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Financial Integration and International Business Cycle Co-movement: Wealth Effects vs. Balance Sheet Effects*

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Abstract

Different types of international financial integration have different effects on cross-country business cycle co-movement. International business cycle transmission through financial integration occurs through the wealth and balance sheet effects. The balance sheet effect leads to business cycle convergence, but the wealth effect leads to divergence. Using a cross-sectional regression, this paper shows that cross-border credit market integration (debt) has a positive effect on co-movement, implying that the balance sheet effect is the main conduit for international transmission through credit markets. However, cross-border capital market integration (equity) has a negative effect, implying that the wealth effect is the main channel for international transmission through capital markets. By distinguishing between wealth and balance sheet effects, this paper resolves many discrepancies between some key empirical and theoretical findings in the open economy macro literature, between different studies in the theoretical literature, and between empirical studies that use a cross-sectional regression and those employing panel data.

JEL codes: E30, E44, F40, G15

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1 Introduction

The last few decades have seen a rapid increase in the degree of international financial integration. The stock of cross-country asset holdings as a percent of GDP has more than tripled since the mid-1980's (Lane and Milesi-Ferretti, 2007). Therefore an interesting question, from both an academic and a policy perspective, is what effect this increased financial integration will have on the co-movement of business cycles across countries.

This seemingly simple question has received little attention in the literature.[1] This is partly due to the lack of available data, but it is also due to the lack of a clear intuitive explanation and the conflicting conclusions of many theoretical and empirical studies.

Using a cross-sectional regression framework, Imbs (2004; 2006) and Kose et al. (2003) find that financial integration has a positive effect on cyclical co-movement. Kose et al. (2008b) and Kose et al. (2008a) find the same results with a dynamic latent factor model. Furthermore, by studying cases of international crisis and contagion, Kaminsky and Reinhart (2000) highlight the importance of international bank lending in the international spread of financial crises, and Moto et al. (2007) find empirical evidence of a cross-country financial accelerator involved in the transmission of business cycles across borders.

The role of cross-border financial integration in facilitating the international spread of the 2007-2009 financial crisis has been the subject of a number of recent empirical papers. Acharya and Schnabl (2010) show how the crisis was spread internationally through the asset backed commercial paper market, and Cetorelli and Goldberg (2011) show how it spread through the relationship between multinational banks and their local affiliates. Imbs (2010) shows how financial linkages between countries were directly responsible for the international transmission of what began as a housing bubble and subprime crisis in the United States, but became "the first global recession in decades".

However some empirical studies argue the opposite, that financial integration has a negative effect on international business cycle co-movement. In a panel data study, Kalemli-Ozcan et al. (2012) find that financial integration leads to less synchronized business cycles,[2] and Heathcote and Perri (2003; 2004) argue that financial integration is responsible for the observed divergence between the U.S. business cycle from that in the rest of the world.

In addition, Kalemli-Ozcan et al. (2011) show that prior to 2007, financial integration had a negative effect on international business cycle co-movement, but after 2007, it had a positive effect.

[1] Relative to the attention paid to the effect of trade integration on cyclical co-movement.

[2] In section 4 we will pay particular attention to this and discuss how the results from this paper can potentially explain the difference between the cross-sectional regression studies in many of the papers mentioned earlier and the panel data study in Kalemli-Ozcan et al. (2012).

This paper shows that the reason for these conflicting empirical results is that different types of financial integration have different effects on cyclical co-movement. Specifically this paper shows that capital market integration (equity and FDI) has a negative effect on cyclical correlation, while credit market integration (debt) has a positive effect. In a cross sectional regression similar to that in Imbs (2004; 2006), we show that when a measure of bilateral financial integration is divided into separate measures of bilateral credit market integration and bilateral capital market integration, credit market integration has a positive effect on cyclical co-movement and capital market integration has a negative effect.

The reason that different types of financial integration have different effects on cyclical co-movement is that there are multiple channels through which international financial integration serves as a conduit for international business cycle transmission, and these channels have opposing signs. Specifically, when discussing the effect of financial integration on international business cycle transmission, two channels are dominant, the wealth effect and the balance sheet effect.

These two opposing channels and their basis in the theoretical literature will be discussed in the next section. However, to summarize, international transmission through the wealth effect is a common feature of the International Real Business Cycle (IRBC) literature, and is described by Backus et al. (1995) as the tendency to "make hay where the sun shines". At the same time, cross border financial integration involving credit constrained parties, particularly credit constrained financial intermediaries, is referred to as the *international financial multiplier* in Krugman (2008) and is one leg of the "Unholy Trinity of Financial Contagion" in Kaminsky et al. (2003).[3] Under capital market integration, the wealth effect is the primary channel for the international transmission of business cycles, but under credit market integration, balance sheets, specifically the balance sheets of financial intermediaries, are the primary conduit through which business cycles are transmitted across borders.

This is not to say that the balance sheet effect is not present at all when discussing business cycle transmission through integrated capital markets or that the wealth effect isn't present when discussing transmission through integrated credit markets, but the empirical results from this paper suggest that when discussing transmission through integrated capital markets, the wealth effect is stronger, while the balance sheet effect is stronger when discussing transmission through integrated credit markets.

The rest of this paper is organized as follows. Section 2 reviews the theoretical literature to explain why the wealth effect is the primary conduit for international transmission via

[3]The different channels through which cross-border lending by leveraged intermediaries can serve as a transmission mechanism, some through solvency and some through liquidity, are summarized in Kollmann and Malherbe (2011).

capital market integration and should have a negative effect on international business cycle correlation, but at the same time, the theory predicts a positive effect of credit market integration through the balance sheet effect. Section 3 presents the econometric model that we use to test this hypothesis and discusses the data and various econometric issues. In section 4 we provide robust empirical evidence that, in accordance with the theoretical predictions from section 2, bilateral capital market integration leads to business cycle divergence while bilateral credit market integration leads to cyclical convergence. Finally, section 5 concludes.

2 Wealth versus balance sheet effects

Investment projects in country A are partially financed by investors in country B. They can either be financed through the capital markets by selling equity shares, or through the credit markets, by taking a loan, most likely from financial intermediaries in country B. Thus bilateral capital market integration involves the trade of state contingent securities, while bilateral credit market integration involves the trade in non-state contingent securities.

Country A is hit by a negative productivity shock. This will of course cause country A's output to fall. Depending on the trade ties between countries A and B and on the substitutability of their traded goods, this negative shock in country A may be transmitted to country B through the usual trade channels. However, abstracting from these trade channels and instead focusing exclusively on the financial linkages between countries A and B, the response of output in country B to the negative shock in country A can either be positive or negative, depending on which effect dominates, the wealth effect or the balance sheet effect.

The effect of trade in state contingent securities on international business cycle transmission is a prominent feature of the international real business cycle (IRBC) literature. In the workhorse IRBC model in Backus et al. (1992), agents in each country have access to a full set of state contingent securities (the complete market assumption). Cross-country GDP co-movement in the model is negative, which is contrary to what we see in the data. Baxter and Crucini (1995) modify this assumption of complete markets and instead assume that the only asset traded internationally is a non-contingent bond. They find that when the asset market is restricted, cross-country GDP correlation in the model is positive.

Baxter and Crucini (1995) attribute the negative effect of asset trade on cross-country GDP correlation to the wealth effect. Equity market integration between countries A and B is like saying that agents in each country have access to a full set of state contingent securities.[4]

[4]Heathcote and Perri (2004) show how the complete markets model with the full set of state contingent securities can be thought of as households owning shares and receiving dividends from investment projects

If agents in country B have equity claims on investment projects in country A, then a negative technology shock in country A will cause wealth to decline in country B. In terms of the goods market equilibrium with the demand for investment and the supply of savings, following the negative technology shock the demand for investment in country A falls, and the amount of investment spending falls. Abstracting from the usual trade channels, the fall in country B's wealth associated with the negative technology shock in country A will cause an increase in savings in country B. This will cause investment spending in country B to increase. Thus the negative technology shock in country A leads to a decrease in investment in country A and an increase in country B.

If there were no cross-border equity holdings then wealth in country B should remain unchanged following the negative technology shock in country A. So the supply of savings in country B should be unaffected. Investment in country A will fall, but it should remain constant in country B. Thus business cycles in countries A and B still diverge following the country specific shock in the case where there is no cross-border equity ownership, but they do not diverge as much as they would in the case where there is cross-border equity ownership and a shock in one country affects the wealth of agents in the other country.[5]

This is the usual tendency, observed in IRBC models with complete asset markets, for highly mobile capital to jump from one country to another chasing the highest return. In this example, following the technology shock in country A, investment returns are higher in country B, so highly mobile capital left country A and went to country B, leading to business cycle divergence. In addition to Baxter and Crucini (1995), the fact that international asset market integration leads to less correlated business cycles is found in IRBC models in Kehoe and Perri (2002), and Heathcote and Perri (2002; 2003; 2004), and also in a model with sticky prices in Faia (2007). Imbs (2006) goes so far as to say that the robust positive association between financial integration and cross-country co-movement in the data and the robust negative relationship in theory constitutes a puzzle.

While many of these models in the IRBC and new Keynesian tradition find that increased bilateral financial integration leads to less correlated business cycles, other models

both at home and abroad, and the complete markets model in Backus et al. (1992) is simply a limiting case where agents hold fully diversified portfolios of home and foreign securities (given that they cannot diversify their labor income, the complete markets assumption actually means that agents are overweight foreign equities).

[5] Throughout this though experiment we abstract from the usual trade channels. In all likelihood, the negative shock in country A will lead to a fall in the demand for country B's exports, and thus a fall in the marginal product of capital and the demand for investment in country B. Thus through the usual trade channels, investment in both countries should fall following the shock in one country. The usual trade channels should lead to positive cross-country GDP correlation, but if we repeat the same thought experiment from this point, the wealth effect implies that the cross-country GDP correlation should be less positive than it would have been without cross-border equity holdings.

incorporating information asymmetry and financial frictions find the opposite. For this it is necessary to abstract from the conditions of the Miller and Modigliani theorem (Modigliani and Miller, 1958), and instead assume that balance sheets matter, specifically the balance sheets of financial intermediaries.[6]

Returning to the example where investment projects in country A are financed by country B. In the previous thought experiment, we considered the role of capital market integration and cross-border equity ownership. Instead assume that investment projects are partially financed by lending from banks in country B. Now the same negative technology shock will causes losses and potentially some defaults in country A. Given that banks in country B are holding some of these defaulting loans, the balance sheets of banks in country B will be affected. Banks in country B face an unexpected fall in the value of their assets and their capital. If financial frictions exist, either in the form of collateral constraints or interbank borrowing rates that are a function of a bank's capital structure, they will respond by selling assets and paying off some debt in order to reduce their debt-asset ratios. This means that banks in country B will reduce the supply of credit to both foreign and domestic borrowers. This leads to a fall in output in country B. Thus cross border bank lending leads to a positive transmission of the shock in country A. GDP in country A falls because of the negative shock, but because of cross-border lending and the balance sheet effect, banks in country B are forced to reduce the supply of credit to their domestic borrowers, leading to a fall in country B's GDP.

This is the chain of events featured in Ueda (2011) and Kollmann et al. (2011), but it should be noted that the fact that the cross-border financing is debt, and is going through banks, is not the important part of this channel. In the thought experiment, the cross-border financing was debt and the negative shock in country A led to increased defaults on loans that were held on the balance sheets of banks in country B. The thought experiment would have worked just as well under equity financing (see e.g. Dedola and Lombardo (2009) and Devereux and Yetman (2010)). The important part is the presence of financial frictions. After facing losses, the party in country B that is financing projects in country A must need

[6] A number of papers present models where balance sheets in the intermediaty sector can have macroeconomic effects (see e.g. Holstrom and Tirole (1997), Stein (1998), Chen (2001), and von Peter (2009))

Motivated by the recent crisis and the central role of the increase in interbank lending spreads (see Taylor and Williams (2009)), a number of recent papers incorporate financial frictions *within* the intermediary sector in a quantitative business cycle model (see e.g. Aikman and Paustain (2006), Gertler and Karadi (2011), Gertler and Kiyotaki (2010), Gilchrist et al. (2009), Curdia and Woodford (2010), Hirakata et al. (2009), Dib (2010), and Meh and Moran (2010)).

van den Heuvel (2009) writes specifically of the "bank capital channel" of monetary policy transmission (as opposed to the "bank lending channel") whereby monetary policy leads to changes in a bank's net worth and in the presence of financial frictions in the banking sector, this change in net worth affects the supply of lending from the intermediary sector.

to shrink their balance sheet in order to improve their capital position. In a world where balance sheets don't matter, financiers in country B would have no motivation to reduce the supply of credit to both foreign and domestic borrowers, but when balance sheets matter, they reduce their lending to domestic borrowers following the foreign shock, leading to the positive cross-country transmission of business cycles.

