sheets.[22] The better banks may withstand economic shocks, the less those shocks will be passed on to their borrowers. It follows directly that a bank that expands operations into new markets, either through direct cross-border lending or by establishing foreign subsidiaries or branches, may improve the geographical diversification of its loan portfolio and lower its susceptibility to national business cycle fluctuations. Hence, cross-border lending and investments in banking markets may improve risk sharing through net factor income in a manner similar to debt and FDI, as discussed in Section 2, but also because diversification of banks' asset portfolios may improve their consolidated risk-return tradeoff and smooth revenues, which, in turn, may impact banks' ability to bear

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[21]Further evidence is provided by Demyanyk (2005, 2008) who shows that income growth rates improved among self-employed following U.S. banking deregulations.

[22]Of course, banks may alternatively pass assumed risk on to third parties through securitization or loan sales, in which case the banks do not bear the risks on their balance sheets, but facilitates risk sharing as intermediaries.

risk and their pattern of lending.[23]

It may be less obvious that also within-market consolidation may improve risk sharing. Demyanyk, Ostergaard, and Sørensen argue that this effect works through two main channels. The first channel is wholesale banking markets. Small banks are typically without access to wholesale money and interbank markets due to informational frictions.[24] From an EU perspective, therefore, domestic bank consolidation may give more banks access to international wholesale markets where banks and other financial institutions share risk with each other. That is, risk sharing between banks themselves may improve. For example, a bank operating in a particular country may avoid terminating borrowers' loan contracts by borrowing in wholesale markets in the face of adverse country-specific shocks. This channel, hence, works through interbank international (cross-border) borrowing and lending.

The second channel is competition in retail banking markets. Outside entry, or the threat of outside entry, may improve the average efficiency of banks, either through efficiency improvements among incumbent banks or because more efficient entrant banks drive incumbent banks out of business. Banks with superior screening or monitoring of customers, or financially less constrained banks, have more financial "slack" and therefore more leeway for sharing risk with their borrowers. Hence, intensified competition may not just lead to more competitive pricing, but also to improved risk sharing.

Assessing the integration of banking markets is important because small and medium enterprizes (SME) are heavily dependent on bank finance. Small firms do not typically have access to corporate bond or equity markets, and integration of these European securities markets, therefore, do not necessarily benefit this group of firms. SMEs are important catalysts in the economy—much new innovation and job creation takes place in small businesses. However, small firms' investment is especially vulnerable to business cycle fluctuations and the extent to which banks are willing and able to bear borrowers' risk may therefore have important implication for economic growth and the welfare of entrepreneurs.

When we consider the existing empirical evidence of the integration of European wholesale and retail banking markets, respectively, the conclusion is generally that wholesale markets are strongly integrated but the retail markets are much less so. Baele et al. (2004) quantify the evolution of market integration after the introduction of the euro and find that repo and unsecured money markets are close to perfectly integrated. Barros et al. (2005) report that the European interbank market is two-tiered: Large domestic banks hold po-

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[23]Houston, James, and Marcus (1997) demonstrate that U.S. bank holding companies manage capital and liquidity at the consolidated level.

[24]See Kashyap and Stein (2001).

sitions against foreign banks and reallocate funding to smaller national banks. Hence, if domestic banking consolidation, through the creation of larger banks, have improved banks' (direct and indirect) access to well-functioning pan-European wholesale markets, EU-wide risk sharing may have improved as a consequence.

On the other hand, considering retail banking markets, several studies have pointed to an apparent lack of integration. Loan interest rates differ considerably between European countries, and while the cross-country dispersion of loan rates has decreased during the 1990s, it is still considerable, especially in the market for consumer and short-term business loans (Baele et al. (2004), and Gual (2004)). This seems to suggest that competition between regional banking markets is still relatively limited. Also, banks hold only a fraction of their assets and liabilities—typically 5–10 percent—directly against non-resident non-bank counterparties (Barros et al. (2005), Dermine (2005)). Direct cross-border banking transactions are relatively small in magnitude. Buch, Driscoll, and Ostergaard (2006) show that banks' asset portfolios are excessively (when considering potential gains from international diversification) tilted toward domestic assets. Dermine (2005) argues that to the extent financial services are non-tradable, it is unlikely that one should observe a lot of direct cross-border banking, especially when considering small business finance. Small business lending is heavily dependent on subjective (soft) information about borrowers, information that banks can not collect without geographical proximity to their borrowers. We should therefore expect integration to be achieved through cross-border investment, that is, through foreign bank entry, rather than cross-border banking.

Currently, entry by foreign banks has been limited in many European countries but a substantial consolidation among domestic banks has occurred in many of the "old" EU-member countries. In the period up to the introduction of the euro, around 60 percent of all mergers and acquisitions in Europe took place in domestic markets (Buch and DeLong (2004), Table 1) with only a few significant cross-border deals.[25] Political opposition and merger control legislation may be other factors that explain the relative absence of foreign bank acquisitions (Carletti, Hartmann, and Ongena (2007)). Recently, however, cross-border mergers seem to be gaining some momentum.[26]

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[25]The latter included the Dutch ING Group, the pan-Scandinavian Nordea Bank, and the German Hypo Vereinsbank, see Dermine (2005).

[26]It is often proposed that banking consolidation may sever bank relationships and harm small borrowers, suggesting that small business owners will be harmed from integration. For example, Degryse, Masschelein, and Mitchell (2006) find that commercial borrowers of target banks in Belgian mergers and acquisitions are more likely to discontinue a bank relationship than borrowers of non-merging banks, and that this effect is larger for small than for large firms. A related concern is that bank competition may be harmful to bank-borrower relationships by limiting the sustainability of implicit contracts and the sharing of intertemporal

The picture is turned upside down, however, when one considers the transitional economies among the group of new countries that joined the EU in 2004. Foreign banks are pervasively present in many of these countries as a result of the transition to market-based economies, and in several countries foreign-owned banks dominate the market completely. Giannetti and Ongena (2007) demonstrate that foreign bank lending in transitional economies has been associated with considerable positive growth effects for SMEs.[27]

6.1 Does integration in banking markets predict better income and consumption risk sharing?

We investigate the effect of domestic and cross-border consolidation in banking markets on risk sharing using the approach outlined in Section 3. That is, we estimate the regression (6), reproduced below, including an interaction effect for different measures of banking integration in country i, date t, generically denoted INT_{it}.

$$\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \mu_i + \kappa \ (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) + \epsilon_{it},$$

$$\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{INT}_{\text{it}} - \overline{\text{INT}} \right), \tag{11}$$

where $1 - \kappa$ is the measure of risk sharing.

Because the institutional structure of financial markets may vary considerably between the countries in the sample, we also run regressions that remove country-specific consolidation effects by subtracting out a country's average level of consolidation of the interaction effect, $\text{INT}_{\text{i.}}$. This specification essentially removes permanent differences between countries in the level of consolidation and the resulting regression captures the effect of the time-variation in banking consolidation on income and consumption risk sharing.

$$\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{INT}_{\text{it}} - \overline{\text{INT}}_{\text{i.}} \right). \tag{12}$$

Permanent differences in financial structure are evident if we compare the groups of old and new member countries. For new member countries, the pre-transitional banking sectors have been completely transformed, but financial markets and institutions are overall still

surplus between borrowers and lenders (Petersen and Rajan (1995)). The effect of European banking consolidation, therefore, must be assessed empirically. The analysis of Demyanyk, Ostergaard, and Sørensen (2007b) shows that, in the United States, such detrimental effects are far outweighed by beneficial first order effects on risk sharing. In particular, they find that the largest effect on risk sharing comes from deregulations that eliminate local monopoly markets for community banks.

[27]See also Focarelli and Pozzolo (2006).

less developed compared to old member countries. Hence, if new member countries tend to experience relatively less risk sharing but a relatively higher degree of consolidation, the outcome of regressions that do not control for permanent differences in banking consolidation are likely to estimate a lower overall effect of banking consolidation on risk sharing. Permanent differences in structure also exist among the group of old member countries, especially Belgium stands out by having experienced a considerably higher degree of foreign bank entry than the average country.

6.2 Data and measures of banking integration

Cross-border ownership

We first measure banking integration as cross-border bank ownership. In particular, we compute the proportion of bank assets (or loans) in country i that are owned by institutions registered in another EU country. (This measure is akin to the FDI liability measure, FDI_F, in equation (2)). The proportion of foreign ownership of a given bank is defined as the the product of foreign owners' equity stake, measured in percent, and the value of total assets (loans) of the bank, provided that the foreign holders' equity stake is at least 50 percent. The proportion of foreign ownership of bank assets (loans) in a given country is then summarized over all banks and divided by the value of aggregate bank assets (loans) in that country. This measure of integration will vary over time and is sensitive to the organizational form of banks with foreign ownership, i.e., this measure will not capture foreign entry if it occurs by the formation of bank branches. Preliminary investigations (not shown), suggest that these ownership measures are quite noisy and may vary considerably from year to year for a given country.

Data of foreign ownership is available from Bankscope published by Bureau van Dijk. Banks considered are commercial, savings, and cooperative banks.

Cumulative acquired bank assets in domestic and foreign M&A deals

As a second measure of banking integration, we consider the cumulated (real) value of bank assets in country i that were acquired in domestic, respectively foreign, merger and acquisition (M&A) deals from the beginning of the sample up to and including year t.[28] We scale this measure by the (real) value of aggregate bank assets in country i in year t. In a given country, this measure will be increasing over time to the extent that consolidation

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[28]In the regressions, we take logarithms and rescale the measure as $\log(1 + INT_{it}*100)*1000$ to eliminate the influence of outliers (we take the log of "one plus INT_{it}" because the cumulative acquired value of bank assets for a given country may equal zero in some years). Multiplication by 1000 is for the purpose of rescaling the parameter estimates and does not affect statical significance.

occurs faster than asset growth of the banking industry. The cumulative nature of the measure gives it "memory" of the intensity of past acquisitions during the sample, that is, the measure will not display a drop in value if years with high M&A activity are followed by years with little activity.

Data on M&A deals between banks are from Zephyr, published by Bureau van Dijk, and country-level total bank assets are from Bankscope. We only consider deals involving banks from EU member countries, that is, acquisitions from banks located outside of the EU area are not included in our measures. Also, we only consider deals where the acquired stake is at least 50 percent. We define "domestic (foreign) M&A deals" as completed deals where the target and the bidding bank are registered in the same (different) countries. In the cases with multiple acquiring banks, a deal is considered "foreign" if at least one of the acquiring banks is registered in a country different from the target.