3 Econometric Methodology, Variables, and Data

3.1 Econometric Methodology

To estimate the effect of financial integration on international business cycle correlation we will use a simultaneous equation model similar to the one introduced in Imbs (2004). In this model, financial integration, trade integration, industrial specialization, and business cycle correlation all determined endogenously. Thus our simultaneous equations model will consist of four equations:

$$\begin{aligned}
\rho_{ij} &= \alpha_o + \alpha_1 F_{ij} + \alpha_2 T_{ij} + \alpha_3 S_{ij} + \varepsilon_{ij} \\
F_{ij} &= \delta_o + \delta_1 T_{ij} + \delta_2 S_{ij} + \boldsymbol{\delta}_3 \mathbf{I}_{ij}^F + \upsilon_{ij} \\
T_{ij} &= \beta_o + \beta_1 F_{ij} + \beta_2 S_{ij} + \boldsymbol{\beta}_3 \mathbf{I}_{ij}^T + \eta_{ij} \\
S_{ij} &= \gamma_o + \gamma_1 F_{ij} + \gamma_2 T_{ij} + \boldsymbol{\gamma}_3 \mathbf{I}_{ij}^S + \mu_{ij}
\end{aligned} \tag{1}$$

Our four endogenous variables are ρ_{ij}, F_{ij}, T_{ij}, and S_{ij}. These measure the bilateral output correlation between country i and country j, bilateral financial integration, bilateral trade integration, and bilateral industrial specialization, respectively. The vectors $\mathbf{I}_{ij}^F$, $\mathbf{I}_{ij}^T$, and $\mathbf{I}_{ij}^S$ are vectors of exogenous variables that help describe bilateral finance, trade, and specialization between countries i and j. The definition of the various endogenous and exogenous variables is saved until the next subsection.

We can use the simultaneous equations model in (1) to isolate the effects of financial integration, trade integration, and industrial specialization on business cycle correlation. If the system is well instrumented, then the coefficients α_1, α_2, and α_3 measure the effect of changes in trade, finance, or specialization on output correlation.[7]

[7] Substituting the equations for F, T, and S in the above system into the equation for ρ shows that when running a simple OLS regression of the equation where ρ is the dependent variable, the estimated coefficient on F, $\hat{\alpha}_1$, is not simply an estimate of the effect of finance integration on business cycle co-movement, α_1, but a combination of many of the above coefficients, since F affects both T and S which then affect ρ. Distinct instruments for F, T, and S are needed to isolate these variables and thus isolate their effects on ρ.

The model presented in (1) involves variables that describe aggregate financial integration. Earlier we discussed how there is theoretical reason to believe that credit market integration may have different cyclical effects than capital market integration. The simultaneous equations model can be altered to test this theoretical prediction.

Our variable that measures bilateral financial integration, F_{ij}, is the sum of a measure of bilateral credit market integration, C_{ij}, and a measure of bilateral capital market integration, K_{ij}. Our model now has five endogenous variables, ρ_{ij}, C_{ij}, K_{ij}, T_{ij}, and S_{ij}. Thus the system of five simultaneous equations that can test if credit and capital market integration have different effects on business cycle correlation is given by the following:

$$
\begin{aligned}
\rho_{ij} &= \alpha_o + \alpha_1 C_{ij} + \alpha_2 K_{ij} + \alpha_3 T_{ij} + \alpha_4 S_{ij} + \varepsilon_{ij} \\
C_{ij} &= \delta_o + \delta_1 K_{ij} + \delta_2 T_{ij} + \delta_3 S_{ij} + \boldsymbol{\delta}_4 \mathbf{I}_{ij}^{C} + \upsilon_{ij} \\
K_{ij} &= \theta_o + \theta_1 C_{ij} + \theta_2 T_{ij} + \theta_3 S_{ij} + \boldsymbol{\theta}_4 \mathbf{I}_{ij}^{K} + \epsilon_{ij} \\
T_{ij} &= \beta_o + \beta_1 C_{ij} + \beta_2 K_{ij} + \beta_3 S_{ij} + \boldsymbol{\beta}_4 \mathbf{I}_{ij}^{T} + \eta_{ij} \\
S_{ij} &= \gamma_o + \gamma_1 C_{ij} + \gamma_2 K_{ij} + \gamma_3 T_{ij} + \boldsymbol{\gamma}_4 \mathbf{I}_{ij}^{S} + \mu_{ij}
\end{aligned} \tag{2}
$$

The effects of credit and capital market integration on business cycle correlation are given by α_1 and α_2.

3.2 Variables and Data

3.2.1 Endogenous Variables

Measures of credit and capital market integration We use four different measures of financial integration. The first two are "volume based" measures. These actually measure the volume of financial flows between two countries. The last two measures are "effective" measures, which proxy the degree of financial integration by looking at the effects of this integration. These include the similarities in interest rates, or the extent of risk sharing.

The first measure of bilateral financial integration is based on the Coordinated Portfolio Investment Survey (CPIS) conducted by the IMF and featured in Imbs (2006). This survey includes data on portfolio assets, both debt and equity, issued by residents of country i and owned by residents of country j, c_{ij} and k_{ij}. The proxies for bilateral credit and capital market integration that we use in the disaggregated regression model in (2), C_{ij}^{cpis} and K_{ij}^{cpis}, is simply the total bilateral debt or equity flows normalized by the sum of the two countries' GDPs:

$$C_{ij}^{cpis} = \frac{c_{ij} + c_{ji}}{GDP_i + GDP_j}$$

$$K_{ij}^{cpis} = \frac{k_{ij} + k_{ji}}{GDP_i + GDP_j}$$

Our second measure of financial integration is also volume based. Here we use data on external assets and liabilities for a wide range of countries compiled by Lane and Milesi-Ferretti (2007). This dataset divides external asset and liability positions into debt, as well as portfolio equity and FDI. Therefore our proxies for bilateral credit and capital market integration are given by:

$$C_{ij}^{nfa} = \left| \frac{nfa_i^c}{GDP_i} - \frac{nfa_j^c}{GDP_j} \right|$$

$$K_{ij}^{nfa} = \left| \frac{nfa_i^k}{GDP_i} - \frac{nfa_j^k}{GDP_j} \right|$$

where nfa_i^c is equal to country i's external debt assets minus their external debt liabilities, and nfa_i^k is equal to the country's external portfolio equity and FDI assets minus their external portfolio equity and FDI liabilities.

This proxy for financial integration is introduced in Imbs (2004), and the reason it is a reasonable proxy for bilateral financial integration is as follows. If country i is a net creditor with a large and positive net foreign asset position and country j is a net debtor with a large and negative net foreign asset position, then it is likely that there are financial flows from country i to country j. In this case, C_{ij}^{nfa} and K_{ij}^{nfa} will be large. If on the other hand both countries are net creditors and have positive net foreign asset positions then it is less likely that there are financial flows between the two, and C_{ij}^{nfa} and K_{ij}^{nfa} is small. Similarly, even if one country is a net creditor and one is a net debtor, but their net foreign asset positions are relatively small then the financial flows between the two may be small; C_{ij}^{nfa} and K_{ij}^{nfa} is small to reflect this.

The effective measures of financial integration proxy integration by interest rate differentials and the degree of risk sharing. The first effective measure uses the mean absolute deviation of the real rates of return in countries i and j. The measure of credit market integration is the mean absolute deviation of bond returns, C_{ij}^{mad}, and the measure of capital market integration is the mean absolute deviation of stock returns, K_{ij}^{mad}.

$$
\begin{aligned}
C_{ij}^{mad} &= \frac{1}{T}\sum_{t=1}^{T}\left|r_{it}^{b}-r_{jt}^{b}\right| \\
K_{ij}^{mad} &= \frac{1}{T}\sum_{t=1}^{T}\left|r_{it}^{s}-r_{jt}^{s}\right|
\end{aligned}
$$

where r_{it}^{b} is the real rate of return on bonds in country j in period t, and r_{it}^{s} is the real rate of return on stocks. If country i and country j are integrated financially, then arbitrage conditions require that their real rates of return are equal. Thus C_{ij}^{mad} and K_{ij}^{mad} should be small for financially integrated economies.

The fourth measure of financial integration measures the extent of income and consumption risk sharing in countries i and j. This relies on a measure of risk sharing introduced by Asdrubali et al. (1996) and is the primary measure of financial integration in Kalemli-Ozcan et al. (2003). The measure of income risk sharing is the coefficient β_i^k, and the measure of consumption risk sharing is the coefficient β_i^c in the following panel data regressions:

$$
\begin{aligned}
\Delta\log\left(GDP_{it}\right)-\Delta\log\left(GNP_{it}\right) &= \alpha_t^k+\beta_i^k\Delta\log\left(GDP_{it}\right)+\varepsilon_{it}^k \\
\Delta\log\left(GNP_{it}\right)-\Delta\log\left(C_{it}\right) &= \alpha_t^c+\beta_i^c\Delta\log\left(GDP_{it}\right)+\varepsilon_{it}^c
\end{aligned}
$$

In the case of no income risk sharing , $\beta_i^k=0$, idiosyncratic fluctuations in GDP_{it} translate directly into fluctuations in GNP_{it} (up to some aggregate fluctuation, α_t^k, and some idiosyncratic error, ε_{it}^k). In the case of perfect income risk sharing, $\beta_i^k=1$, idiosyncratic fluctuations in GDP_{it} do not carry through into fluctuations in GNP_{it}, and GNP_{it} is a constant (again, up to some aggregate, and thus non-diversifiable, fluctuation, and some idiosyncratic error). International capital market integration leads to this income risk sharing. Thus if $K_{ij}^{rs}=\beta_i^k+\beta_j^k$ is high then countries i and j are well integrated in the international capital markets. This makes it likely that the degree of bilateral capital market integration between countries i and j is high.

The same logic can be used to show how $C_{ij}^{rs}=\beta_i^c+\beta_j^c$ is a measure of bilateral credit market integration.

Some summary statistics for our four measures of credit market integration and our four measures of capital market integration are listed in table 1. Table 2 lists the unconditional correlation between these measures of credit and capital market integration.

Table 2 shows that in almost every case, C and K are highly correlated. Using the CPIS data, the correlation between C^{cpis} and K^{cpis} is over 70%, and it is over 50% and 60% using the net foreign asset data (C^{nfa} and K^{nfa}) and the mean absolute deviation of asset returns (C^{mad} and K^{mad}).

This fact highlights an important contribution of this paper. Given that C and K are highly correlated, any attempt to *pull apart* the effects of credit and capital market integration on cyclical co-movement would require many more degrees of freedom than are available in the previous empirical studies mentioned earlier. The data in this paper is specifically chosen to maximize the country coverage, and thus maximize the number of bilateral observations. We use 58 countries in this study, so there are a total of 1653 country pairs. These 58 countries produce 95% of world GDP. The full list of countries can be found in the appendix.

Measures of trade, specialization, and co-movement We use the Trade, Production, and Protection database compiled by the World Bank and described in Nicita and Olarrenga (2006) to construct our measures of trade integration and industrial specialization. This data set contains bilateral trade data, disaggregated into 28 manufacturing sectors corresponding to the 3 digit ISIC level of aggregation. It also contains country level production and tariff data with the same level of disaggregation. The data set potentially covers 100 countries over the period $1976-2004$, but data availability is a problem for some countries, especially during the first half of the sample period. To maximize the number of countries in our sample, we use data for 58 countries from $1991-2004$.