6.3 Empirical findings: Banking consolidation

Figure 2 displays foreign ownership as a fraction of aggregate bank assets in 2000 and 2006 for each country, grouped into "old" and "new" EU countries respectively. It is evident that foreign ownership is much more pervasive in the new member countries, and that in some countries, especially the Baltic countries, foreign owned banks dominate the market completely. The dramatic change in the structure of eastern European banking markets during transition is evidenced by a comparison of foreign ownership in 2000 and 2006. In contrast, foreign ownership of bank assets is much lower in the western European longstanding member countries, with Finland being the exception due to the strong market position of the pan-Scandinavian bank Nordea.[29]

Figure 3 displays the total number of domestic and foreign M&A deals finalized during our sample period and Figure 4 shows the cumulative value of acquired bank assets over the sample. Not only is the number of acquisitions in the old EU countries higher, the deals also involve larger target banks, compared to deals involving new EU target banks. Furthermore, it is evident that domestic consolidation is much more pronounced than foreign acquisitions in the old EU member countries. In new member countries, relatively more of the deals involve entry by a foreign bank. It is also clear from the figures that the degree of consolidation is uneven across the different countries, even when taking into account the

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[29]Because Nordea is registered in Sweden, our measure of foreign penetration of the Swedish market is essentially nil. This observation also reveals a deficiency of the use of foreign ownership as a measure of bank integration. However, since the measure of foreign ownership turns out to have no estimated effect on risk sharing in the regressions, as we show below, we do not pursue modifications of this measure further.

different size of the economies.

Table 10 shows the results from income and consumption risk sharing regressions, equation (11), measuring banking market integration as the proportion of foreign ownership. First notice that the overall levels of income and consumption risk sharing are of a similar order of magnitude as those reported in Table 2, although the level of income insurance is generally insignificant (the relatively large standard errors are due to the small sample sizes). Foreign ownership is negatively associated with income risk sharing in the EMU and old EU group, but insignificant for the other groups, whether measured as a fraction of aggregate bank assets or loans. This may imply that foreign entry has been associated with tighter credit conditions, but the negative coefficient may also reflect permanent differences in the level of foreign ownership among the longstanding EU countries. The effect on consumption risk sharing is generally insignificant.

In Table 11 we control for permanent differences in ownership structures and the estimated coefficients on foreign ownership are now all insignificant. The effect on consumption risk sharing is again generally insignificant, except in one instance for the all EU group. In both tables the results appear quite noisy and we believe this may be due to the small sample sizes and to "noise" in the measure of foreign ownership: Foreign ownership varies considerably from country to country and the very large foreign ownership shares in some countries, such as Estonia and Latvia, are not randomly distributed but concentrated in countries that experience dramatic changes in their economies—these changes may swamp any effects on risk sharing from banking integration. We turn to our second measure of bank integration and do not pursue any further analysis with the measure of foreign ownership.

Table 12 shows the results from risk sharing regressions where market integration is measured as cumulative acquired bank assets in all deals (i.e., both foreign and domestic deals). The effect of banking consolidation on income insurance is generally not significant. Banking consolidation, however, tends to be associated with negative consumption risk sharing, that is, consolidation over the sample period has been associated with an increase in the procyclicality of consumption, consistent with the overall decline in consumption smoothing during the 2000-2006 period. The negative association between consumption risk sharing and banking consolidation most likely reflects temporary consumption shocks that have occurred simultaneously with banking consolidation, similarly to the effect observed in Table 7.

In Table 13, we report the results of separate regressions for domestic and foreign consolidation. The results for domestic consolidation are similar to those of Table 12, although foreign entry appears to be associated with negative income smoothing in the group of

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new EU countries. If foreign bank entry in transitional countries causes finance to be cut for some borrowers, for example because foreign banks apply more sophisticated screening methods or because foreign banks squeeze domestic banks out of the market and cut lending to informationally opaque borrowers, the effect on income risk sharing may well be negative.[30] Consumption risk sharing is also affected negatively by banking consolidation, especially in the case of foreign deals. The exception is the group of EMU countries where domestic consolidation is associated with consumption smoothing. There appears to be an asymmetry between domestic and foreign deals for the groups of old and new EU countries: For old member countries, foreign entry tends to dis-smooth consumption, for new member countries, domestic consolidation tends to dis-smoth consumption.

Tables 14 and 15 display the results from risk sharing regressions (12) that control for differences in the level of banking consolidation across countries. Considering first the effect of overall consolidation, Table 14, we observe a positive impact on income risk sharing for all subgroups of countries. The estimated coefficient is significant at the 10 percent level for the EMU and old EU groups, but insignificant for the new and all EU groups. The effect of consolidation on consumption risk sharing is insignificant for all groups.

Splitting the regressions into domestic and foreign deals, Table 15, it is clear that domestic consolidation has a relatively large, positively significant, effect on income smoothing, especially for EMU and old EU member countries, whereas foreign consolidation has no significant effect. The bottom part of the table reconfirms that neither domestic or foreign consolidation has systematic effects on consumption risk sharing (although the estimated coefficient is significantly negative for the all EU group).

Overall, our results indicate that the process of banking consolidation after 2000, has been associated with an improvement in income risk sharing, in particular within the EMU and longstanding EU countries. The results suggest that consolidation may be associated with positive welfare effects and are consistent with the results of Demyanyk, Ostergaard, and Sørensen (2007a,b), who find beneficial effect for especially small business owners—in the present paper, however, we stop short of estimating the effect on small businesses. Our findings confirm our conjecture and finding from the United States that within-country consolidation may be equally important for banking integration as cross-border consolidation. Although the improvement in risk sharing that we estimate is associated only with domestic consolidation, we believe that foreign bank entry in EU markets is likely to have similar effects. The lack of results for foreign mergers and acquisitions is probably caused by the

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[30]Detragiache, Tressel, and Gupta (2006) argue that foreign banks in poor countries supply less credit and hold less risky loan portfolios, i.e., that foreign banks are less willing to bear risk.

short time series—there is simply too little foreign entry early in the sample to identify an effect.

7 Conclusion

We investigate whether risk sharing between EMU and EU member countries have increased since the adoption of the euro. We document that overall income risk sharing has been higher in the five years following the introduction of the euro than during the previous five year period, and that the improvement has been highest for the group of EMU members. In the same period, however, overall consumption risk sharing has decreased except among EMU members. Our results imply that financial integration between the EMU countries, and financial globalization in general, has facilitated the smoothing of income. We suggest that temporary shifts in consumption in response to, e.g., taste shocks or increased availability of credit, is responsible for the dis-smoothing of consumption.

We further show that international portfolio diversification has increased for both EU and EMU members. We find evidence that increased holdings of foreign assets have been associated with increased income risk sharing. The estimates are somewhat imprecise, and may reflect that significant international integration of asset markets is very recent and still on-going. The effect of diversification on risk sharing is approximately similar whether one considers assets held against foreign residents (domestic assets), or foreigners' assets holdings against domestic residents (domestic liabilities). Our results show, however, that assets and liabilities invested outside the EU (EMU) have the largest effect on risk sharing per euro invested, which indicates that such securities may have returns that are less correlated with the output of the EU (EMU) countries and therefore better able to smooth income. Increasing international asset holdings are associated with declining consumption risk sharing. We believe that these are transitory patterns due to, for example, simultaneously high consumption growth and improved availability of credit in some countries.

Finally, we investigate the effect of banking market integration on risk sharing. We find that income risk sharing has improved following domestic banking consolidation when we focus on country-specific trends in consolidation. Hence, the countries with a higher average level of banking consolidation do not on average obtain more risk sharing. We do not find any evidence of a similar effect from foreign banking consolidation, but we believe that too little foreign consolidation has yet occurred that one may identify such an effect.

Overall, our results leave little doubt that the process of financial integration among

EMU countries has been associated with beneficial welfare effects, in particular in the form of improved smoothing of income. Financial integration, however, is progressing only slowly and the overall level of integration is still lagging behind the level of integration between U.S. states where cross-state investment and securities holdings are much more pervasive. The removal of formal barriers to diversification of assets and removal of obstacles to cross-border banking integration will help. However, individuals' desire to invest in international assets may also be depend on non-regulatory factors such as the degree to which they trust foreign individuals and institutions. Ekinci, Kalemli-Ozcan, and Sørensen (2008) show that "social capital" variables explain patterns of risk sharing within EU countries—such variables may prove harder to change than formal economic barriers to integration.

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Table 1:

Country-level growth rates of real GDP, GNI, and Consumption per capita.

Country	GDP		GNI		CONS	
	(1)	(2)	(3)	(4)	(5)	(6)
	95–99	00–06	95–99	00–06	95–99	00–06
Austria	2.0	1.2	1.9	1.4	1.3	0.9
Belgium	1.8	1.6	1.8	1.5	1.4	1.7
Bulgaria	–3.1	5.2	n.a.	5.3	–2.5	4.9
Cyprus	2.0	2.1	1.7	2.2	3.0	2.5
Czech	1.6	3.9	1.1	3.4	2.4	3.1
Denmark	1.8	2.0	1.8	2.3	1.4	1.7
Estonia	6.6	10.0	6.2	9.5	5.8	8.1
Finland	4.8	2.6	5.3	2.9	3.5	3.0
France	2.0	1.5	2.3	1.3	1.4	1.8
Germany	0.8	0.4	0.7	0.7	0.9	0.2
Greece	2.9	4.0	2.6	4.0	2.2	3.7
Hungary	2.7	4.8	2.2	4.6	1.6	5.3
Ireland	10.6	3.9	9.4	3.9	7.4	3.7
Italy	1.9	1.1	2.2	1.1	2.5	1.4
Latvia	5.7	10.4	5.3	10.1	5.3	9.8
Lithuania	4.7	8.3	4.1	8.3	4.7	7.5
Luxembourg	4.4	4.2	3.6	2.9	3.3	2.7
Malta	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	3.3	1.8	3.2	1.9	3.1	1.8
Poland	4.4	3.3	4.6	2.9	4.9	3.3
Portugal	4.4	0.8	4.1	0.6	4.2	1.4
Romania	n.a.	8.5	n.a.	8.3	n.a.	8.4
Slovak	2.2	3.3	1.9	3.1	3.3	3.2
Slovenia	4.5	3.4	4.4	3.2	3.8	2.6
Spain	3.8	3.0	3.7	2.9	3.3	2.8
Sweden	3.6	2.6	3.9	2.8	3.6	2.2
UK	3.0	2.1	3.0	2.3	3.1	2.5

Note: The rows display the average values of (real, per capita) GDP, GNI, and Consumption growth rates over the 1995-1999 period, see columns (1), (3), and (5) and over the 2000-2006 period, see columns (2), (4), and 6) for each of the EU-27 countries. Data source: Eurostat (1994–2006).

Income and Consumption Smoothing among
EMU, Old, New, and All EU member countries.

EMU		OLD EU		NEW EU		ALL EU	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
95–99	00–06	95–99	00–06	95–99	00–06	95–99	00–06
			Income Risk Sharing				
−2.9	15.7**	11.2***	5.1	7.7	12.6**	4.6**	6.5*
(4.3)	(7.8)	(4.4)	(6.2)	(5.3)	(5.3)	(2.6)	(3.4)
			Consumption Risk Sharing				
42.3***	52.9***	40.5***	38.6***	25.1***	11.5*	24.7***	19.0***
(10.6)	(7.1)	(5.6)	(5.3)	(8.7)	(6.4)	(3.7)	(4.8)

Note: The table reports the average amount of risk sharing during the time-period considered among the countries included in the sample. The numbers are calculated as $1 - \hat{\kappa}$ where the $\hat{\kappa}$ coefficients are estimates from GLS regressions of the form $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \mu_i + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t \right) + \epsilon_{it}$, where μ_i are country fixed-effects (for income risk sharing). Consumption risk sharing regressions are estimated in a similar manner with GNI_{it} replaced by consumption growth. Columns (1) and (2) use a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain for the time periods of 1995-1999 and 2000-2006, respectively. Columns (3) and (4) use a subsample of old EU countries consisting of the EMU countries plus Denmark, Sweden, and the UK for the time periods of 1995-1999 and 2000-2006, respectively. Columns (5) and (6) use a subsample of new EU countries: Bulgaria, Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia for the time periods of 1995-1999 and 2000-2006, respectively. Columns (7) and (8) include all of the above countries in the sample for the time periods of 1995-1999 and 2000-2006, respectively. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Numbers in parentheses are standard errors.

Table 3:

Risk Sharing via Private and Government Saving among EU countries:
EMU, Old, New, and All EU member countries.

	EMU		OLD EU		NEW EU		ALL EU	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	95–99	00–06	95–99	00–06	95–99	00–06	95–99	00–06
Risk sharing via Private Saving								
	−23.1	61.2***	34.1***	37.2***	−21.5	−41.9***	4.9	−9.1
	(22.0)	(19.4)	(17.3)	(13.0)	(34.0)	(17.0)	(10.3)	(9.2)
Risk sharing via Government Saving								
	32.8***	−36.1***	8.0	−0.3	26.5	15.9*	9.7*	5.2
	(12.8)	(17.8)	(6.8)	(11.2)	(31.2)	(10.4)	(6.4)	(6.6)

Note: The table reports average risk sharing via private or government saving among the countries included in the sample. The results are coefficient estimates from GLS regressions of the form $\Delta \log \text{NNDI}_{it} - \Delta \log(\text{NNDI}_{it} - \text{PS}_{it}) = \mu_i + \gamma \, (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) + \epsilon_{it}$ (for private saving). Risk sharing via government saving is estimated in a similar manner with PS_{it} replaced by government saving GS_{it}. Columns (1) and (2) use a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain for the time periods of 1995-1999 and 2000-2006, respectively. Columns (3) and (4) use a subsample of old EU countries consisting of the EMU countries plus Denmark, Sweden, and the UK for the time periods of 1995-1999 and 2000-2006, respectively. Columns (5) and (6) use a subsample of new EU countries: Bulgaria, Cyprus, Czech, Estonia, Latvia, Lithuania, Poland, Slovakia, and Slovenia for the time periods of 1995-1999 and 2000-2006, respectively. Columns (7) and (8) include all of the above countries in the sample for the time periods of 1995-1999 and 2000-2006, respectively. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 4:

Country-level foreign asset and liability holdings of equity, debt, and foreign direct investment relative to GDP

Country	Assets						Liabilities					
	Equity		Debt		FDI		Equity		Debt		FDI	
	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004
Austria	0.03	0.16	0.70	1.67	0.07	0.23	0.02	0.19	0.50	1.42	0.05	0.25
Belgium	0.04	0.13	1.55	2.48	0.41	1.34	0.23	0.49	1.56	2.68	0.29	1.05
Bulgaria	n.a.	0.00	0.79	0.70	0.03	0.40	n.a.	0.01	0.32	0.26	0.01	−0.01
Cyprus	n.a.	0.02	1.12	1.72	0.22	0.75	n.a.	0.13	0.88	2.04	0.01	0.20
Czech	0.03	0.09	0.30	0.36	0.13	0.53	0.01	0.03	0.25	0.30	0.01	0.03
Denmark	0.04	0.18	0.77	1.31	0.13	0.45	0.06	0.27	0.42	0.91	0.17	0.46
Estonia	0.00	0.17	0.20	0.70	0.18	0.88	n.a.	0.04	0.14	0.44	0.02	0.12
Finland	0.13	0.54	0.68	1.04	0.07	0.29	0.01	0.28	0.24	0.96	0.12	0.43
France	0.08	0.29	0.59	1.25	0.22	0.46	0.04	0.22	0.55	1.14	0.24	0.68
Germany	0.05	0.15	0.52	1.19	0.04	0.25	0.07	0.25	0.47	1.13	0.09	0.27
Greece	0.02	0.14	0.43	1.13	0.11	0.13	0.01	0.03	0.28	0.57	0.01	0.06
Hungary	0.01	0.12	0.64	0.62	0.27	0.62	0.00	0.01	0.06	0.17	0.00	0.06
Ireland	0.38	3.37	1.21	4.84	0.41	1.29	0.32	1.69	1.25	6.97	0.12	0.58
Italy	0.03	0.13	0.52	0.96	0.06	0.13	0.04	0.23	0.38	0.63	0.10	0.17
Latvia	0.00	0.01	0.27	0.88	0.13	0.34	n.a.	0.01	0.21	0.51	0.05	0.02
Lithuania	0.00	0.01	0.23	0.42	0.06	0.29	0.00	0.00	0.07	0.15	0.00	0.02
Luxembourg	n.a.	45.43	n.a.	26.85	n.a.	29.86	n.a.	20.04	n.a.	55.65	n.a.	27.72
Malta	0.00	0.01	0.74	2.94	0.28	0.85	n.a.	0.10	0.74	3.31	0.01	0.19
Netherlands	0.30	0.58	0.82	2.46	0.28	0.87	0.22	0.70	0.57	2.13	0.42	1.03
Poland	n.a.	0.05	0.37	0.44	0.06	0.35	0.00	0.00	0.11	0.16	0.00	0.01
Portugal	0.04	0.28	0.58	1.77	0.17	0.39	0.03	0.08	0.42	1.36	0.03	0.27
Romania	0.00	n.a.	0.19	0.37	0.01	0.26	0.00	n.a.	0.16	0.10	0.00	0.00
Slovak	0.04	0.09	0.31	0.51	0.07	0.37	0.04	0.04	0.31	0.19	0.01	0.01
Slovenia	0.00	0.02	0.23	0.59	0.09	0.23	0.00	0.02	0.23	0.28	0.02	0.09
Spain	0.07	0.25	0.41	1.11	0.19	0.38	0.01	0.12	0.33	0.76	0.06	0.37
Sweden	0.17	0.36	0.90	1.26	0.19	0.51	0.12	0.52	0.36	0.69	0.35	0.77
UK	0.19	0.47	1.70	2.88	0.20	0.35	0.30	0.41	1.49	2.54	0.28	0.60

Note. The rows display the value of foreign equity, debt, and foreign direct investment holdings divided by GDP in the same year. The term debt refers to debt securities of any maturity while the term FDI refers to foreign direct investment. Asset and liability data are from Lane and Milesi-Ferretti (2007).

Table 5:

Share of Equity and Debt in EU Countries' Portfolios: 2001 and 2006

Country/year	2001	2006	2001	2006	2001	2006	2001	2006
	EMU Equity		EU Equity		EMU Debt		EU Debt	
Austria	53.5	55.6	64.6	64.9	61.8	65.6	72.2	81.2
Belgium	78.9	79.7	84.8	84.9	75.6	76.7	81.4	84.8
Bulgaria	n.a.	92.6	n.a.	94.6	25.6	41.9	26.9	47.6
Cyprus	15.1	10.1	27.7	23.7	21.1	27.9	36.3	51.3
Czech	23.9	75.2	29.3	84.9	50.5	58.3	67.8	75.5
Denmark	25.4	25.6	49.2	45.9	49.7	52.3	68.6	68.3
Estonia	48.4	33.2	83.9	71.6	73.5	70.0	89.4	87.7
Finland	31.1	38.8	64.5	66.5	74.1	72.4	85.3	91.6
France	51.1	50.5	64.7	63.6	58.1	64.7	68.5	76.2
Germany	59.7	69.6	72.3	76.9	64.7	66.6	77.4	80.2
Greece	49.9	43.0	73.5	62.4	34.0	29.8	54.1	66.5
Hungary	40.8	72.0	57.6	80.1	30.1	47.0	44.0	49.1
Ireland	18.5	26.8	43.3	48.0	31.2	38.0	50.4	60.1
Italy	64.3	79.2	71.7	82.6	49.8	65.3	57.4	71.3
Latvia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lithuania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Luxembourg	37.0	33.6	49.7	45.9	56.6	56.2	67.0	68.3
Malta	23.5	28.9	47.1	48.9	39.0	26.1	48.9	34.3
Netherlands	26.5	25.6	40.3	39.6	66.6	69.0	74.0	77.1
Poland	59.1	52.4	65.2	67.9	30.3	35.1	36.8	51.7
Portugal	65.5	67.3	72.8	78.7	53.4	61.7	59.7	70.4
Romania	83.3	93.8	83.3	97.7	50.0	57.0	50.0	80.7
Slovak	33.3	59.8	75.9	76.3	74.5	62.9	86.5	75.5
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	54.2	77.0	72.9	82.9	67.4	56.7	72.9	69.4
Sweden	33.1	38.2	48.7	51.8	44.7	44.7	58.8	68.1
UK	41.5	30.4	45.2	32.8	42.0	38.6	44.9	41.5
EMU Average	49.2	53.9	64.6	66.4	57.8	60.2	68.4	74.8
Non-EMU EU Average	38.9	47.2	55.7	62.0	44.2	46.8	54.9	61.0
EU Average	44.2	50.7	60.3	64.3	51.0	53.5	61.6	67.9

Note: The table shows the share of equity and debt that European Union countries hold in foreign European Monetary Union countries and foreign European Union countries relative to total foreign equity and debt investment, measured in percent. The data for each year are from the IMF Coordinated Portfolio Investment Surveys.

Table 6:

Income Risk Sharing and Foreign Asset Holdings in the EMU and EU 2001–2006.