Our primary measure of trade integration is developed by Deardorff (1998) and used by Clark and van Wincoop (2001), among others. This measure is independent of the sizes of countries i and j. If the set $\mathcal{N}$ contains the 28 industries in the Trade, Production, and Protection data set, then our primary measure of trade intensity is given by:

$$T_{ij}^{1}=\frac{1}{2}\sum_{n\in\mathcal{N}}\frac{\left(X_{ij}^{n}+M_{ij}^{n}\right)GDP_{w}}{GDP_{i}GDP_{j}}$$

where X_{ij}^{n} represents the exports in sector n from country i to country j, M_{ij}^{n} represents imports in sector n to country i from country j, and GDP_{w} is world GDP.

To test the robustness of the results we also use the measure of bilateral trade intensity from Frankel and Rose (1998):

$$T_{ij}^{2}=\sum_{n\in\mathcal{N}}\frac{X_{ij}^{n}+M_{ij}^{n}}{GDP_{i}+GDP_{j}}$$

With the sectoral value added data in the Trade, Production, and Protection database, we can construct a measure of bilateral industrial specialization. This measure,used in Clark and van Wincoop (2001) and Imbs (2004; 2006), is defined as follows:

$$S_{ij} = \sum_{n \in \mathcal{N}} \left| \frac{VA_i^n}{GDP_i} - \frac{VA_j^n}{GDP_j} \right|$$

where VA_i^n represents the value added in sector n in country i.

Finally, our measure of bilateral business cycle correlation, ρ_{ij}, is the correlation of GDP fluctuations between countries i and j. Since GDP is non-stationary, we need to detrend the data before finding correlations. Our primary detrending method is the Hodrick-Prescott filter, but for robustness we repeat the estimation using log differences and linear detrending.

3.2.2 Exogenous Variables

Instruments for financial integration The vector $\mathbf{I}_{ij}^F$ contains the exogenous variables that describe bilateral financial integration. This vector contains nine elements. The first three are suggested by Portes and Rey (2005). They find that the gravity variables that are commonly used to describe bilateral trade integration are also useful in explaining bilateral financial integration. Therefore the first three elements of $\mathbf{I}_{ij}^F$ are the physical distance between the capital of i and the capital of j, a dummy variable equal to one if countries i and j share the same language, and a dummy variable equal to one if countries i and j share a border. The next six elements of $\mathbf{I}_{ij}^F$ are from the Law and Finance literature, and are indices that describe the rule of law in a country, the strength of creditor rights, and the strength of shareholder rights. These indices were developed by La Porta et al. (1998), and this original paper supplies the data for most of the countries in this study. However we also referred to Pistor et al. (2000) for similar indices for the Eastern European Transition Economies and Allen et al. (2005) for China.

There are two elements in $\mathbf{I}_{ij}^F$ that account for the strength of the rule of law in countries i and j. The first is the sum of the La Porta index of the rule of law in country i and the index measuring the rule of law in country j. This is meant to capture the overall strength of the rule of law in the two countries. The overall strength of the rule of law in the two countries should have a positive effect on bilateral financial integration. The second element in $\mathbf{I}_{ij}^F$ representing the rule of law is the difference between the La Porta index in country i and the index in country j. This is to capture whether or not there is a large difference between the strength of the rule of law in country i and that in country j. A large difference in legal enforcement between two countries could have a negative effect on the financial integration between them.

In addition to the country-specific measure of the rule of law, La Porta et al. (1998) introduces indices of the strength of creditor rights and shareholder rights. The index of the strength of creditor rights measures the legal protections that creditors have in the case of bankruptcy. These are issues like does the reorganization procedure impose an automatic stay on assets (in the UK and Germany, there is no automatic stay, in the U.S. chapter 11 bankruptcy protection imposes a stay on the assets, temporarily shielding them from secured creditors), are secured creditors paid first in the case of bankruptcy (in the U.S. they are, in France they are not), or can creditors force liquidation as opposed to reorganization (in the UK and Germany, creditors can force liquidation, in the U.S. they cannot).

The La Porta et al. (1998) index of shareholder rights describes the legal protections for shareholders. Basically, the index measures how easy is it for the owners of a company's shares to replace the management and the board of directors. This index considers how closely the shareholder laws conform to the principle of one share-one vote (most countries have special provisions like high-voting founder's shares, however corporate law in Japan does conform to the one-share-one-vote-principle), is voting by proxy allowed (in the U.S. and the UK proxy voting is allowed, in Japan and Germany it isn't), or are there protections for minority shareholders against oppression by directors (in the U.S., minority shareholders can challenge a the board's decision in count, the derivative suit).

In a companion paper, La Porta et al. (1997) show that these measures of creditor rights, shareholder rights, and the rule of law have a significant effect on the size of a country's financial markets. Specifically, the index of creditor rights has a significant effect on the size of a country's credit markets, and the index of shareholder rights has a significant effect on the size of a country's equity markets.

Two elements in $\mathbf{I}_{ij}^F$ representing the strength of creditor rights are constructed from the La Porta indices of creditor rights. The first bilateral index of the strength of creditor rights in countries i and j is the sum of the creditor rights index in country i and the same index in country j, the second bilateral index is the difference between these two. In the same way, the La Porta indices of shareholder rights are used to construct can be used to construct two elements in $\mathbf{I}_{ij}^F$ representing the strength of shareholder rights. A list of the elements of the instrument vector $\mathbf{I}_{ij}^F$ is found in the appendix section A.1.

As discussed in section A.1, for robustness we will estimate the same models where only the sum of the La Porta indices are included as instruments, or alternatively, only the difference in the La Porta indices are included as instruments. The results in the paper, namely the fact that credit market integration has a positive effect on business cycle correlation while capital market integration has a negative effect, do not change under the different instrument lists.

In (2) we divide the measure of financial integration, F, into its capital and credit components, K and C. This means that the vector of exogenous variables, $\mathbf{I}_{ij}^F$, must be divided into two parts, $\mathbf{I}_{ij}^{K}$ and $\mathbf{I}_{ij}^{C}$ where there is at least one element of $\mathbf{I}_{ij}^{K}$ that is not in $\mathbf{I}_{ij}^{C}$ and at least one element of $\mathbf{I}_{ij}^{C}$ that is not in $\mathbf{I}_{ij}^{K}$. We leave the first three elements of $\mathbf{I}_{ij}^{F}$, the gravity variables, unchanged. The variable describing the rule of law in both countries is also common to both vectors. The index describing creditor rights is in $\mathbf{I}_{ij}^{C}$ but not $\mathbf{I}_{ij}^{K}$, while the index of shareholder rights is in $\mathbf{I}_{ij}^{K}$ but not $\mathbf{I}_{ij}^{C}$.

Therefore since the index of creditor rights is the unique element in $\mathbf{I}_{ij}^{C}$ and the index of shareholder rights is the unique element in $\mathbf{I}_{ij}^{K}$, successful identification requires sufficient heterogeneity in these two indices. Figure 1 plots the La Porta index of shareholder rights along the horizontal axis and the index of creditor rights along the vertical axis for the 58 countries in the sample (there is some overlap, hence there are only 26 markers). The countries in the G-7 and the BRICs have been labeled, as well as two outliers, Belgium and Venezuela. The scatter plot shows there is considerable heterogeneity across countries in the strength of their creditor rights and the strength of their creditor rights. Some countries, like the UK and India, receive high marks for their legal protections for both creditors and shareholders. Some other countries, like the U.S. and Canada, do very well in shareholder rights but are rather weak in creditor rights. At the other extreme, countries like Germany, and to an extent, Italy, do well in the strength of their creditor rights but fare poorly in the strength of their shareholder rights.[8]

Instruments for trade integration and industrial specialization The vector $\mathbf{I}_{ij}^{T}$ contains exogenous variables that describe bilateral trade integration. This vector contains six variables, all from the gravity literature. The first five elements in $\mathbf{I}_{ij}^{T}$ are the physical distance between the capital of i and the capital of j, a dummy variable equal to one if countries i and j share the same language, a dummy variable equal to one if countries i and j share a border, the number of countries in the pair that are islands, and the number of countries in the pair that are landlocked. The sixth element in $\mathbf{I}_{ij}^{T}$ is a sum of tariff rates in countries i and j. The Trade, Production, and Protection database contains information on country and sector specific tariff rates. t_i^n is the average tariff applied to imports from sector n into country i. The sixth element of $\mathbf{I}_{ij}^{T}$ is simply the sum of these tariff rates across countries i and j and across sectors in $\mathcal{N}$, $t_{ij} = \sum_{n \in \mathcal{N}} \left(t_i^n + t_j^n \right)$.

The vector $\mathbf{I}_{ij}^{S}$ contains three exogenous variables that describe bilateral industrial spe-

[8] The fact that India fares exceptionally well in both shareholder and creditor rights and Russia fares exceptionally well in shareholder rights might seem to contradict some anecdotal evidence. However, these indices simply measure the strength of the laws on the books. They do not measure the actual implementation of those laws, for instance through the efficiency of the legal system, the culture of corruption, or the risk of expropriation. The extent to which the laws on the books are actually implemented is taken up by the index of the rule of law, which is also included in the instrument set, but is common to both credit and capital market integration.

cialization. The first two of these describe per capita income in countries i and j. Imbs and Wacziarg (2003) show that sectoral diversification is closely related to per capita income. At low levels of income, countries are specialized, and as income increases they diversify. They also find that the relationship between income and diversification is non-monotonic. At high levels of income, as income increases, countries again specialize. For this reason, in his list of exogenous variables that influence specialization, Imbs (2004) includes the sum of per capita GDP across i and j to account for the fact that as income increases countries diversify, and he also includes the difference in per capita GDP across i and j to account for the non-monotonic relationship between income and diversification.

To these two variables we add a measure of comparative advantage. The revealed comparative advantage of country i for production in sector n is defined by Balassa (1965) as:

$$b_i^n = \frac{X_i^n}{\sum_n X_i^n} / \sum_h \left(\frac{X_h^n}{\sum_n X_h^n} \right)$$

where X_i^n are aggregate exports by country i in sector n. Our third term in $\mathbf{I}_{ij}^S$ is then defined as follows:

$$b_{ij} = \sum_{n \in \mathcal{N}} \left| b_i^n - b_j^n \right| \tag{3}$$

4 Results

The results from the regression models in (1) and (2) are presented in table 5. This table only presents the results from the regression where bilateral GDP correlation is the dependent variable. The results from the The full set of results from all four or five equations in the system are presented in table 10 in the appendix.

The table contains the results from each of our four proxies of financial integration. The table also reports both the OLS and GMM estimation results. However, as discussed earlier, GMM estimation is necessary to isolate the effect of financial integration, trade integration, or industrial specialization on business cycle co-movement, so we will only discuss the GMM results.

In accordance with other empirical studies, the results show that regardless of the proxy for financial integration, trade integration has a positive effect on cyclical correlation and industrial specialization has a negative effect.

The table shows that the effect of aggregate financial integration on cyclical correlation is not robust to different proxies of financial integration. The effect of finance on co-movement is either positive or insignificant depending on our particular proxy for aggregate financial integration. In the appendix where we present the same results but under different combinations of instrumental variables, the effect of financial integration on co-movement is negative under some specifications.

However, when aggregate financial integration is divided into credit and capital market integration, credit market integration has a positive effect on cyclical correlation and capital market integration has a negative effect. This result is robust across the four measures of financial integration.[9]

The volume-based measures of financial integration, $CPIS$ and NFA, both measure (or in the case of NFA are a proxy for) the volume of financial flows between two countries. The results from the regression under these two proxies for financial integration are easiest to interpret. The GMM results show that doubling the degree of credit market integration between two countries will cause their bilateral GDP correlation to increase by between 6 and 12 percentage points. Similarly, doubling the degree of capital market integration between two countries will cause their bilateral GDP correlation to fall by between 7 and 14 percentage points.[10]

The results in table 5 also find that doubling the volume of trade between two countries leads to about a 7 percentage point increase in bilateral GDP correlation.[11] Thus doubling the degree of credit market integration between two countries has about the same effect on bilateral GDP correlation as doubling the level of trade integration, and doubling the level of capital market integration has about the same effect on bilateral correlation as halving the level of trade integration.

Partial residual plots from the main regression specification (using the $CPIS$ measure of financial integration) are displayed in figures 2 and 3. Specifically, figure 2 plots the partial

[9] Recall that with the proxy for financial integration based on the mean absolute deviation of asset returns, so more integration implies a lower C or K. In the regression results, a positive coefficient on K implies that capital market integration has a negative effect on co-movement, and a negative coefficient on C implies that credit market integration has a positive effect.

[10] When using the volume based measures of financial integration, NFA and $CPIS$, doubling the degree of financial integration between two countries can be thought of as doubling the volume of financial flows between them, and thus is directly comparable to the flow based measure of trade integration used in this paper and other papers in the literature.

The effective measures of financial integration, MAD and RS, are not as straight forward. Doubling the volume of financial flows between two countries need not necessarily lead to a halving of the mean absolute deviation in their asset returns or a doubling in their consumption risk sharing, and thus while these measures are a useful robust check, they are not as useful for testing the economic significance of the results.

Since the financial integration variable is in logs, doubling the degree of financial integration implies that the variable in the regression increases by $\ln(2)$, so the coefficient, say 0.093 is multiplied by $\ln(2) = .69$ to get the effect of doubling the level of credit market integration on cyclical correlation, $0.093 \times 0.69 = 0.064$.

[11] Similar results are found in a number of studies using a wide range of sample countries, observation period, and econometric methodologies (see Frankel and Rose (1998); Clark and van Wincoop (2001); Baxter and Kouparitsas (2005); Kose and Yi (2006); Calderon et al. (2007)).

residuals from the GMM estimation of the regression equation where bilateral correlation is the dependent variable against $\ln(C)$, and figure 3 plots the partial residuals from the same regression against $\ln(K)$.[12] Of course, credit market integration has a positive effect on the partial residual that excludes C and capital market integration has a negative effect on the partial residual that excludes K, but from the partial residual plots it is clear that the results are not driven by a small group of outliers.

4.1 Panel data vs. Cross sectional regression

Imbs (2004; 2006) uses a cross-sectional regression to show that financial integration has a positive effect on co-movement, as do many other papers that measure the effect of trade on co-movement. However, Kalemli-Ozcan et al. (2012) argue that these cross-sectional regressions suffer from omitted-variable bias. A simplified version of their argument goes as follows:

Suppose that bilateral business cycle synchronization between countries i and j at time t, ρ_{ijt}, depends on bilateral financial integration, F_{ijt}, as well as a non-time-varying vector of variables $\mathbf{X}_{ij}$. This vector captures factors like culture, geography, etc. that may not be observable, or even quantifiable, but affect business cycle synchronization. Therefore business cycle synchronization between countries i and j at time t is given by:

$$\rho_{ijt} = \alpha_1 F_{ijt} + \boldsymbol{\alpha}\mathbf{X}_{ij} + \varepsilon_{ijt} \tag{4}$$

where α_1 is the effect of bilateral financial integration on bilateral business cycle co-movement.

The cross-sectional regression used in this paper and many like it would estimate the system of equations in (1). Instead of a time-specific measures of bilateral business cycle synchronization and financial integration, ρ_{ijt} and F_{ijt}, we consider the average level of synchronization or integration over our entire sample, ρ_{ij} and F_{ij}, and estimate the following with either OLS or GMM:[13]

$$\rho_{ij} = \alpha_1 F_{ij} + \epsilon_{ij} \tag{5}$$

Kalemli-Ozcan et al. (2012) argue that if F_{ij} is positively correlated with $\mathbf{X}_{ij}$, then the omission of $\mathbf{X}_{ij}$ from the regression puts an upward bias on the estimate of α_1 where $\hat{\alpha}_1 \to a$ where $a > \alpha_1$. Kalemli-Ozcan et al. (2012) argue that since many of the terms in $\mathbf{X}_{ij}$ cannot

[12] The variable along the vertical axis in figure 2 is $\rho_{ij} - \hat{\alpha}_o - \hat{\alpha}_2 K_{ij} - \hat{\alpha}_3 T_{ij} - \hat{\alpha}_4 S_{ij}$ for all county pairs ij and the variable along the vertical axis in figure 3 is $\rho_{ij} - \hat{\alpha}_o - \hat{\alpha}_1 C_{ij} - \hat{\alpha}_3 T_{ij} - \hat{\alpha}_4 S_{ij}$ for all county pairs ij.

[13] Of course bilateral trade integration and industrial specialization are included in this regression as well. For clarity I am leaving them out of this example.

be observed, the cross-sectional regression approach is inappropriate, and instead we have to use the time varying measures of synchronization and integration. If we take first differences of the equation for ρ_{ijt} in (4) then we can estimate the following:

$$\rho_{ijt} - \rho_{ijt-1} = \alpha_1 \left(F_{ijt} - F_{ijt-1}\right) + \varepsilon_{ijt} - \varepsilon_{ijt-1} \tag{6}$$

Here the regression of $\rho_{ijt} - \rho_{ijt-1}$ on $F_{ijt} - F_{ijt-1}$ would not suffer from omitted variable bias and the estimate $\hat{\alpha}_1$ will be consistent. Kalemli-Ozcan et al. (2012) estimate these regressions and find that when using the cross-sectional regression framework, the estimate $\hat{\alpha}_1$ is positive, but when using first differences in a panel data framework, $\hat{\alpha}_1$ is negative. They argue that these results are fully consistent with the fact that the cross-sectional regression suffers from omitted variable bias.

However there is another way to interpret the fact that $\hat{\alpha}_1$ is positive in a cross-sectional regression but negative in a first-differences regression that does not imply that cross-sectional regressions suffer from omitted variable bias. Rewrite both the cross-sectional regression model and the first differences model in (5) and (6) replacing aggregate financial integration F, with the sum of capital market integration and credit market integration, and allow for the fact that the two measures may have different effects on co-movement:

$$\begin{aligned}
\rho_{ij} &= \beta_1 C_{ij} + \beta_2 K_{ij} + \epsilon_{ij} \\
&\quad \text{and} \\
\rho_{ijt} - \rho_{ijt-1} &= \beta_1 \left(C_{ijt} - C_{ijt-1}\right) + \beta_2 \left(K_{ijt} - K_{ijt-1}\right) + \varepsilon_{ijt} - \varepsilon_{ijt-1}
\end{aligned}$$

From the cross-sectional regression we can see that $\hat{\beta}_1 C_{ij} + \hat{\beta}_2 K_{ij} = \hat{\alpha}_1 F_{ij}$. If $\hat{\beta}_1 > 0$, then the estimate $\hat{\alpha}_1$ in the cross-sectional regression is positive if $\frac{C_{ij}}{K_{ij}} > -\frac{\hat{\beta}_2}{\hat{\beta}_1}$. Thus if credit market integration has a positive effect on co-movement and credit market integration is a large enough component of aggregate financial integration, F_{ij}, then the cross-sectional regression of ρ_{ij} on F_{ij} should yield a positive coefficient. Similarly, from the panel data regression $\hat{\beta}_1 \Delta C_{ijt} + \hat{\beta}_2 \Delta K_{ijt} = \hat{\alpha}_1 \Delta F_{ijt}$, where Δ indicates first differences. If $\hat{\beta}_1 > 0$, then the estimate $\hat{\alpha}_1$ in the first-differences regression is negative if $\frac{\Delta C_{ijt}}{\Delta K_{ijt}} < -\frac{\hat{\beta}_2}{\hat{\beta}_1}$. There are a few ways to interpret this, but suppose that ΔC_{ijt} and ΔK_{ijt} are both positive, then if $\hat{\beta}_1 > 0$, the estimate of $\hat{\alpha}_1$ will be negative if $\hat{\beta}_2 < 0$ and ΔK_{ijt} is sufficiently bigger than ΔC_{ijt}. Thus the panel data regression using aggregate financial integration as the independent variable will pick up the effect of the faster growing component of financial integration. Kalemli-Ozcan et al. (2012) find that the cross-sectional regression yields a positive estimate of $\hat{\alpha}_1$ while the panel data regression yields a negative coefficient, and they interpret this as evidence that the cross-sectional regression suffers from omitted variable bias. An equally plausible explanation would be that credit market integration has a positive effect on co-movement, capital market integration has a negative effect, credit market integration is the larger component of aggregate financial integration, but capital market integration is the faster growing component.

Table 8 presents data on the average stock of international capital and credit market assets and liabilities for each country in the sample over the period 1991-2004, and table 9 presents data on the change in the stock of international capital and credit market assets and liabilities for each country in the sample between 1991 and 2004. The data is taken from the Lane and Milesi-Ferretti (2007) dataset of external capital and credit market assets and liabilities.

Table 8 shows that for nearly every country in the sample, the stock of external credit market assets and liabilities is greater than the stock of capital market assets and liabilities. An unweighted average of the 58 countries in the sample show that over the 1991-2004 period, the sum of credit market assets and liabilities was approximately 125% of GDP. The sum of capital market assets and liabilities over this same period was 66% of GDP. Thus in terms of the notation introduced earlier in this section, $\frac{C_{ij}}{K_{ij}} \approx 2$ and even if credit market integration has a positive effect on co-movement and capital market integration has a negation effect, a cross-sectional regression of co-movement on aggregate financial integration should yield a positive coefficient if $\frac{C_{ij}}{K_{ij}} > -\frac{\hat{\beta}_2}{\hat{\beta}_1}$. The regression results in table 5 show that $\hat{\beta}_2 \approx -\hat{\beta}_1$. Since the majority of aggregate financial integration is actually credit market integration, which has a positive effect on co-movement, then we should observe that in the cross-section, aggregate financial integration has a positive effect on bilateral GDP co-movement.

But at the same time, table 9 shows that capital market integration is the faster growing component of aggregate financial integration. The table shows that for nearly every one of the 58 countries in the sample, the sum of capital market assets and liabilities grew faster than the sum of credit market assets and liabilities from 1991 to 2004. The unweighted average of the countries in the sample shows that over this period, external capital market assets and liabilities grew by 283%, while external credit market assets and liabilities grew by 188%. In terms of the notation introduced earlier in this section, $\frac{\Delta C_{ijt}}{\Delta K_{ijt}} \approx 0.66$. If credit market integration has a positive effect on co-movement but capital market integration has a negative effect, then in a first-differences regression we should observe that aggregate financial integration has a negative effect on co-movement if $\frac{\Delta C_{ijt}}{\Delta K_{ijt}} < -\frac{\hat{\beta}_2}{\hat{\beta}_1}$. As discussed earlier, the right-hand side of this inequality is about equal to 1. Since capital market integration, which has a negative effect on co-movement, is the faster growing component of aggregate financial integration, in a first differences regression we should observe that aggregate financial integration has a negative effect on co-movement.

4.2 Additional tests

This result, that bilateral credit market integration has a positive effect on bilateral correlation and capital market integration has a negative effect is robust to our different measures of trade integration and different ways of detrending GDP to calculate the bilateral correlation. Tables 11 and 12 in the appendix present the results from the estimating the same system of equations, using the alternate measure of trade integration, T_2, or calculating GDP correlation using log-differences or linear detrending. The results do not change.

This result is also robust to different ways to instrument for the level of credit and capital market integration. The previous section describes how in the benchmark estimation of the model, there are two unique instruments for credit market integration and two unique instruments for capital market integration. The unique instruments for the level of credit market integration are the sum of the La Porta et al. (1998) index of creditor rights in country i and the index of creditor rights in country j, as well as the difference between the La Porta index of creditor rights in country i and the index of creditor rights in country j. The two unique instruments for capital market integration are instead constructed with the La Porta et al. indices of shareholder rights.