EMU								EU							
		GDP× equity shares in EMU portfolio			GDP× debt shares in EMU portfolio					GDP× equity shares in EU portfolio			GDP× debt shares in EU portfolio		
RS	trend	EMU	EU	ROW	EMU	EU	ROW	RS	trend	EMU	EU	ROW	EMU	EU	ROW
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
12.8	—	—	—	—	—	—	—	0.1	—	—	—	—	—	—	—
(12.1)	—	—	—	—	—	—	—	(8.3)	—	—	—	—	—	—	—
12.4	1.9	—	—	—	—	—	—	−2.3	−1.6	—	—	—	—	—	—
(14.2)	(8.9)	—	—	—	—	—	—	(8.4)	(6.6)	—	—	—	—	—	—
12.2	2.1	1.9	—	—	—	—	—	−2.0	−1.2	7.4	—	—	—	—	—
(14.9)	(9.0)	(15.2)	—	—	—	—	—	(8.4)	(6.7)	(13.0)	—	—	—	—	—
10.7	1.8	—	6.8	—	—	—	—	−2.8	−1.4	—	13.8	—	—	—	—
(14.6)	(9.0)	—	(15.0)	—	—	—	—	(8.3)	(6.6)	—	(14.0)	—	—	—	—
6.7	−0.9	—	—	20.5*	—	—	—	−5.3	−3.6	—	—	9.2	—	—	—
(13.7)	(8.9)	—	—	(11.6)	—	—	—	(8.6)	(6.8)	—	—	(8.5)	—	—	—
6.6	0.2	—	—	—	24.3	—	—	−0.5	−2.3	—	—	—	13.5	—	—
(14.2)	(8.9)	—	—	—	(18.8)	—	—	(8.5)	(6.6)	—	—	—	(13.8)	—	—
10.6	2.4	—	—	—	—	6.2	—	−3.7	−1.2	—	—	—	—	6.2	—
(21.9)	(9.0)	—	—	—	—	(29.3)	—	(11.7)	(6.5)	—	—	—	—	(23.4)	—
−0.8	−4.8	—	—	—	—	—	34.2***	−3.4	−4.1	—	—	—	—	—	18.1*
(13.1)	(8.7)	—	—	—	—	—	(13.6)	(8.6)	(6.8)	—	—	—	—	—	(11.7)

Note: The results are based on GLS regressions of the form $\Delta \log \mathrm{GNI}_{it} - \Delta \log \mathrm{GNI}_t = \mu_i + \kappa \left(\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\mathrm{FA}_{it} - \overline{\mathrm{FA}} \right)$. FA_{it} is the ratio of foreign assets holdings of country i at time t relative to country i's GDP, $\overline{\mathrm{FA}}$ is the mean value of FA, and μ_i are country fixed-effects. FA refers to the following equity or debt ratios relative to GDP: EMU equity (equities issued by other EMU countries) in columns (3) and (11), EU equity in (4) and (12), "rest-of-the-world" (ROW) equity in (5) and (13), EMU debt in (6) and (14), EU debt in (7) and (15), ROW debt in (8) and (16). The estimated value of $(1 - \kappa_0)$ corresponds to the average amount of income risk sharing within the group, reported in columns (1) and (9). $(1 - \kappa_0 - \kappa_1 t - \kappa_2 (\mathrm{FA}_{it} - \overline{\mathrm{FA}}))$ measures the amount of income risk sharing obtained in period t by country i. Columns (2) and (10) report the estimated values of κ_1 and the estimated values of κ_2 are reported in columns (3)–(8) and (11)–(16). The first block of results, columns (1)–(8), is based on regressions for EMU countries, and the second block, columns (9)–(16), for EU countries. EMU Countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain. EU countries: EMU countries plus Denmark, Sweden, and the UK. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. The asset data for each year are from the IMF Coordinated Portfolio Investment Surveys. Sample: 2001–2006.

Table 7:

Consumption Risk Sharing and Foreign Asset Holdings in the EMU and EU 2001–2006.

	EMU								EU							
	RS	trend	GDP× equity in EMU portfolio			GDP× debt in EMU portfolio			RS	trend	GDP× equity in EU portfolio			GDP× debt in EU portfolio		
			EMU	EU	ROW	EMU	EU	ROW			EMU	EU	ROW	EMU	EU	ROW
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	52.4 (10.2)	—	—	—	—	—	—	—	41.5*** (6.9)	—	—	—	—	—	—	—
	52.2 (10.6)	-3.4 (6.0)	—	—	—	—	—	—	41.8*** (7.4)	-0.3 (4.9)	—	—	—	—	—	—
	61.1 (10.9)	0.3 (6.1)	-16.8* (9.3)	—	—	—	—	—	47.0*** (8.3)	1.8 (5.2)	-12.0 (8.4)	—	—	—	—	—
	62.2 (11.4)	-0.2 (6.0)	—	-14.5* (8.6)	—	—	—	—	47.3*** (8.5)	1.5 (5.2)	—	-8.6 (7.6)	—	—	—	—
	64.9 (11.1)	0.5 (5.9)	—	—	-12.7*** (6.4)	—	—	—	56.4*** (8.7)	1.9 (5.4)	—	—	-15.2*** (6.4)	—	—	—
	64.9 (10.8)	1.0 (6.1)	—	—	—	-22.6*** (10.1)	—	—	45.2*** (8.0)	2.3 (5.3)	—	—	—	-9.7 (7.9)	—	—
	63.4 (12.6)	-2.5 (5.9)	—	—	—	—	-22.0* (14.9)	—	48.4*** (8.4)	0.2 (4.6)	—	—	—	—	-17.2* (10.9)	—
	68.5 (10.6)	1.0 (5.8)	—	—	—	—	—	-16.7*** (6.9)	51.8*** (8.5)	1.3 (5.7)	—	—	—	—	—	-13.2* (7.2)

Note: The results are based on GLS regressions of the form $\Delta \log \text{CONS}_t = \mu_i + \kappa \ (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 (\text{FA}_{it} - \overline{\text{FA}})$. FA_{it} is the ratio of foreign assets holdings of country i at time t relative to country i's GDP, $\overline{\text{FA}}$ is the mean value of FA, and μ_i are country fixed-effects. FA refers to the following equity or debt ratios relative to GDP: EMU equity (equities issued by other EMU countries) in columns (3) and (11), EU equity in (4) and (12), "rest-of-the-world" (ROW) equity in (5) and (13), EMU debt in (6) and (14), EU debt in (7) and (15), ROW debt in (8) and (16). The estimated value of $(1 - \kappa_0)$ corresponds to the average amount of consumption risk sharing within the group, reported in columns (1) and (9). $(1 - \kappa_0 - \kappa_1 t - \kappa_2 (\text{FA}_{it} - \overline{\text{FA}}))$ measures the amount of consumption risk sharing obtained in period t by country i. Columns (2) and (10) report the estimated values of κ_1 and the estimated values of κ_2 are reported in columns (3)−(8) and (11)−(16). The first block of results, columns (1)−(8), is based on regressions for EMU countries, and the second block, columns (9)−(16), for EU countries. EMU Countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain. EU Countries: EMU countries plus Denmark, Sweden, and the UK. Numbers in parentheses are standard errors. *** , ** , and * indicate statistical significance at 1%, 5%, and 10%, respectively. The asset data for each year are from the IMF Coordinated Portfolio Investment Surveys. Sample: 2001–2006.

Table 8:

Income Risk Sharing and Foreign Asset/Liability Holdings. EMU and EU 1996–2006.

		EMU								EU					
			GDP× assets			GDP× liabilities					GDP× assets			GDP× liabilities		
RS	trend	equity	debt	FDI	equity	debt	FDI	RS	trend	equity	debt	FDI	equity	debt	FDI
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
8.1*	—	—	—	—	—	—	—	4.9	—	—	—	—	—	—	—
(5.4)	—	—	—	—	—	—	—	(4.7)	—	—	—	—	—	—	—
9.8*	2.4	—	—	—	—	—	—	5.1	0.3	—	—	—	—	—	—
(5.6)	(2.1)	—	—	—	—	—	—	(4.8)	(1.8)	—	—	—	—	—	—
2.2	0.6	8.1***	—	—	—	—	—	0.7	−1.1	8.0***	—	—	—	—	—
(6.7)	(2.2)	(4.1)	—	—	—	—	—	(5.2)	(1.9)	(3.9)	—	—	—	—	—
−0.1	−0.1	—	15.2***	—	—	—	—	−0.3	−1.0	—	12.6***	—	—	—	—
(1.8)	(2.0)	—	(5.1)	—	—	—	—	(1.6)	(1.7)	—	(5.1)	—	—	—	—
6.1	1.1	—	—	8.4	—	—	—	3.9	−0.4	—	—	4.8	—	—	—
(6.2)	(2.3)	—	—	(6.1)	—	—	—	(5.0)	(2.0)	—	—	(5.7)	—	—	—
4.5	0.8	—	—	—	9.8***	—	—	2.1	−0.7	—	—	—	8.7*	—	—
(6.1)	(2.2)	—	—	—	(4.7)	—	—	(5.0)	(1.8)	—	—	—	(4.4)	—	—
−2.6	−1.5	—	—	—	—	26.0***	—	−1.1	−1.9	—	—	—	—	20.7***	—
(6.9)	(2.4)	—	—	—	—	(9.6)	—	(5.3)	(1.9)	—	—	—	—	(8.8)	—
4.1	0.1	—	—	—	—	—	13.8***	1.8	−1.7	—	—	—	—	—	14.9***
(6.0)	(2.3)	—	—	—	—	—	(6.5)	(4.9)	(1.9)	—	—	—	—	—	(6.6)

Note: The results are based on GLS regressions of the form $\Delta \log \text{CONS}_{it} - \Delta \log \text{CONS}_t = \mu_i + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 (\text{FA}_{it} - \overline{\text{FA}})$. FA_{it} is the ratio of foreign assets holdings in country i at time t relative to GDP of country i, $\overline{\text{FA}}$ is the mean value of FA, and μ_i are country fixed-effects. In columns (3) and (11) [(6) and (14)] FA refers to total equity assets [liabilities] relative to GDP, in columns (4) and (12) [(7) and (15)] to debt assets [liabilities] relative to GDP, and in columns (5) and (13) [(8) and (16)] to FDI assets [liabilities] relative to GDP. The estimated value of $(1 - \kappa_0)$ corresponds to the average amount of consumption risk sharing within the group, reported in columns (1) and (9). $(1 - \kappa_0 - \kappa_1 t - \kappa_2 (\text{FA}_{it} - \overline{\text{FA}}))$ measures the amount of consumption risk sharing obtained in period t by country i. The estimated values of κ_1 are reported in columns (2) and (10) while the estimated values of κ_2 are presented in columns (3)–(8) and (11)–(16). The first block of results is based on the sample of EMU countries, and the next block is based on the sample of EU countries. EMU countries included: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain. EU countries consist of the EMU countries plus Denmark, Sweden, and the UK. Asset and liability data are from Lane and Milesi-Ferretti (2007), linearly extrapolated for the years 2005 and 2006. Sample: 1996–2006. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

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Table 9:

Consumption Risk Sharing and Foreign Asset and Liability Holdings. EMU and EU 1996–2006.