To test the sensitivity of the results with respect to the choice of instruments for credit and capital market integration, we again estimate the same model where there is only one unique instrument for credit market integration and one unique instrument for capital market integration, the sum of the La Porta indices in each country. Alternatively we estimate the model where there is only one unique instrument, the difference between the La Porta indices in each country. This robustness check is described in more detail in section A.1 of the appendix and the estimation results can be found in tables 6 and 7. The result that credit market integration has a positive effect on cyclical correlation and capital market integration has a negative effect continues to hold when under these different combinations of instruments for credit and capital market integration.

Tables 6 and 7 present the results from the regression where bilateral business cycle correlation is the dependent variable. The full set of results from the estimation of all four or five equations can be found in tables 13-18 in the appendix.

5 Conclusion

This paper explains why different types of financial integration seem to have had different effects on cross-country business cycle co-movement. Years of international financial integration in the form of equity market integration and cross-border FDI flows seem to have resulted in less co-movement and a divergence between the U.S. business cycle and that in the rest of the world (Heathcote and Perri, 2003), but this divergence trend reversed sharply in the Fall of 2008. A housing bubble and a subprime crisis in the United States and a handful of other countries quickly spread around the world as banks in countries without a housing bubble still found themselves exposed to declining house prices and defaults in the United States.

To explain this apparent contradiction, this paper shows how international financial integration that involves trade in equity and ownership shares leads to less international business cycle co-movement, but financial integration that involves trade in debt leads to greater cyclical co-movement. The negative effect of capital market integration is a common feature of many international real business cycle models and comes from the wealth effect. The positive effect of credit market integration is due to balance sheet effects.

Relatively little attention has been paid to the effect of financial integration on international business cycle co-movement (relative to the amount of attention paid to the effect of trade on co-movement). This is partly because the data is better for trade flows than for financial flows, but partly because there seemed to be little consistency in the results. Specifically there was a discrepancy between many papers in the empirical half of the open economy macro literature that found international financial integration has a positive effect on international business cycle co-movement and papers from the theoretical half of the literature that found the opposite. Theoretical models that did not feature financial frictions found that financial integration has a negative effect on co-movement, while theoretical models with financial frictions found the opposite. And empirical papers that used a cross-sectional regression found that financial integration has a positive effect on co-movement, while those that use panel data find the opposite.

This paper shows that when we think of financial integration not as one homogenous set of financial flows, but rather as a heterogenous set, some where wealth effects dominate and some where balance sheet effects dominate, these seemingly inexplicable results can be explained.

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A Appendix

A.1 Instrument lists

The five independent variables in the regression in (1) or (2) are potentially endogenous. In the GMM estimation, the measure of bilateral trade integration T is instrumented by $\mathbf{I}_{ij}^{T}$, the measure of bilateral industrial specialization is instrumented by $\mathbf{I}_{ij}^{S}$, and the measure of bilateral financial integration is instrumented by $\mathbf{I}_{ij}^{F}$. In (2) when financial integration is dividend into credit and capital market integration, bilateral credit market integration C is instrumented by $\mathbf{I}_{ij}^{C}$ and bilateral capital market integration is instrumented by $\mathbf{I}_{ij}^{K}$.

The elements in each of these vectors $\mathbf{I}$ are as follows:

$\mathbf{I}_{ij}^{T}$

1. Distance between the capital of country i and the capital of country j
2. An indicator variable equal to one if countries i and j share a language
3. An indicator variable equal to one if countries i and j share a border
4. The number of countries in the country pair that are islands.
5. The number of countries in the country pair that are landlocked.
6. Sum of average tariff rates, as described in the text.

$\mathbf{I}_{ij}^{S}$

1. The sum of the per capita GDPs in countries i and j
2. The difference between the per capita GDPs in countries i and j
3. The measure of the differences in relative comparative advantage as described in (3)

$\mathbf{I}_{ij}^{F}$

1. Distance between the capital of country i and the capital of country j
2. An indicator variable equal to one if countries i and j share a language
3. An indicator variable equal to one if countries i and j share a border
4. The sum of the La Porta et al. (1998) index of the rule of law in country i with the rule of law in country j

5. The sum of the La Porta index of shareholder rights in country i with the index of shareholder rights in country j
6. The sum of the La Porta index of creditor rights in country i with the index of shareholder rights in country j
7. The difference between the La Porta index of the rule of law in country i and the rule of law in country j
8. The difference between the La Porta index of shareholder rights in country i with and index of shareholder rights in country j
9. The difference between the La Porta index of creditor rights in country i with and index of shareholder rights in country j

$\mathbf{I}_{ij}^{C}$ contains all of the elements in $\mathbf{I}_{ij}^{F}$ except the indices of shareholder rights (5 and 8), $\mathbf{I}_{ij}^{K}$ contains all of the elements in $\mathbf{I}_{ij}^{F}$ except the indices of creditor rights (6 and 9).

For robustness we also estimate the model where the differences in the La Porta indices are not included in the instrument list (so the instruments are 1-6) and again where the sum of the La Porta indices are not included in the instrument list (so the instruments are 1-3 and 7-9).

A.2 Countries in the estimations

Argentina (ARG); Australia (AUS); Austria (AUT); Belgium-Luxembourg (BLX); Brazil (BRA); Bulgaria (BGR); Canada (CAN); Chile (CHL); China (CHN); Colombia (COL); Czech Rep. (CZE); Denmark (DEN); Ecuador (ECU); Egypt (EGY); Finland (FIN); France (FRA); Germany (DEU); Greece (GRC); Hong Kong (HKG); Hungary (HUN); India (IND); Indonesia (IDN); Ireland (IRE); Israel (ISR); Italy (ITA); Japan (JPN); Jordan (JOR); Kenya (KEN); Korea (KOR); Latvia (LVA); Malaysia (MYS); Mexico (MEX); Netherlands (NLD); New Zealand (NZL); Nigeria (NGA); Norway (NOR); Pakistan (PAK); Peru (PER); Philippines (PHL); Poland (POL); Portugal (PRT); Romania (ROM); Russia (RUS); Singapore (SGP); Slovakia (SVK); Slovenia (SVN); South Africa (ZAF); Spain (ESP); Sri Lanka (LKA); Sweden (SWE); Switzerland (CHE); Taiwan (TWN); Thailand (THL); Turkey (TUR); UK (GBR); Uruguay (URU); USA (USA); Venezuela (VEN)

The GDP, bilateral trade, and industrial specialization data is available for all countries. The financial data needed to construct the NFA and RS measures of financial integration are also available for all 58 countries, meaning that in the cross-sectional regression using the NFA or RS measures of financial integration, there are 1653 bilateral observations.

The CPIS data is only available for 47 countries in the sample, which means that in the cross-sectional regression using the $CPIS$ measure of financial integration, there are 1081 observations. The 11 countries missing are Nigeria; China; Ecuador; Kenya; Sri Lanka; Latvia; Peru; Belgium-Luxembourg; Jordan; Slovenia; Taiwan

The data used to construct the MAD index of financial integration is only available for 46 countries in the sample, which means that in the cross-sectional regression, there are 1035 observations. The 12 countries missing are Nigeria; Czech Republic; Ecuador; Kenya; Sri Lanka; Latvia; Peru; Jordan; Poland; Romania; Slovakia; Uruguay

Table 1: Some descriptive statistics for the various measures of credit and capital market integration

Variable	Mean	St. Dev.	Minimum	Maximum
C^{cpis}	3.18×10^{-3}	9.87×10^{-3}	9.63×10^{-10} (ESP-IND)	0.100 (IRL-GBR)
K^{cpis}	1.79×10^{-3}	5.58×10^{-3}	2.27×10^{-10} (JPN-ROM)	0.060 (USA-GBR)
C^{nfa}	0.381	0.416	3.36×10^{-5} (NLD-ESP)	2.158 (IRL-JOR)
K^{nfa}	0.245	0.268	3.46×10^{-4} (RUS-IDN)	1.841 (IRL-SWE)
C^{mad}	0.076	0.048	3.86×10^{-3} (DEU-PRT)	0.348 (TUR-JPN)
K^{mad}	0.071	0.022	0.022 (NLD-FRA)	0.150 (TUR-IDN)
C^{rs}	0.086	0.093	4.53×10^{-5} (ESP-HUN)	0.689 (IDN-NGA)
K^{rs}	0.037	0.026	5.90×10^{-5} (SVN-PAK)	0.135 (PER-EGY)

Table 2: Unconditional correlations between the various measures of credit and capital market integration

	C^{cpis}	K^{cpis}	C^{nfa}	K^{nfa}	C^{mad}	K^{mad}	C^{rs}	K^{rs}
C^{cpis}	1							
K^{cpis}	0.721	1						
C^{nfa}	0.127	0.131	1					
K^{nfa}	0.187	0.187	0.537	1				
C^{mad}	−0.146	−0.093	0.036	0.007	1			
K^{mad}	−0.144	−0.130	−0.005	0.059	0.626	1		
C^{rs}	0.006	0.033	0.031	−0.047	−0.118	−0.202	1	
K^{rs}	−0.112	−0.054	0.007	−0.077	−0.014	−0.022	0.052	1

Table 3: Some descriptive statistics for the aggregate endogenous variables in the regression model

Variable	Mean	St. Dev.	Minimum	Maximum
ρ	0.1343	0.4501	−0.9448 (ESP-CHN)	0.9784 (IRL-PRT)
F^{cpis}	4.9×10^{-3}	0.0143	1.9×10^{-9} (NZL-MEX)	0.1543 (IRL-GBR)
F^{nfa}	0.6260	0.6034	0.0061 (SVN-URY)	3.7122 (IRL-SWE)
F^{mad}	0.1474	0.0643	0.0294 (NLD-FRA)	0.4904 (JPN-TUR)
F^{rs}	0.1235	0.0985	6.9×10^{-4} (FRA-SVN)	0.8192 (IDN-NGA)
T	2.1×10^{-3}	7.8×10^{-3}	1.2×10^{-7} (SGP-IDN)	0.2268 (SGP-MYS)
S	0.1567	0.0741	0.0363 (USA-GBR)	0.4211 (SGP-LKA)

Table 4: Unconditional correlations between the aggregate endogenous variables in the regression model

	ρ	F^{cpis}	F^{nfa}	F^{mad}	F^{rs}	T	S
ρ	1						
F^{cpis}	0.221	1					
F^{nfa}	−0.056	0.183	1				
F^{mad}	−0.090	−0.147	0.027	1			
F^{rs}	0.072	−0.010	−0.007	−0.157	1		
T	0.178	0.363	0.065	0.016	−0.006	1	
S	−0.078	0.006	0.472	0.083	−0.002	0.057	1

Table 5: Results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization.

Dependent Variable:	**Independent Variable:**	Measure of financial integration: *CPIS* OLS		*CPIS* GMM		*NFA* OLS		*NFA* GMM	
(1) GDP Correlation	F	0.000	(0.005)	−0.003	(0.007)	−0.039**	(0.014)	−0.026	(0.051)
	T	0.064**	(0.014)	0.065**	(0.022)	0.051**	(0.007)	0.043**	(0.011)
	S	−0.129**	(0.031)	−0.797**	(0.108)	−0.087**	(0.027)	−0.762**	(0.109)
(2) GDP Correlation	C	0.004	(0.005)	0.093**	(0.015)	−0.003	(0.009)	0.177**	(0.039)
	K	−0.005	(0.005)	−0.101**	(0.014)	−0.032**	(0.009)	−0.200**	(0.033)
	T	0.068**	(0.014)	0.123**	(0.023)	0.052**	(0.007)	0.080**	(0.012)
	S	−0.128**	(0.031)	−0.687**	(0.114)	−0.092**	(0.026)	−0.610**	(0.122)
Obs.		1081				1653			
		MAD OLS		*MAD* GMM		*RS* OLS		*RS* GMM	
(1) GDP Correlation	F	−0.142**	(0.035)	0.104	(0.081)	0.056**	(0.014)	0.229**	(0.067)
	T	0.070**	(0.011)	0.158**	(0.019)	0.050**	(0.006)	0.047**	(0.011)
	S	−0.084**	(0.031)	−0.919**	(0.109)	−0.114**	(0.025)	−0.984**	(0.082)
(2) GDP Correlation	C	−0.067**	(0.025)	−0.387**	(0.080)	0.006	(0.009)	0.114**	(0.052)
	K	−0.105*	(0.055)	0.628**	(0.111)	0.050**	(0.011)	−0.274**	(0.047)
	T	0.066**	(0.011)	0.161**	(0.019)	0.054**	(0.007)	−0.050**	(0.016)
	S	−0.079**	(0.032)	−0.496**	(0.125)	−0.129**	(0.025)	−1.166**	(0.092)
Obs.		1035				1653			

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 6: Results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (sum of index values).

		Measure of financial integration:							
		$CPIS$				NFA			
Dependent Variable:	**Independent Variable:**	OLS		GMM		OLS		GMM	
(1) GDP Correlation	F	0.000	(0.005)	−0.004	(0.008)	−0.039**	(0.014)	0.083	(0.058)
	T	0.064**	(0.014)	0.069**	(0.022)	0.051**	(0.007)	0.032**	(0.011)
	S	−0.129**	(0.031)	−0.818**	(0.111)	−0.087**	(0.027)	−0.986**	(0.123)
(2) GDP Correlation	C	0.004	(0.005)	0.091**	(0.016)	−0.003	(0.009)	0.164**	(0.043)
	K	−0.005	(0.005)	−0.097**	(0.015)	−0.032**	(0.009)	−0.184**	(0.038)
	T	0.068**	(0.014)	0.114**	(0.023)	0.052**	(0.007)	0.078**	(0.012)
	S	−0.128**	(0.031)	−0.707**	(0.117)	−0.092**	(0.026)	−0.630**	(0.137)
Obs.		1081				1653			
		MAD				RS			
		OLS		GMM		OLS		GMM	
(1) GDP Correlation	F	−0.142**	(0.035)	0.246**	(0.088)	0.056**	(0.014)	0.388**	(0.072)
	T	0.070**	(0.011)	0.188**	(0.021)	0.050**	(0.006)	0.064**	(0.011)
	S	−0.084**	(0.031)	−1.158**	(0.115)	−0.114**	(0.025)	−1.088**	(0.088)
(2) GDP Correlation	C	−0.067**	(0.025)	−0.326**	(0.094)	0.006	(0.009)	0.313**	(0.063)
	K	−0.105*	(0.055)	0.585**	(0.121)	0.050**	(0.011)	−0.297**	(0.054)
	T	0.066**	(0.011)	0.173**	(0.019)	0.054**	(0.007)	−0.071**	(0.017)
	S	−0.079**	(0.032)	−0.521**	(0.143)	−0.129**	(0.025)	−1.422**	(0.101)
Obs.		1035				1653			

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 7: Results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (difference in index values).

		Measure of financial integration:							
Dependent	**Independent**	*CPIS*				*NFA*			
Variable:	**Variable:**	OLS		GMM		OLS		GMM	
(1) GDP Correlation	F	0.000	(0.005)	−0.020**	(0.009)	−0.039**	(0.014)	0.073	(0.064)
	T	0.064**	(0.014)	0.112**	(0.029)	0.051**	(0.007)	0.002	(0.013)
	S	−0.129**	(0.031)	−0.541**	(0.155)	−0.087**	(0.027)	−1.136**	(0.156)
(2) GDP Correlation	C	0.004	(0.005)	0.159**	(0.026)	−0.003	(0.009)	0.136**	(0.047)
	K	−0.005	(0.005)	−0.144**	(0.022)	−0.032**	(0.009)	−0.284**	(0.046)
	T	0.068**	(0.014)	0.078**	(0.030)	0.052**	(0.007)	0.096**	(0.015)
	S	−0.128**	(0.031)	−0.611**	(0.159)	−0.092**	(0.026)	−0.356*	(0.184)
Obs.		1081				1653			
		MAD				*RS*			
		OLS		GMM		OLS		GMM	
(1) GDP Correlation	F	−0.142**	(0.035)	0.100	(0.086)	0.056**	(0.014)	0.258**	(0.073)
	T	0.070**	(0.011)	0.147**	(0.020)	0.050**	(0.006)	0.024**	(0.012)
	S	−0.084**	(0.031)	−0.644**	(0.139)	−0.114**	(0.025)	−1.070**	(0.107)
(2) GDP Correlation	C	−0.067**	(0.025)	−0.737**	(0.088)	0.006	(0.009)	0.190**	(0.058)
	K	−0.105*	(0.055)	1.046**	(0.131)	0.050**	(0.011)	−0.201**	(0.059)
	T	0.066**	(0.011)	0.213**	(0.022)	0.054**	(0.007)	−0.039**	(0.019)
	S	−0.079**	(0.032)	0.700**	(0.191)	−0.129**	(0.025)	−1.248**	(0.115)
Obs.		1035				1653			

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 8: Ratio of external capital or credit market assets and liabilities to GDP, average ratio from 1991 to 2004

	Capital Market	Credit Market		Capital Market	Credit Market
Argentina	30.7%	96.9%	Latvia	24.7%	75.8%
Australia	77.8%	65.2%	Malaysia	78.6%	62.3%
Austria	38.8%	177.5%	Mexico	26.7%	41.8%
Belgium	163.5%	360.0%	Netherlands	199.8%	242.4%
Brazil	25.6%	38.0%	New Zealand	90.0%	84.8%
Bulgaria	16.1%	190.6%	Nigeria	59.1%	112.9%
Canada	86.3%	89.9%	Norway	64.0%	107.9%
Chile	72.0%	59.1%	Pakistan	8.3%	47.7%
China	19.5%	27.5%	Peru	27.7%	65.5%
Colombia	17.4%	45.2%	Philippines	24.5%	85.9%
Czech Rep.	38.0%	65.1%	Poland	15.8%	52.0%
Denmark	77.5%	159.3%	Portugal	48.6%	161.3%
Ecuador	27.7%	84.5%	Romania	11.3%	41.6%
Egypt	25.3%	64.6%	Russia	23.9%	99.3%
Finland	101.2%	123.2%	Singapore	288.3%	268.8%
France	103.4%	147.1%	Slovak Rep.	31.4%	72.1%
Germany	55.5%	142.4%	Slovenia	17.6%	56.9%
Greece	19.4%	90.4%	South Africa	62.0%	30.1%
Hong Kong	418.8%	744.8%	Spain	58.5%	99.7%
Hungary	42.7%	67.2%	Sri Lanka	11.6%	70.3%
India	8.1%	27.7%	Sweden	116.1%	133.5%
Indonesia	14.5%	79.3%	Switzerland	255.6%	414.5%
Ireland	322.4%	573.4%	Taiwan	42.4%	41.9%
Israel	35.9%	82.5%	Thailand	33.9%	62.2%
Italy	40.0%	109.8%	Turkey	9.7%	47.3%
Japan	20.6%	79.6%	UK	138.7%	363.9%
Jordan	35.3%	132.2%	USA	50.8%	68.4%
Kenya	11.7%	73.5%	Uruguay	12.8%	122.8%
Korea	19.6%	37.1%	Venezuela	33.8%	90.3%

Table 9: Growth from 1991 to 2004 in external credit and capital market assets and liabilities

	Capital Market	Credit Market		Capital Market	Credit Market
Argentina	167.1%	80.5%	Latvia	851.8%	986.1%
Australia	160.4%	124.0%	Malaysia	159.0%	105.8%
Austria	230.6%	154.7%	Mexico	176.9%	34.0%
Belgium	186.8%	103.0%	Netherlands	183.9%	164.0%
Brazil	199.8%	47.2%	New Zealand	128.1%	124.3%
Bulgaria	354.1%	29.8%	Nigeria	105.2%	28.7%
Canada	145.1%	58.0%	Norway	210.2%	182.2%
Chile	217.5%	84.6%	Pakistan	158.1%	53.7%
China	293.8%	154.6%	Peru	302.7%	17.7%
Colombia	164.8%	75.8%	Philippines	145.6%	64.1%
Czech Rep.	1120.9%	1115.7%	Poland	464.1%	78.7%
Denmark	212.3%	92.5%	Portugal	237.6%	256.2%
Ecuador	204.1%	57.9%	Romania	517.2%	145.5%
Egypt	78.4%	36.6%	Russia	1267.3%	1284.3%
Finland	291.6%	125.5%	Singapore	214.5%	206.5%
France	186.9%	146.2%	Slovak Rep.	1024.6%	1024.3%
Germany	196.7%	143.9%	Slovenia	939.3%	1032.0%
Greece	195.7%	185.3%	South Africa	171.9%	104.5%
Hong Kong	204.3%	−11.0%	Spain	217.9%	216.6%
Hungary	370.4%	125.6%	Sri Lanka	169.7%	58.0%
India	321.3%	44.0%	Sweden	199.9%	96.8%
Indonesia	152.1%	55.2%	Switzerland	170.1%	110.9%
Ireland	361.3%	352.1%	Taiwan	217.7%	173.9%
Israel	237.8%	102.5%	Thailand	156.9%	45.2%
Italy	180.6%	131.5%	Turkey	209.8%	119.4%
Japan	121.9%	28.7%	UK	155.7%	147.0%
Jordan	280.1%	−0.7%	USA	162.7%	138.9%
Kenya	83.4%	20.8%	Uruguay	115.4%	77.5%
Korea	305.8%	118.4%	Venezuela	194.9%	55.9%

Table 10: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with two unique instruments each for credit and capital market integration.

		Measure of financial and trade integration, and detrending method:							
		CPIS		*NFA*		*MAD*		*RS*	
Dependent	**Independent**	T_1		T_1		T_1		T_1	
Variable:	**Variable:**	H-P		H-P		H-P		H-P	
Correlation	F	−0.003	(0.007)	−0.026	(0.051)	0.104	(0.081)	0.229**	(0.067)
	T	0.065**	(0.022)	0.043**	(0.011)	0.158**	(0.019)	0.047**	(0.011)
	S	−0.797**	(0.108)	−0.762**	(0.109)	−0.919**	(0.109)	−0.984**	(0.082)
Finance (F)	T	2.905**	(0.140)	0.227**	(0.025)	−0.027	(0.027)	−0.152**	(0.020)
	S	6.227**	(0.937)	2.305**	(0.220)	1.613**	(0.130)	1.125**	(0.178)
Trade (T)	F	0.229**	(0.015)	1.314**	(0.210)	−0.931**	(0.224)	−2.671**	(0.249)
	S	−0.185	(0.294)	−2.979**	(0.318)	0.336	(0.356)	0.515	(0.440)
Specialization (S)	F	−0.040**	(0.019)	0.381**	(0.028)	0.264**	(0.088)	0.478**	(0.062)
	T	−0.068**	(0.030)	−0.085**	(0.011)	−0.020	(0.022)	−0.078**	(0.015)
Correlation	C	0.093**	(0.015)	0.177**	(0.039)	−0.387**	(0.080)	0.114**	(0.052)
	K	−0.101**	(0.014)	−0.200**	(0.033)	0.628**	(0.111)	−0.274**	(0.047)
	T	0.123**	(0.023)	0.080**	(0.012)	0.161**	(0.019)	−0.050**	(0.016)
	S	−0.687**	(0.114)	−0.610**	(0.122)	−0.496**	(0.125)	−1.166**	(0.092)
Credit (C)	K	1.053**	(0.062)	−0.283**	(0.134)	0.540*	(0.277)	−0.781**	(0.173)
	T	−0.951**	(0.192)	0.112**	(0.043)	0.155**	(0.037)	0.013	(0.046)
	S	2.646**	(0.753)	3.002**	(0.313)	1.688**	(0.202)	1.658**	(0.263)
Capital (K)	C	0.758**	(0.043)	−0.178*	(0.092)	0.290**	(0.040)	−0.230**	(0.099)
	T	1.697**	(0.115)	0.237**	(0.036)	−0.103**	(0.009)	−0.280**	(0.022)
	S	1.259**	(0.625)	1.717**	(0.317)	0.013	(0.063)	−0.353	(0.222)
Trade (T)	C	−0.330**	(0.042)	−0.135	(0.200)	1.600**	(0.394)	0.948**	(0.275)
	K	0.433**	(0.031)	0.743**	(0.119)	−3.457**	(0.550)	−2.226**	(0.161)
	S	−0.599*	(0.306)	−2.450**	(0.420)	−0.763*	(0.430)	−2.705**	(0.496)
Specialization (S)	C	−0.022	(0.018)	0.282**	(0.023)	0.367**	(0.060)	0.310**	(0.041)
	K	−0.007	(0.021)	0.122**	(0.035)	−0.442**	(0.106)	−0.174**	(0.044)
	T	−0.037	(0.030)	−0.073**	(0.012)	0.005	(0.021)	−0.149**	(0.017)
Obs.		1081		1653		1035		1653	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 11: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with two unique instruments each for credit and capital market integration.