	EMU								EU							
			GDP × assets			GDP × liabilities					GDP × assets			GDP × liabilities		
RS	trend	equity	debt	FDI	equity	debt	FDI	RS	trend	equity	debt	FDI	equity	debt	FDI
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
41.3***	–	–	–	–	–	–	–	39.4***	–	–	–	–	–	–	–
(3.6)	–	–	–	–	–	–	–	(3.7)	–	–	–	–	–	–	–
41.1***	0.4	–	–	–	–	–	–	39.5***	0.1	–	–	–	–	–	–
(3.9)	(1.6)	–	–	–	–	–	–	(3.7)	(1.6)	–	–	–	–	–	–
42.8***	0.6	–0.8	–	–	–	–	–	36.7***	–0.2	1.7	–	–	–	–	–
(7.8)	(1.8)	(3.5)	–	–	–	–	–	(6.4)	(1.7)	(3.3)	–	–	–	–	–
2.9	–2.6	–	18.6***	–	–	–	–	2.9	–2.4	–	16.9***	–	–	–	–
(2.0)	(2.0)	–	(3.8)	–	–	–	–	(2.0)	(1.9)	–	(3.8)	–	–	–	–
43.7***	1.1	–	–	–4.1	–	–	–	40.4***	0.4	–	–	–2.0	–	–	–
(5.7)	(1.9)	–	–	(6.4)	–	–	–	(4.6)	(1.8)	–	–	(5.8)	–	–	–
42.9**	0.6	–	–	–	–0.9	–	–	35.8***	–0.3	–	–	–	2.3	–	–
(7.5)	(1.8)	–	–	–	(3.8)	–	–	(6.5)	(1.7)	–	–	–	(3.4)	–	–
45.6***	1.1	–	–	–	–	–4.6	–	39.5***	0.3	–	–	–	–	–0.3	–
(8.6)	(2.1)	–	–	–	–	(8.3)	–	(7.0)	(1.9)	–	–	–	–	(7.3)	–
44.7***	1.0	–	–	–	–	–	–3.7	37.6***	0.0	–	–	–	–	–	2.2
(7.4)	(1.9)	–	–	–	–	–	(6.7)	(6.3)	(1.8)	–	–	–	–	–	(6.3)

Note: The results are based on GLS regressions of the form $\Delta \log \mathrm{GNI}_{it} - \Delta \log \mathrm{GNI}_t = \mu_i + \kappa \left(\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\mathrm{FA}_{it} - \overline{\mathrm{FA}} \right)$. FA_{it} is the ratio of foreign assets holdings in country i at time t relative to GDP of country i, $\overline{\mathrm{FA}}$ is the mean value of FA, and μ_i are country fixed-effects. In columns (3) and (11) [(6) and (14)] FA refers to total equity assets [liabilities] relative to GDP, in columns (4) and (12) [(7) and (15)] to debt assets [liabilities] relative to GDP, and in columns (5) and (13) [(8) and (16)] to FDI assets [liabilities] relative to GDP. The estimated value of $(1 - \kappa_0)$ corresponds to the average amount of consumption risk sharing within the group, reported in columns (1) and (9). $(1 - \kappa_0 - \kappa_1 t - \kappa_2 (\mathrm{FA}_{it} - \overline{\mathrm{FA}}))$ measures the amount of consumption risk sharing obtained in period t by country i. The estimated values of κ_1 are reported in columns (2) and (10) while the estimated values of κ_2 are presented in columns (3)–(8) and (11)–(16). The first block of results is based on the sample of EMU countries, and the next block is based on the sample of EU countries. EMU countries included: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain. EU countries consist of the EMU countries plus Denmark, Sweden, and the UK. Asset and liability data are from Lane and Milesi-Ferretti (2007), linearly extrapolated for the years 2005 and 2006. Sample: 1996–2006. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

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Table 10:

Risk Sharing and Foreign Ownership in Percent of Aggregate Bank Assets and Loans 2000–2006

	Foreign Assets				Foreign Loans			
	EMU	OLD EU	NEW EU	ALL EU	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Income Risk Sharing				Income Risk Sharing			
Avg. Risk Sharing	9.9	1.6	10.6	2.7	8.5	1.5	9.7	2.4
	(10.8)	(8.0)	(6.8)	(4.4)	(10.8)	(8.0)	(6.8)	(4.5)
Trend	3.9	2.2	-5.2	-5.0*	3.2	1.8	-5.2	-4.9*
	(6.4)	(4.5)	(4.1)	(2.6)	(6.4)	(4.5)	(4.3)	(2.7)
Foreign Ownership	-7.4	-10.3**	4.6	2.5	-9.6*	-11.7**	3.2	2.1
	(5.6)	(4.9)	(4.5)	(2.2)	(5.7)	(4.9)	(4.5)	(2.2)
	Consumption Risk Sharing				Consumption Risk Sharing			
Avg. Risk Sharing	46.8***	38.4***	5.6	16.5***	47.3***	38.6***	5.3	16.4***
	(9.1)	(6.6)	(11.1)	(6.0)	(8.8)	(6.5)	(10.7)	(6.0)
Trend	-4.0	0.8	-10.9*	-0.2	-3.3	0.9	-10.3	0.0
	(5.2)	(3.8)	(6.5)	(3.3)	(5.2)	(3.7)	(6.8)	(3.3)
Foreign Ownership	6.1	1.0	-0.9	-3.3	6.6	2.1	-1.9	-3.5
	(4.6)	(4.3)	(7.7)	(3.7)	(4.6)	(4.4)	(7.0)	(3.5)

Note: The results for income risk sharing are coefficient estimates from the GLS regression: $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \mu_i + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{INT}_{it} - \overline{\text{INT}} \right)$. t is a trend, INT_{it} measures bank integration as the proportion of foreign ownership to aggregate bank assets (loans) in country i in year t, and $\overline{\text{INT}}$ is the average of INT_{it} over the countries and years in the sample. Consumption risk sharing regressions are estimated in a similar manner with $\Delta \log \text{GNI}_{it}$ replaced by consumption growth. The rows labelled Avg. Risk Sharing display $\hat{\kappa}_0$, the rows labelled Trend display $\hat{\kappa}_1$, and the rows labelled Foreign Ownership display $\hat{\kappa}_2$. Columns (1) and (5) use a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. Columns (2) and (6) use the sample of EMU countries plus Denmark, Sweden, and the UK. Columns (3) and (7) use a subsample of new EU countries: Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Columns (4) and (8) include all of the above countries in the sample. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Sample: 2000–2006.

Table 11:

Risk Sharing and Foreign Ownership in Percent of Total Bank Assets and Loans 2000–2006
The Effect of Country-Specific Time Variation in Banking Consolidation

| | Foreign Assets | | | | Foreign Loans | | | |
	EMU	OLD EU	NEW EU	ALL EU	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Income Risk Sharing				**Income Risk Sharing**			
Avg. Risk Sharing	2.7	3.8	10.3	4.0	2.4	3.7	10.1	3.7
	(4.4)	(8.1)	(7.4)	(4.5)	(4.5)	(8.2)	(7.3)	(4.5)
Trend	−5.0*	0.9	−3.7	−4.4	−4.9*	0.5	−3.5	−4.4
	(2.6)	(4.5)	(4.2)	(2.6)	(2.7)	(4.5)	(4.3)	(2.7)
Foreign Ownership	2.5	−10.4	0.3	1.2	2.1	−8.3	−0.3	1.0
	(2.2)	(12.0)	(5.0)	(2.8)	(2.2)	(12.2)	(5.0)	(2.8)
	Consumption Risk Sharing				**Consumption Risk Sharing**			
Avg. Risk Sharing	16.5***	39.0***	6.2	18.7***	16.4***	39.0***	6.6	19.4***
	(6.0)	(6.5)	(10.9)	(6.2)	(6.0)	(6.5)	(10.7)	(6.2)
Trend	−0.2	1.0	−13.4**	−1.9	0.0	0.9	−12.0**	−2.3
	(3.3)	(3.7)	(6.2)	(3.3)	(3.3)	(3.8)	(6.3)	(3.3)
Foreign Ownership	−3.3	−5.4	−0.1	6.1	−3.5	−2.0	1.8	9.3**
	(3.7)	(11.4)	(9.9)	(5.3)	(3.5)	(11.7)	(9.8)	(5.2)

Note: The results for income risk sharing are coefficient estimates from the GLS regression: $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_{t} = \mu_i + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_{t} \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{INT}_{it} - \overline{\text{INT}_{i,\cdot}} \right)$. t is a trend, INT_{it} measures bank integration as the proportion of foreign ownership to aggregate bank assets (loans) in country i in year t, and $\overline{\text{INT}_{i,\cdot}}$ is the average of INT_{it} over the years in the sample for each country i. Consumption risk sharing regressions are estimated in a similar manner with $\Delta \log \text{GNI}_{it}$ replaced by consumption growth. The rows labelled Avg. Risk Sharing display κ_0, the rows labelled Trend display κ_1, and the rows labelled Foreign Ownership display κ_2. Columns (1) and (5) use a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. Columns (2) and (6) use the sample of EMU countries plus Denmark, Sweden, and the UK. Columns (3) and (7) use a subsample of new EU countries: Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Columns (4) and (8) include all of the above countries in the sample. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Sample: 2000–2006.

Risk Sharing and Cumulative Acquired Bank Assets Scaled by Aggregate Assets
All Mergers and Acquisitions 2000–2006

	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)
Income Risk Sharing				
Avg. Risk Sharing	10.8	3.3	10.6	3.4
	(10.7)	(8.1)	(7.1)	(4.5)
Trend	5.3	1.1	–3.7	–3.8
	(6.2)	(4.5)	(3.9)	(2.5)
Bank Consolidation	1.5	0.9	–1.8	0.0
	(1.3)	(1.3)	(2.3)	(1.0)
Consumption Risk Sharing				
Avg. Risk Sharing	49.0***	33.5***	2.0	15.3***
	(9.6)	(7.4)	(11.0)	(6.1)
Trend	–3.1	1.3	–10.5*	–1.4
	(5.9)	(4.0)	(5.8)	(3.1)
Bank Consolidation	–0.1	–2.8**	–4.3	–2.5*
	(1.2)	(1.3)	(3.7)	(1.2)

Note: The results for income risk sharing are coefficient estimates from the GLS regression: $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \mu_i + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{INT}_{it} - \overline{\text{INT}} \right)$. t is a trend, INT_{it} measures bank integration as the cumulative value of acquired bank assets scaled by aggregate bank assets in country i in year t in both domestic and foreign merger and acquisitions deals, and $\overline{\text{INT}}$ is the average of INT_{it} over all years and countries. Consumption risk sharing regressions are estimated in a similar manner with $\Delta \log \text{GNI}_{it}$ replaced by consumption growth. Column (1) uses a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. Column (2) uses the EMU countries plus Denmark, Sweden, and the UK. Column (3) uses a subsample of new EU countries: Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Column (4) includes all of the above countries in the sample. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Sample: 2000–2006.

Table 13:

Risk Sharing and Cumulative Acquired Bank Assets Scaled by Aggregate Assets
Domestic and Foreign Deals 2000–2006

	Domestic M&A Deals				Foreign M&A Deals			
	EMU	OLD EU	NEW EU	ALL EU	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Income Risk Sharing				*Income Risk Sharing*			
Avg. Risk Sharing	12.7	3.7	11.5*	3.2	11.5	2.8	5.2	4.2
	(10.6)	(8.1)	(6.8)	(4.4)	(10.8)	(8.1)	(8.1)	(4.6)
Trend	5.2	1.1	−3.7	−4.0	4.5	0.5	−2.7	−3.9
	(6.3)	(4.5)	(3.9)	(2.5)	(6.2)	(4.5)	(3.8)	(2.5)
Bank Consolidation	1.0	0.3	0.2	0.0	2.1	2.1	−9.3*	0.5
	(1.3)	(1.5)	(2.3)	(1.1)	(2.7)	(2.4)	(5.6)	(2.0)
	Consumption Risk Sharing				*Consumption Risk Sharing*			
Avg. Risk Sharing	48.0***	39.3***	2.4	16.1***	49.3***	34.4***	6.5	15.6***
	(8.6)	(7.0)	(10.3)	(6.0)	(7.5)	(6.3)	(10.8)	(6.3)
Trend	−3.2	1.2	−11.3**	−2.1	−4.4	2.4	−11.5**	−0.3
	(5.2)	(3.8)	(5.7)	(3.2)	(4.6)	(3.7)	(5.8)	(3.2)
Bank Consolidation	1.6*	0.1	−8.3*	−2.5*	−10.3***	−9.4***	0.9	−3.2
	(0.9)	(1.5)	(4.8)	(1.4)	(2.1)	(2.1)	(6.1)	(2.8)

Note: The results for income risk sharing are coefficient estimates from the GLS regression: $\Delta \log \mathrm{GNI}_{it} - \Delta \log \mathrm{GNI}_t = \mu_i + \kappa \left(\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\mathrm{INT}_{it} - \overline{\mathrm{INT}} \right)$. t is a trend, INT_{it} measures bank integration as the cumulative value of acquired bank assets scaled by aggregate bank assets in country i in year t in domestic *or* foreign merger and acquisitions deals respectively, and $\overline{\mathrm{INT}}$ is the average of INT_{it} over all years and countries. Consumption risk sharing regressions are estimated in a similar manner with $\Delta \log \mathrm{GNI}_{it}$ replaced by consumption growth. Columns (1) and (5) use a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. Columns (2) and (6) use the EMU countries plus Denmark, Sweden, and the UK. Columns (3) and (7) use a subsample of new EU countries: Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Columns (4) and (8) include all of the above countries in the sample. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Sample: 2000–2006.