		Measure of financial and trade integration, and detrending method:					
		CPIS		*CPIS*		*CPIS*	
Dependent	**Independent**	T_2		T_1		T_1	
Variable:	**Variable:**	H-P		Log Diff.		Linear	
Correlation	F	0.002	(0.005)	0.004	(0.005)	−0.026**	(0.007)
	T	0.082**	(0.018)	0.064**	(0.014)	0.078**	(0.023)
	S	−0.903**	(0.101)	−0.488**	(0.064)	−0.918**	(0.103)
Finance (F)	T	3.707**	(0.371)	2.874**	(0.140)	2.909**	(0.140)
	S	1.194	(1.130)	6.590**	(0.948)	6.542**	(0.937)
Trade (T)	F	0.018	(0.015)	0.238**	(0.015)	0.237**	(0.015)
	S	1.183**	(0.268)	−0.062	(0.294)	−0.206	(0.297)
Specialization (S)	F	−0.058**	(0.014)	−0.039**	(0.019)	−0.051**	(0.017)
	T	−0.011	(0.019)	−0.071**	(0.030)	−0.049*	(0.028)
Correlation	C	0.091**	(0.015)	0.026**	(0.009)	0.039**	(0.016)
	K	−0.085**	(0.014)	−0.024**	(0.009)	−0.065**	(0.015)
	T	0.095**	(0.018)	0.082**	(0.014)	0.113**	(0.022)
	S	−0.873**	(0.107)	−0.462**	(0.066)	−0.863**	(0.107)
Credit (C)	K	0.940**	(0.035)	1.057**	(0.063)	1.061**	(0.063)
	T	−1.452**	(0.199)	−0.969**	(0.194)	−0.998**	(0.194)
	S	3.942**	(0.815)	3.061**	(0.764)	3.141**	(0.754)
Capital (K)	C	1.046**	(0.036)	0.753**	(0.044)	0.751**	(0.043)
	T	2.004**	(0.161)	1.712**	(0.116)	1.740**	(0.116)
	S	−2.931**	(0.817)	1.067*	(0.632)	1.000	(0.631)
Trade (T)	C	−0.495**	(0.044)	−0.328**	(0.042)	−0.319**	(0.042)
	K	0.424**	(0.033)	0.430**	(0.031)	0.420**	(0.031)
	S	1.102**	(0.346)	−0.440	(0.307)	−0.468	(0.309)
Specialization (S)	C	−0.013	(0.016)	−0.029	(0.018)	−0.040**	(0.017)
	K	−0.031	(0.020)	−0.003	(0.020)	−0.005	(0.020)
	T	0.000	(0.019)	−0.039	(0.030)	−0.018	(0.029)
Obs.		1081		1081		1081	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 12: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with two unique instruments each for credit and capital market integration.

		Measures of financial and trade integration, and detrending method:					
		NFA		NFA		NFA	
Dependent	**Independent**	T_2		T_1		T_1	
Variable:	**Variable:**	H-P		Log Diff.		Linear	
Correlation	F	−0.015	(0.046)	0.054*	(0.030)	0.262**	(0.058)
	T	0.105**	(0.013)	0.057**	(0.006)	−0.044**	(0.012)
	S	−0.763**	(0.104)	−0.446**	(0.066)	−1.521**	(0.115)
Finance (F)	T	0.271**	(0.064)	0.223**	(0.025)	0.230**	(0.025)
	S	2.455**	(0.234)	2.349**	(0.221)	2.265**	(0.219)
Trade (T)	F	−0.432**	(0.150)	1.361**	(0.212)	1.374**	(0.212)
	S	1.528**	(0.245)	−3.014**	(0.318)	−2.842**	(0.318)
Specialization (S)	F	0.308**	(0.026)	0.402**	(0.028)	0.380**	(0.028)
	T	−0.039**	(0.010)	−0.078**	(0.011)	−0.096**	(0.010)
Correlation	C	0.150**	(0.037)	0.079**	(0.023)	0.357**	(0.042)
	K	−0.133**	(0.028)	−0.015	(0.019)	−0.108**	(0.038)
	T	0.109**	(0.013)	0.063**	(0.007)	0.000	(0.014)
	S	−0.83**2	(0.113)	−0.429**	(0.070)	−1.360**	(0.123)
Credit (C)	K	0.007	(0.140)	−0.244*	(0.135)	−0.184	(0.131)
	T	0.880**	(0.127)	0.109**	(0.044)	0.098**	(0.042)
	S	2.463**	(0.343)	3.157**	(0.319)	2.864**	(0.307)
Capital (K)	C	−0.026	(0.090)	−0.192**	(0.093)	−0.167*	(0.092)
	T	−0.211**	(0.088)	0.229**	(0.037)	0.235**	(0.036)
	S	1.647**	(0.358)	1.749**	(0.329)	1.470**	(0.320)
Trade (T)	C	−0.063	(0.127)	−0.170	(0.202)	−0.171	(0.201)
	K	−0.225**	(0.067)	0.740**	(0.120)	0.695**	(0.120)
	S	1.490**	(0.262)	−2.348**	(0.425)	−2.217**	(0.425)
Specialization (S)	C	0.196**	(0.024)	0.275**	(0.023)	0.293**	(0.022)
	K	0.112**	(0.032)	0.136**	(0.036)	0.085**	(0.033)
	T	−0.037**	(0.011)	−0.073**	(0.012)	−0.085**	(0.011)
Obs.		1653		1653		1653	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 13: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (sum of index values).

		Measure of financial and trade integration, and detrending method:							
		CPIS		*NFA*		*MAD*		*RS*	
Dependent	**Independent**	T_1		T_1		T_1		T_1	
Variable:	**Variable:**	H-P		H-P		H-P		H-P	
Correlation	F	−0.004	(0.008)	0.083	(0.058)	0.246**	(0.088)	0.388**	(0.072)
	T	0.069**	(0.022)	0.032**	(0.011)	0.188**	(0.021)	0.064**	(0.011)
	S	−0.818**	(0.111)	−0.986**	(0.123)	−1.158**	(0.115)	−1.088**	(0.088)
Finance (F)	T	2.937**	(0.148)	0.215**	(0.022)	−0.077**	(0.026)	−0.163**	(0.019)
	S	6.440**	(1.020)	2.283**	(0.192)	1.647**	(0.127)	1.001**	(0.175)
Trade (T)	F	0.229**	(0.015)	1.075**	(0.268)	−1.486**	(0.228)	−3.387**	(0.291)
	S	0.055	(0.319)	−2.381**	(0.398)	2.156**	(0.392)	1.510**	(0.514)
Specialization (S)	F	−0.06**1	(0.020)	0.400**	(0.028)	0.220**	(0.101)	0.494**	(0.068)
	T	−0.033	(0.032)	−0.077**	(0.011)	−0.002	(0.024)	−0.070**	(0.015)
Correlation	C	0.091**	(0.016)	0.164**	(0.043)	−0.326**	(0.094)	0.313**	(0.063)
	K	−0.097**	(0.015)	−0.184**	(0.038)	0.585**	(0.121)	−0.297**	(0.054)
	T	0.114**	(0.023)	0.078**	(0.012)	0.173**	(0.019)	−0.071**	(0.017)
	S	−0.707**	(0.117)	−0.630**	(0.137)	−0.521**	(0.143)	−1.422**	(0.101)
Credit (C)	K	0.942**	(0.059)	−0.891**	(0.117)	0.459	(0.350)	−0.590**	(0.171)
	T	−0.633**	(0.190)	0.258**	(0.045)	0.031	(0.040)	0.020	(0.046)
	S	2.456**	(0.785)	3.546**	(0.329)	2.049**	(0.330)	1.816**	(0.262)
Capital (K)	C	0.816**	(0.044)	−0.697**	(0.083)	0.300**	(0.042)	−0.290**	(0.122)
	T	1.622**	(0.119)	0.342**	(0.038)	−0.111**	(0.010)	−0.254**	(0.026)
	S	1.792**	(0.671)	3.209**	(0.296)	0.011	(0.069)	−0.071	(0.248)
Trade (T)	C	−0.429**	(0.053)	−0.202	(0.260)	1.837**	(0.465)	1.188**	(0.392)
	K	0.497**	(0.036)	0.819**	(0.145)	−3.757**	(0.639)	−2.361**	(0.218)
	S	−0.485	(0.352)	−2.050**	(0.567)	−0.677	(0.486)	−3.371**	(0.619)
Specialization (S)	C	−0.029	(0.019)	0.266**	(0.022)	0.488**	(0.106)	0.338**	(0.049)
	K	−0.003	(0.022)	0.109**	(0.040)	−0.554**	(0.118)	−0.159**	(0.048)
	T	−0.034	(0.031)	−0.068**	(0.012)	0.020	(0.030)	−0.145**	(0.018)
Obs.		1081		1653		1035		1653	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 14: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (sum of index values).

		Measure of financial and trade integration, and detrending method:					
		$CPIS$		$CPIS$		$CPIS$	
Dependent	**Independent**	T_2		T_1		T_1	
Variable:	**Variable:**	H-P		Log Diff.		Linear	
Correlation	F	0.004	(0.005)	0.004	(0.005)	−0.029**	(0.007)
	T	0.079**	(0.019)	0.067**	(0.014)	0.090**	(0.023)
	S	−0.895**	(0.106)	−0.488**	(0.067)	−0.896**	(0.107)
Finance (F)	T	3.194**	(0.354)	2.927**	(0.149)	2.954**	(0.148)
	S	1.896*	(1.143)	6.872**	(1.028)	6.941**	(1.016)
Trade (T)	F	0.025	(0.017)	0.240**	(0.016)	0.238**	(0.015)
	S	1.202**	(0.302)	0.165	(0.319)	−0.037	(0.322)
Specialization (S)	F	−0.062**	(0.015)	−0.065**	(0.021)	−0.072**	(0.019)
	T	−0.005	(0.021)	−0.034	(0.032)	−0.015	(0.030)
Correlation	C	0.090**	(0.016)	0.029**	(0.010)	0.029*	(0.017)
	K	−0.083**	(0.014)	−0.026**	(0.009)	−0.054**	(0.015)
	T	0.088**	(0.019)	0.078**	(0.014)	0.102**	(0.023)
	S	−0.850**	(0.112)	−0.460**	(0.069)	−0.907**	(0.111)
Credit (C)	K	0.895**	(0.036)	0.952**	(0.060)	0.943**	(0.060)
	T	−0.825**	(0.210)	−0.662**	(0.191)	−0.662**	(0.191)
	S	3.137**	(0.782)	3.029**	(0.797)	2.990**	(0.785)
Capital (K)	C	1.082**	(0.037)	0.808**	(0.044)	0.821**	(0.044)
	T	1.736**	(0.143)	1.648**	(0.120)	1.655**	(0.119)
	S	−1.685**	(0.806)	1.486**	(0.679)	1.491**	(0.679)
Trade (T)	C	−0.628**	(0.056)	−0.416**	(0.053)	−0.422**	(0.053)
	K	0.526**	(0.039)	0.487**	(0.036)	0.483**	(0.036)
	S	0.981**	(0.419)	−0.254	(0.354)	−0.355	(0.355)
Specialization (S)	C	−0.023	(0.017)	−0.040**	(0.019)	−0.049**	(0.018)
	K	−0.027	(0.021)	0.000	(0.021)	−0.003	(0.021)
	T	0.008	(0.021)	−0.032	(0.031)	−0.013	(0.030)
Obs.		1081		1081		1081	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 15: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (sum of index values).