Table 14:

Risk Sharing and Cumulative Acquired Bank Assets Scaled by Aggregate Assets
All Mergers and Acquisition Deals 2000–2006
The Effect of Country-Specific Time Variation in Banking Consolidation

	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)
		Income Risk Sharing		
Avg. Risk Sharing	11.4	4.0	11.5*	3.8
	(10.3)	(8.0)	(6.6)	(4.3)
Trend	3.3	1.2	–3.9	–4.7*
	(6.2)	(4.4)	(3.8)	(2.5)
Bank Consolidation	5.7**	4.3*	2.9	2.6
	(2.8)	(2.6)	(4.7)	(1.8)
		Consumption Risk Sharing		
Avg. Risk Sharing	51.8***	39.1***	5.3	16.6***
	(8.7)	(6.5)	(10.3)	(6.1)
Trend	–4.5	1.1	–9.8	–0.7
	(5.3)	(3.7)	(6.3)	(3.3)
Bank Consolidation	0.1	–1.3	–3.1	–1.4
	(2.7)	(3.1)	(7.1)	(2.7)

Note: The results for income risk sharing are coefficient estimates from the GLS regression: $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \mu_i + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{INT}_{it} - \overline{\text{INT}_{i.}} \right)$. t is a trend, INT_{it} measures bank integration as the cumulative value of acquired bank assets scaled by aggregate bank assets in country i in year t in both domestic and foreign merger and acquisitions deals, and $\overline{\text{INT}_{i.}}$ is the average of INT_{it} over all years for each country i. Consumption risk sharing regressions are estimated in a similar manner with $\Delta \log \text{GNI}_{it}$ replaced by consumption growth. Column (1) uses a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. Column (2) uses the EMU countries plus Denmark, Sweden, and the UK. Column (3) uses a subsample of new EU countries: Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Column (4) includes all of the above countries in the sample. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Sample: 2000–2006.

Table 15:

Risk Sharing and Cumulative Acquired Bank Assets Scaled by Total Assets

Domestic and Foreign Deals 2000–2006

The Effect of Country-Specific Time Variation in Banking Consolidation

	Domestic M&A Deals				Foreign M&A Deals			
	EMU	OLD EU	NEW EU	ALL EU	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Income Risk Sharing				Income Risk Sharing			
Avg. Risk Sharing	10.7	3.5	8.9	3.1	13.5	3.8	11.2	3.8
	(10.4)	(7.9)	(6.6)	(4.3)	(10.5)	(8.1)	(6.8)	(4.4)
Trend	1.8	–1.7	–3.9	–3.7	4.7	0.8	–3.8	–4.8*
	(6.1)	(4.4)	(3.8)	(2.5)	(6.2)	(4.5)	(4.0)	(2.6)
Bank Consolidation	10.9**	8.3**	6.8	4.5	2.8	2.3	–0.4	2.1
	(4.6)	(4.1)	(6.1)	(3.0)	(4.3)	(3.8)	(9.0)	(2.6)
	Consumption Risk Sharing				Consumption Risk Sharing			
Avg. Risk Sharing	51.8***	39.1***	5.8	15.3***	52.4***	38.8	6.2	17.5***
	(8.8)	(6.5)	(10.2)	(6.0)	(8.5)	(6.5)	(10.3)	(6.1)
Trend	–4.9	1.0	–10.1*	–1.1	–4.7	1.3*	–11.2	–2.0
	(5.4)	(3.8)	(5.8)	(3.1)	(5.2)	(3.8)	(6.5)	(3.1)
Bank Consolidation	1.8	0.1	–8.9	–7.5**	–5.5	–4.1	–0.3	2.3
	(3.2)	(4.4)	(12.1)	(3.7)	(5.4)	(4.9)	(9.5)	(4.0)

Note: The results for income risk sharing are coefficient estimates from the GLS regression: $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_{t} = \mu_i + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_{t} \right) + \epsilon_{it}$, where $\kappa = \kappa_0 + \kappa_1 t + \kappa_2 \left(\text{INT}_{1t} - \overline{\text{INT}_1} \right)$. t is a trend, INT_{1t} measures bank integration as the cumulative value of acquired bank assets scaled by aggregate bank assets in country i in year t in domestic *or* foreign merger and acquisitions deals respectively, and $\overline{\text{INT}_1}$ is the average of INT_{1t} over all years for each country i. Consumption risk sharing regressions are estimated in a similar manner with $\Delta \log \text{GNI}_{it}$ replaced by consumption growth. Columns (1) and (5) use a subsample of EMU countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. Columns (2) and (6) use the EMU countries plus Denmark, Sweden, and the UK. Columns (3) and (7) use a subsample of new EU countries: Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. Columns (4) and (8) include all of the above countries in the sample. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Sample: 2000–2006.

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9 Appendix

In this appendix, we display results of risk sharing regressions without country fixed effects. Such regressions do not remove the average growth of consumption, output, and income over the years of the sample and the results will therefore be impacted by longer-run patterns of risk sharing.

The results of such regressions are quite similar to those including fixed effects although there are some differences. Without fixed effects, see Table 16, income risk sharing in the EMU has not improved since 1999 and consumption risk sharing is lower. We tend to think the former results is due to the short sample while the later result seems intuitive: People smooth consumption more a shorter frequencies. At longer horizons (i.e., not including country fixed effects) the effects of government and private saving is less volatile, see Table 17, and there is no impact of government saving except for the new EU countries after 2000 where government saving helps smooth consumption. The effect of foreign asset holdings on income smoothing is typically much smaller at the longer frequencies as indicated by the results of Tables 18 and 20. The negative correlations of foreign assets with consumption smoothing are similar but with smaller coefficients when fixed effects are not included, see Tables 19 and 21.

Tables 22 and 23 show results from the regressions without country fixed effects to investigate the effect of banking consolidation on risk sharing over longer horizons. We find little evidence of a systematic effect on either income or consumption risk sharing, whether considering all deals, or domestic versus foreign deals, although the asymmetric effect on consumption risk sharing between old and new member countries, as illustrated in Table 13 appears to be apply also to longer horizons. (The results of Tables 14 and 15 suggest that this asymmetry is due to permanent structural or institutional differences in financial markets in these two groups of countries.)

Table 16:

Income and Consumption Smoothing among
EMU, Old, New, and All EU member countries.
Without Country Fixed-Effects.

	EMU		OLD EU		NEW EU		ALL EU	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	95–99	00–06	95–99	00–06	95–99	00–06	95–99	00–06
Income Risk Sharing								
	8.9***	8.3***	9.5***	3.7	3.9	1.7	6.5***	4.0***
	(2.2)	(4.1)	(2.8)	(4.1)	(3.8)	(2.6)	(2.1)	(1.6)
Consumption Risk Sharing								
	33.1***	27.0***	32.5***	27.4***	28.9***	16.7***	21.9***	16.0***
	(2.7)	(5.4)	(3.3)	(4.8)	(7.2)	(4.3)	(4.1)	(3.2)

Note: See notes to Table 2. The difference to Table 2 is that the regressions are estimated as $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \text{constant} + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t \right) + \epsilon_{it}$, with a constant rather than dummy variables for each country. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 17:

Risk Sharing via Private and Government Saving among EU countries:
EMU, Old, New, and All EU member countries.
Without Country Fixed-Effects.

	EMU		OLD EU		NEW EU		ALL EU	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	95–99	00–06	95–99	00–06	95–99	00–06	95–99	00–06
Risk sharing via Private Saving								
	16.1***	13.2	18.2***	17.6*	36.7*	−1.3	17.9***	6.4*
	(8.2)	(12.2)	(8.3)	(10.9)	(27.6)	(8.1)	(7.8)	(4.9)
Risk sharing via Government Saving								
	0.1	3.1	−1.4	8.8	−12.6	8.2***	2.7	9.5***
	(2.1)	(10.6)	(1.5)	(9.3)	(24.5)	(4.0)	(3.9)	(2.9)

Note: See notes to Table 3. The difference to Table 3 is that the regressions are estimated as $\Delta \log \text{NNDI}_{it} - \Delta \log(\text{NNDI}_{it} - \text{PS}_{it}) = \text{constant} + \gamma \ (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) + \epsilon_{it}$, with a constant rather than dummy variables for each country. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 18:

Income Risk Sharing and Foreign Asset Holdings in the EMU and EU 2001–2006.
Without Country Fixed-Effects.

	EMU								EU							
			GDP× equity in EMU portfolio			GDP× debt in EMU portfolio					GDP× equity in EU portfolio			GDP× debt in EU portfolio		
RS	RS	trend	EMU	EU	ROW	EMU	EU	ROW	RS	trend	EMU	EU	ROW	EMU	EU	ROW
	(1)	(2)	(6)	(7)	(8)	(3)	(4)	(5)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	8.2	–	–	–	–	–	–	–	2.8	–	–	–	–	–	–	–
	(6.0)	–	–	–	–	–	–	–	(5.2)	–	–	–	–	–	–	–
	7.5	-0.6	–	–	–	–	–	–	2.0	–1.8	–	–	–	–	–	–
	(6.2)	(3.5)	–	–	–	–	–	–	(5.3)	(3.1)	–	–	–	–	–	–
	8.7	-1.1	5.7	–	–	–	–	–	2.3	–2.0	0.9	–	–	–	–	–
	(6.4)	(3.6)	(8.1)	–	–	–	–	–	(5.5)	(3.2)	(0.7)	–	–	–	–	–
	8.9	-0.9	–	5.1	–	–	–	–	2.4	–2.0	–	1.1	–	–	–	–
	(6.5)	(3.5)	–	(8.0)	–	–	–	–	(5.6)	(3.2)	–	(7.8)	–	–	–	–
	10.0	-0.3	–	–	5.0	–	–	–	1.4	–1.9	–	–	-1.3	–	–	–
	(7.0)	(3.5)	–	–	(6.9)	–	–	–	(5.8)	(3.1)	–	–	(5.3)	–	–	–
	9.0	-0.7	–	–	–	5.3	–	–	2.2	–1.7	–	–	–	0.0	–	–
	(6.7)	(3.5)	–	–	–	(10.2)	–	–	(5.6)	(3.1)	–	–	–	(9.5)	–	–
	8.4	-0.5	–	–	–	–	-1.8	–	1.2	–1.7	–	–	–	–	1.4	–
	(7.3)	(3.5)	–	–	–	–	(8.1)	–	(6.3)	(3.1)	–	–	–	–	(8.2)	–
	8.7	-0.7	–	–	–	–	–	6.6	1.7	–1.8	–	–	–	–	–	-0.3
	(6.5)	(3.5)	–	–	–	–	–	(8.5)	(5.5)	(3.1)	–	–	–	–	–	(8.1)

Note: See notes to Table 6. The difference to Table 6 is that results are from regressions of the form $\Delta \log \mathrm{GNI}_{it} - \Delta \log \mathrm{GNI}_t = \text{constant} + \kappa \left(\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t \right) + \epsilon_{it}$ with a constant rather than a dummy variable for each country. Numbers in parentheses are standard errors. $***$, $**$, and $*$ indicate statistical significance at 1%, 5%, and 10%, respectively.

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Table 19:

Consumption Risk Sharing and Foreign Asset Holdings in the EMU and EU 2001–2006.
Without Country Fixed-Effects.

		EMU							EU							
			GDP× equity in EMU portfolio			GDP× debt in EMU portfolio					GDP× equity in EU portfolio			GDP× debt in EU portfolio		
RS	trend	EMU	EU	ROW	EMU	EU	ROW	RS	trend	EMU	EU	ROW	EMU	EU	ROW
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
28.5*** (6.0)	—	—	—	—	—	—	—	29.8*** (5.2)	—	—	—	—	—	—	—
28.3*** (6.3)	-3.1 (3.7)	—	—	—	—	—	—	30.2*** (5.4)	1.1 (3.1)	—	—	—	—	—	—
26.8*** (5.8)	-3.1 (3.4)	-11.8*** (4.4)	—	—	—	—	—	29.4*** (5.2)	0.7 (3.1)	-11.5*** (4.7)	—	—	—	—	—
28.3*** (5.9)	-3.8 (3.4)	—	-10.6*** (4.1)	—	—	—	—	30.9*** (5.2)	0.0 (3.1)	—	-9.2*** (4.4)	—	—	—	—
30.7*** (6.2)	-4.5 (3.5)	—	—	-8.5*** (3.5)	—	—	—	32.1*** (5.4)	-0.5 (3.1)	—	—	-7.6*** (3.6)	—	—	—
28.7*** (5.9)	-3.4 (3.4)	—	—	—	-12.6*** (5.2)	—	—	31.6*** (5.3)	0.3 (3.2)	—	—	—	-12.0*** (5.4)	—	—
37.9*** (7.4)	-2.4 (3.0)	—	—	—	—	-9.6*** (3.6)	—	38.5*** (6.0)	-0.5 (2.7)	—	—	—	—	-8.5*** (2.7)	—
34.3*** (6.6)	-4.5 (3.4)	—	—	—	—	—	-11.1*** (4.4)	35.3*** (5.7)	-1.1 (3.2)	—	—	—	—	—	-9.9*** (4.7)

Note: See notes to Table 7. The difference to Table 7 is that the results are coefficient estimates from GLS regressions of the form $\Delta \log \text{CONS}_{it} - \Delta \log \text{CONS}_t = \text{constant} + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t\right) + \epsilon_{it}$ with a constant rather than a dummy variable for each country. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 20:

Income Risk Sharing and Foreign Asset/Liability Holdings. EMU and EU 1996–2006.
Without Country Fixed-Effects.

		EMU								EU					
		GDP× assets			GDP× liabilities					GDP× assets			GDP× liabilities		
RS	trend	debt	equity	FDI	debt	equity	FDI	RS	trend	debt	equity	FDI	debt	equity	FDI
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
7.3***	–	–	–	–	–	–	–	5.3*	–	–	–	–	–	–	–
(3.2)	–	–	–	–	–	–	–	(3.0)	–	–	–	–	–	–	–
7.9***	0.4	–	–	–	–	–	–	4.9	−0.4	–	–	–	–	–	–
(3.5)	(1.1)	–	–	–	–	–	–	(3.2)	(1.0)	–	–	–	–	–	–
1.9	0.2	10.9***	–	–	–	–	–	1.4	−0.5	7.7***	–	–	–	–	–
(1.9)	(1.0)	(3.8)	–	–	–	–	–	(1.7)	(0.9)	(3.8)	–	–	–	–	–
3.6	0.6	–	5.1*	–	–	–	–	2.7	−0.3	–	3.9	–	–	–	–
(4.4)	(1.1)	–	(3.1)	–	–	–	–	(3.6)	(1.0)	–	(3.1)	–	–	–	–
6.5	0.2	–	–	4.0	–	–	–	5.0	−0.3	–	–	−0.2	–	–	–
(4.0)	(1.1)	–	–	(4.9)	–	–	–	(3.3)	(1.1)	–	–	(4.6)	–	–	–
5.2	0.3	–	–	–	9.9	–	–	3.6	−0.5	–	–	–	6.8	–	–
(3.9)	(1.1)	–	–	–	(6.3)	–	–	(3.4)	(1.0)	–	–	–	(6.2)	–	–
6.1***	0.6	–	–	–	–	5.5	–	3.9	−0.3	–	–	–	–	4.7	–
(3.7)	(1.1)	–	–	–	–	(3.4)	–	(3.3)	(1.0)	–	–	–	–	(3.3)	–
7.0*	0.3	–	–	–	–	–	5.9	4.8	−0.5	–	–	–	–	–	5.2
(3.6)	(1.1)	–	–	–	–	–	(4.0)	(3.2)	(1.0)	–	–	–	–	–	(4.1)

Note: See notes to Table 8. The difference to Table 8 is that the results are coefficient estimates from GLS regressions of the form $\Delta \log \mathrm{GNI}_{it} - \Delta \log \mathrm{GNI}_t =$ constant $+ \kappa \ (\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t) + \epsilon_{it}$ with a constant rather than country-specific dummy variables. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 21:

Consumption Risk Sharing and Foreign Asset and Liability Holdings. EMU and EU 1996–2006.
Without Country Fixed-Effects.

	EMU								EU							
			GDP× assets			GDP× liabilities					GDP× assets			GDP× liabilities		
RS	trend	debt	equity	FDI	debt	equity	FDI	RS	trend	debt	equity	FDI	debt	equity	FDI
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
30.4*** (2.8)	–	–	–	–	–	–	–	30.0*** (2.8)	–	–	–	–	–	–	–
25.6*** (3.6)	–2.2** (1.1)	–	–	–	–	–	–	26.9*** (3.4)	–1.7 (1.1)	–	–	–	–	–	–
4.7*** (2.3)	–4.6*** (0.9)	8.8*** (2.8)	–	–	–	–	–	4.1*** (2.2)	–4.2*** (1.0)	10.3*** (2.9)	–	–	–	–	–
27.9*** (6.1)	–2.2** (1.1)	–	–1.2 (2.6)	–	–	–	–	26.2*** (5.1)	–1.7 (1.1)	–	0.5 (2.6)	–	–	–	–
30.6*** (4.8)	–1.3 (1.2)	–	–	–7.8 (5.1)	–	–	–	28.6*** (4.0)	–1.2 (1.2)	–	–	–4.3 (4.9)	–	–	–
25.9*** (5.9)	–2.2** (1.2)	–	–	–	–0.2 (5.6)	–	–	26.1*** (4.9)	–1.7 (1.1)	–	–	–	1.4 (5.3)	–	–
23.3*** (5.8)	–2.3*** (1.1)	–	–	–	–	1.4 (2.8)	–	22.6*** (4.9)	–1.7 (1.1)	–	–	–	–	3.3 (2.7)	–
26.1*** (5.3)	–2.2** (1.1)	–	–	–	–	–	–0.4 (4.2)	25.8*** (4.6)	–1.7 (1.1)	–	–	–	–	–	1.7 (4.1)

Note: See notes to Table 9. The difference to Table 9 is that the results are coefficient estimates from GLS regressions of the form $\Delta \log \mathrm{CONS}_{it} - \Delta \log \mathrm{CONS}_t = \text{constant} + \kappa \left(\Delta \log \mathrm{GDP}_{it} - \Delta \log \mathrm{GDP}_t \right) + \epsilon_{it}$ with a constant rather than country specific dummy variables. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

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Table 22:

Risk Sharing and Cumulative Acquired Bank Assets
All Mergers and Acquisition Deals 2000–2006
Without Country Fixed Effects

	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)
Income Risk Sharing				
Avg. Risk Sharing	7.5	2.5	–0.9	3.8**
	(5.6)	(4.8)	(3.7)	(1.9)
Trend	1.0	0.0	0.1	–0.4
	(2.8)	(2.4)	(1.4)	(0.9)
Bank Consolidation	0.1	–0.4	-1.8	–0.4
	(0.9)	(0.8)	(1.2)	(0.4)
Consumption Risk Sharing				
Avg. Risk Sharing	26.6***	25.9***	13.5**	16.6***
	(5.9)	(5.3)	(5.9)	(2.8)
Trend	–1.5	1.7	–7.4***	–5.0***
	(2.6)	(2.3)	(2.1)	(1.4)
Bank Consolidation	0.9	–0.8	–2.3	–0.5
	(0.9)	(0.9)	(1.8)	(0.4)

Note: See notes to Table 12. The difference to Table 12 is that the results are based on GLS regressions of the form $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \text{constant} + \kappa \left(\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t \right) + \epsilon_{it}$, with a constant rather than country-specific dummy variables. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Table 23:

Risk Sharing and Cumulative Acquired Bank Assets Scaled by Total Assets

Domestic and Foreign Deals 2000–2006

Without Country Fixed Effects

	Domestic M&A Deals				Foreign M&A Deals			
	EMU	OLD EU	NEW EU	ALL EU	EMU	OLD EU	NEW EU	ALL EU
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Income Risk Sharing				Income Risk Sharing			
Avg. Risk Sharing	7.7	1.8	0.9	3.9**	7.4	2.9	-2.5	4.3**
	(5.8)	(5.0)	(3.3)	(1.9)	(5.4)	(4.8)	(3.9)	(1.9)
Trend	1.0	-0.1	0.0	-0.4	1.0	-0.1	0.3	-0.4
	(2.8)	(2.4)	(1.4)	(0.9)	(2.8)	(2.4)	(1.4)	(0.9)
Bank Consolidation	0.3	-0.8	-1.4	-0.6	-0.1	-0.2	-5.5*	0.0
	(1.2)	(1.3)	(1.5)	(0.4)	(1.2)	(1.0)	(3.0)	(0.5)
	Consumption Risk Sharing				Consumption Risk Sharing			
Avg. Risk Sharing	29.1***	28.2***	15.7***	17.4***	24.3***	26.8***	13.8***	16.8***
	(5.6)	(5.4)	(5.6)	(2.8)	(5.5)	(4.8)	(5.5)	(2.9)
Trend	-1.6	1.3	-7.7***	-5.2***	-0.4	1.7	-7.3***	-5.1***
	(2.6)	(2.3)	(2.2)	(1.4)	(2.6)	(2.2)	(2.1)	(1.4)
Bank Consolidation	2.6***	0.3	-1.9	-0.7	-1.1	-1.7	-4.5	0.2
	(1.0)	(1.3)	(2.9)	(0.5)	(1.3)	(1.2)	(3.1)	(0.9)

Note: See notes to Table 13. The difference to Table 13 is that the results are based on regressions of the form $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \text{constant} + \kappa (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) + \epsilon_{it}$, with a constant rather than country-specific dummy variables. Numbers in parentheses are standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Figure 1: Income and Consumption Risk Sharing in EMU and EU Countries: 1996–2006.
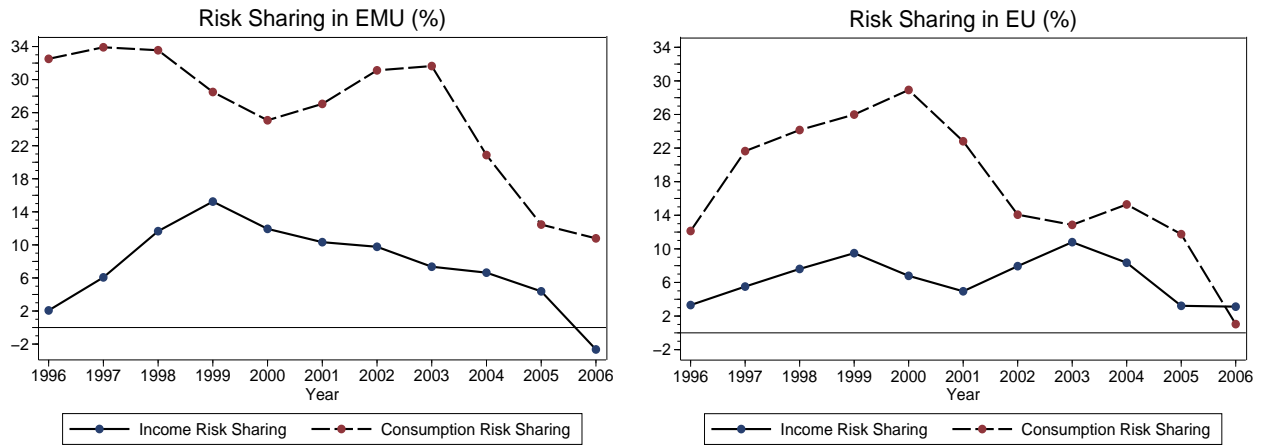
Notes: The figure shows (smoothed) estimates of risk sharing for EMU (left panel) and EU (right panel) countries for each year from 1996 to 2006.

For each year, the extent of income risk sharing is $(1 - \beta_{K,t})$, where $\beta_{K,t}$ is the estimated regression coefficient based on the regression $\Delta \log \text{GNI}_{it} - \Delta \log \text{GNI}_t = \text{constant} + \beta_{K,t} (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) + \epsilon_{it}$. The extent of consumption risk sharing is $(1 - \beta_{C,t})$, where $\beta_{C,t}$ is the estimated regression coefficient based on the regression $\Delta \log \text{C}_{it} - \Delta \log \text{C}_t = \text{constant} + \beta_{C,t} (\Delta \log \text{GDP}_{it} - \Delta \log \text{GDP}_t) + \epsilon_{it}$. Data source: Eurostat.

Figure 2: Foreign Ownership of Banks in Percent of Aggregate Bank Assets: 2000 and 2006
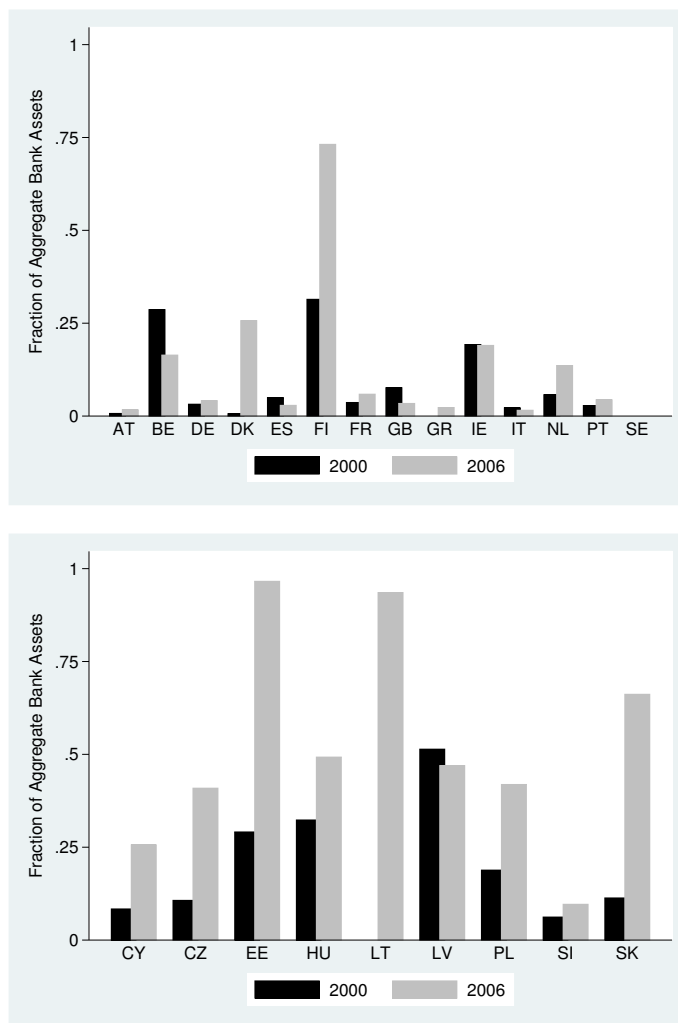
Notes: The figure shows foreign ownership of bank assets relative to aggregate bank assets in "old" EU countries (upper panel) and in "new" EU countries (lower panel) for the years 2000 and 2006. Foreign ownership is defined as an equity stake of 50 percent or higher held by investors registered in another EU country. Data source: Bureau van Dijk, Bankscope.

Figure 3: Number of Domestic and Foreign M&A Deals: 2000–2006
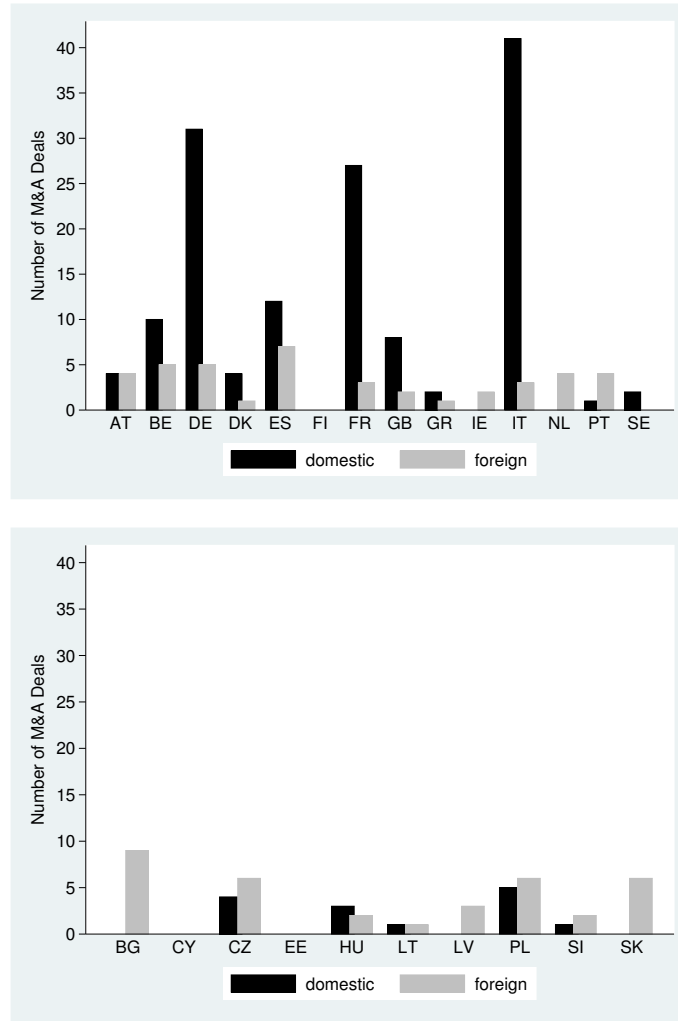
Notes: The figure shows the total number of domestic and foreign merger and acquisition deals between banks located in "old" EU countries (upper panel), and between banks located in "new" EU countries (lower panel) during the period 2000–2006. Data source: Bureau van Dijk, Zephyr.

Figure 4: Cumulative Acquired Bank Assets Scaled by Aggregate Bank Assets: 2000–2006
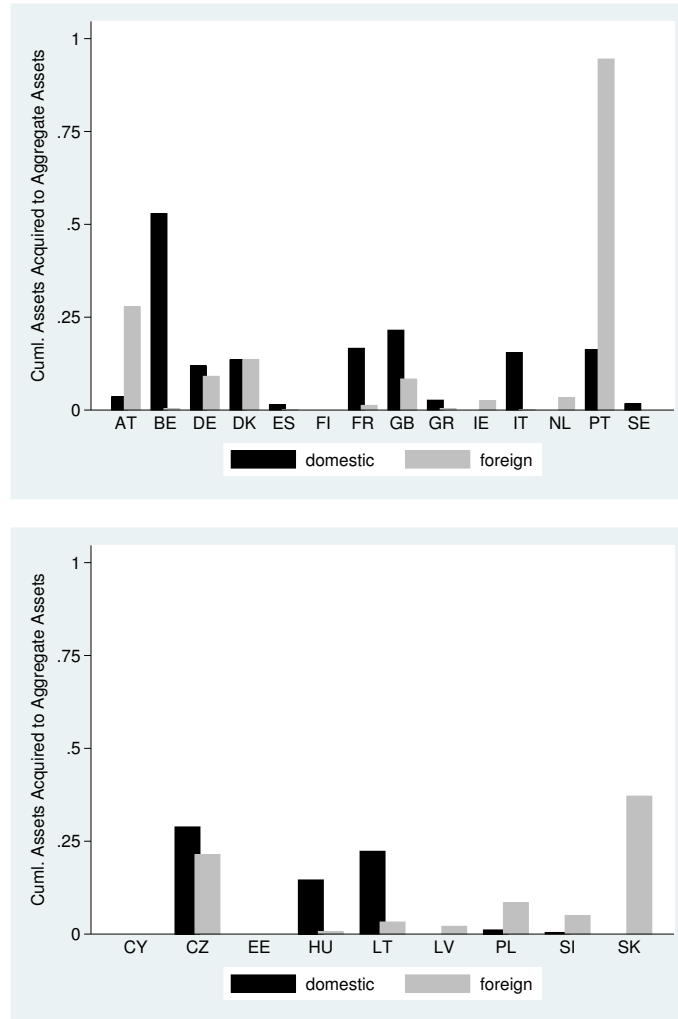
Notes: The figure shows the cumulative value of bank assets acquired in domestic and foreign M&A deals between banks located in EU member countries during the period 2000-2006, scaled by aggregate bank assets in 2006, in "old" EU countries (upper panel) and in "new" EU countries (lower panel). Data source: Bureau van Dijk, Bankscope and Zephyr.