		Measures of financial and trade integration, and detrending method:					
		NFA		NFA		NFA	
Dependent	**Independent**	T_2		T_1		T_1	
Variable:	**Variable:**	H-P		Log Diff.		Linear	
Correlation	F	0.072	(0.052)	0.129**	(0.033)	0.315**	(0.066)
	T	0.098**	(0.013)	0.047**	(0.007)	−0.047**	(0.013)
	S	−0.957**	(0.116)	−0.619**	(0.072)	−1.636**	(0.134)
Finance (F)	T	0.149**	(0.054)	0.215**	(0.022)	0.224**	(0.022)
	S	2.689**	(0.205)	2.320**	(0.193)	2.222**	(0.191)
Trade (T)	F	−1.091**	(0.211)	1.102**	(0.268)	1.074**	(0.270)
	S	3.031**	(0.358)	−2.449**	(0.399)	−2.258**	(0.398)
Specialization (S)	F	0.327**	(0.027)	0.420**	(0.029)	0.401**	(0.028)
	T	−0.032**	(0.010)	−0.072**	(0.011)	−0.086**	(0.010)
Correlation	C	0.189**	(0.040)	0.109**	(0.024)	0.305**	(0.047)
	K	−0.099**	(0.032)	0.010	(0.022)	−0.118**	(0.043)
	T	0.099**	(0.014)	0.055**	(0.007)	0.012	(0.014)
	S	−1.013**	(0.124)	−0.549**	(0.077)	−1.228**	(0.145)
Credit (C)	K	−0.400**	(0.126)	−0.849**	(0.118)	−0.825**	(0.115)
	T	0.555**	(0.126)	0.256**	(0.045)	0.260**	(0.045)
	S	3.064**	(0.321)	3.619**	(0.336)	3.352**	(0.323)
Capital (K)	C	−0.255**	(0.104)	−0.681**	(0.084)	−0.686**	(0.083)
	T	−0.629**	(0.073)	0.336**	(0.039)	0.342**	(0.038)
	S	3.623**	(0.318)	3.190**	(0.302)	2.983**	(0.295)
Trade (T)	C	−0.535**	(0.165)	−0.315	(0.262)	−0.292	(0.260)
	K	−0.573**	(0.088)	0.781**	(0.146)	0.745**	(0.146)
	S	3.246**	(0.391)	−1.807**	(0.573)	−1.680**	(0.573)
Specialization (S)	C	0.217**	(0.023)	0.262**	(0.022)	0.274**	(0.021)
	K	0.125**	(0.035)	0.131**	(0.041)	0.081**	(0.038)
	T	−0.032**	(0.011)	−0.070**	(0.012)	−0.078**	(0.011)
Obs.		1653		1653		1653	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 16: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (difference in index values).

		Measure of financial and trade integration, and detrending method:							
		$CPIS$		NFA		MAD		RS	
Dependent	**Independent**	T_1		T_1		T_1		T_1	
Variable:	**Variable:**	H-P		H-P		H-P		H-P	
Correlation	F	−0.020**	(0.009)	0.073	(0.064)	0.100	(0.086)	0.258**	(0.073)
	T	0.112**	(0.029)	0.002	(0.013)	0.147**	(0.020)	0.024**	(0.012)
	S	−0.541**	(0.155)	−1.136**	(0.156)	−0.644**	(0.139)	−1.070**	(0.107)
Finance (F)	T	3.733**	(0.111)	0.311**	(0.020)	−0.144**	(0.021)	−0.127**	(0.022)
	S	10.955**	(0.941)	2.553**	(0.286)	0.814**	(0.118)	0.926**	(0.194)
Trade (T)	F	0.258**	(0.011)	2.504**	(0.297)	−0.014	(0.417)	−2.784**	(0.304)
	S	−2.968**	(0.272)	−6.743**	(0.505)	−4.583**	(0.785)	−0.702	(0.621)
Specialization (S)	F	0.055**	(0.018)	0.325**	(0.028)	0.442**	(0.124)	0.454**	(0.066)
	T	−0.233**	(0.030)	−0.104**	(0.009)	−0.043	(0.027)	−0.096**	(0.015)
Correlation	C	0.159**	(0.026)	0.136**	(0.047)	−0.737**	(0.088)	0.190**	(0.058)
	K	−0.144**	(0.022)	−0.284**	(0.046)	1.046**	(0.131)	−0.201**	(0.059)
	T	0.078**	(0.030)	0.096**	(0.015)	0.213**	(0.022)	−0.039**	(0.019)
	S	−0.611**	(0.159)	−0.356*	(0.184)	0.700**	(0.191)	−1.248**	(0.115)
Credit (C)	K	0.876**	(0.018)	−0.870**	(0.144)	1.392**	(0.068)	−0.358**	(0.178)
	T	−0.311**	(0.103)	0.426**	(0.056)	0.245**	(0.028)	0.043	(0.047)
	S	0.872	(0.662)	4.661**	(0.496)	1.863**	(0.145)	1.198**	(0.288)
Capital (K)	C	1.108**	(0.021)	−0.934**	(0.094)	0.713**	(0.046)	−0.242*	(0.124)
	T	0.502**	(0.105)	0.505**	(0.033)	−0.182**	(0.023)	−0.206**	(0.027)
	S	−0.473	(0.763)	4.887**	(0.442)	−1.456**	(0.141)	−0.073	(0.278)
Trade (T)	C	−0.729**	(0.165)	1.246**	(0.245)	3.394**	(0.492)	2.063**	(0.414)
	K	0.724**	(0.125)	1.608**	(0.198)	−5.307**	(0.748)	−3.030**	(0.342)
	S	−2.101**	(0.722)	−7.906**	(0.866)	−5.965**	(0.685)	−2.288**	(0.923)
Specialization (S)	C	0.091	(0.099)	0.214**	(0.025)	0.306**	(0.048)	0.286**	(0.042)
	K	−0.037	(0.090)	0.111**	(0.046)	−0.503**	(0.144)	−0.053	(0.051)
	T	−0.164**	(0.071)	−0.080**	(0.013)	−0.060**	(0.018)	−0.131**	(0.018)
Obs.		1081		1653		1035		1653	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 17: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (difference in index values).

		Measure of financial and trade integration, and detrending method:					
		$CPIS$		$CPIS$		$CPIS$	
Dependent	**Independent**	T_2		T_1		T_1	
Variable:	**Variable:**	H-P		Log Diff.		Linear	
Correlation	F	−0.009*	(0.005)	0.000	(0.005)	−0.069**	(0.008)
	T	0.122**	(0.022)	0.073**	(0.019)	0.245**	(0.028)
	S	−0.631**	(0.126)	−0.383**	(0.095)	−0.047	(0.154)
Finance (F)	T	5.937**	(0.509)	3.733**	(0.112)	3.731**	(0.110)
	S	3.083*	(1.672)	11.211**	(0.950)	11.070**	(0.949)
Trade (T)	F	0.117**	(0.015)	0.258**	(0.011)	0.254**	(0.010)
	S	−0.782**	(0.355)	−3.001**	(0.274)	−2.979**	(0.272)
Specialization (S)	F	−0.023	(0.016)	0.052**	(0.018)	0.042**	(0.018)
	T	−0.080**	(0.023)	−0.227**	(0.030)	−0.205**	(0.030)
Correlation	C	0.106**	(0.028)	0.050**	(0.016)	0.080**	(0.027)
	K	−0.091**	(0.023)	−0.042**	(0.013)	−0.107**	(0.022)
	T	0.061**	(0.024)	0.074**	(0.020)	0.191**	(0.029)
	S	−0.861**	(0.131)	−0.353**	(0.097)	−0.103	(0.157)
Credit (C)	K	0.855**	(0.010)	0.884**	(0.018)	0.874**	(0.018)
	T	−0.851**	(0.265)	−0.332**	(0.104)	−0.339**	(0.104)
	S	1.916**	(0.770)	1.015	(0.671)	0.835	(0.678)
Capital (K)	C	1.167**	(0.014)	1.100**	(0.021)	1.110**	(0.021)
	T	0.939**	(0.310)	0.521**	(0.107)	0.545**	(0.106)
	S	−2.424**	(0.892)	−0.681	(0.773)	−0.474	(0.778)
Trade (T)	C	−0.401**	(0.132)	−0.722**	(0.165)	−0.693**	(0.165)
	K	0.336**	(0.100)	0.717**	(0.125)	0.685**	(0.125)
	S	−0.198	(0.522)	−1.939**	(0.728)	−1.975**	(0.721)
Specialization (S)	C	−0.087	(0.061)	0.118	(0.105)	0.130	(0.109)
	K	0.083	(0.064)	−0.066	(0.094)	−0.079	(0.098)
	T	−0.024	(0.031)	−0.174**	(0.073)	−0.178**	(0.075)
Obs.		1081		1081		1081	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

Table 18: Multi-equation GMM results from the cross-sectional regression of business cycle correlation on financial integration, trade integration and industrial specialization. Results from the regression with one unique instrument each for credit and capital market integration (difference in index values).

		Measures of financial and trade integration, and detrending method:					
		NFA		NFA		NFA	
Dependent	**Independent**	T_2		T_1		T_1	
Variable:	**Variable:**	H-P		Log Diff.		Linear	
Correlation	F	−0.112**	(0.054)	0.079**	(0.038)	0.544**	(0.074)
	T	0.119**	(0.016)	0.043**	(0.008)	−0.137**	(0.015)
	S	−0.393**	(0.156)	−0.552**	(0.095)	−2.438**	(0.163)
Finance (F)	T	0.571**	(0.080)	0.316**	(0.020)	0.304**	(0.020)
	S	2.939**	(0.319)	2.648**	(0.288)	2.321**	(0.282)
Trade (T)	F	0.603**	(0.192)	2.618**	(0.302)	2.631**	(0.299)
	S	−2.440**	(0.381)	−7.077**	(0.518)	−6.492**	(0.508)
Specialization (S)	F	0.245**	(0.030)	0.340**	(0.028)	0.338**	(0.028)
	T	−0.078**	(0.011)	−0.095**	(0.010)	−0.112**	(0.009)
Correlation	C	0.106**	(0.043)	0.078**	(0.025)	0.393**	(0.050)
	K	−0.205**	(0.035)	−0.045*	(0.026)	−0.121**	(0.052)
	T	0.121**	(0.016)	0.067**	(0.009)	−0.017	(0.018)
	S	−0.425**	(0.163)	−0.372**	(0.103)	−1.603**	(0.188)
Credit (C)	K	−0.549**	(0.108)	−0.880**	(0.145)	−0.843**	(0.142)
	T	1.273**	(0.123)	0.407**	(0.056)	0.402**	(0.055)
	S	3.576**	(0.438)	4.678**	(0.512)	4.448**	(0.490)
Capital (K)	C	−1.017**	(0.163)	−0.932**	(0.095)	−0.964**	(0.093)
	T	1.107**	(0.199)	0.483**	(0.034)	0.498**	(0.034)
	S	5.322**	(0.642)	4.862**	(0.451)	4.823**	(0.448)
Trade (T)	C	0.672**	(0.104)	1.265**	(0.249)	1.114**	(0.245)
	K	0.266**	(0.085)	1.667**	(0.203)	1.505**	(0.197)
	S	−2.214**	(0.358)	−8.102**	(0.909)	−7.495**	(0.882)
Specialization (S)	C	0.149**	(0.025)	0.216**	(0.026)	0.226**	(0.025)
	K	0.119**	(0.045)	0.090*	(0.050)	0.063	(0.042)
	T	−0.066**	(0.012)	−0.084**	(0.013)	−0.089**	(0.012)
Obs.		1653		1653		1653	

Notes: Robust standard errors are written in parenthesis. ** implies significance at the 5% level, * implies significance at the 10% level. F, C, K, T, S are the natural logs of the variables listed in the text

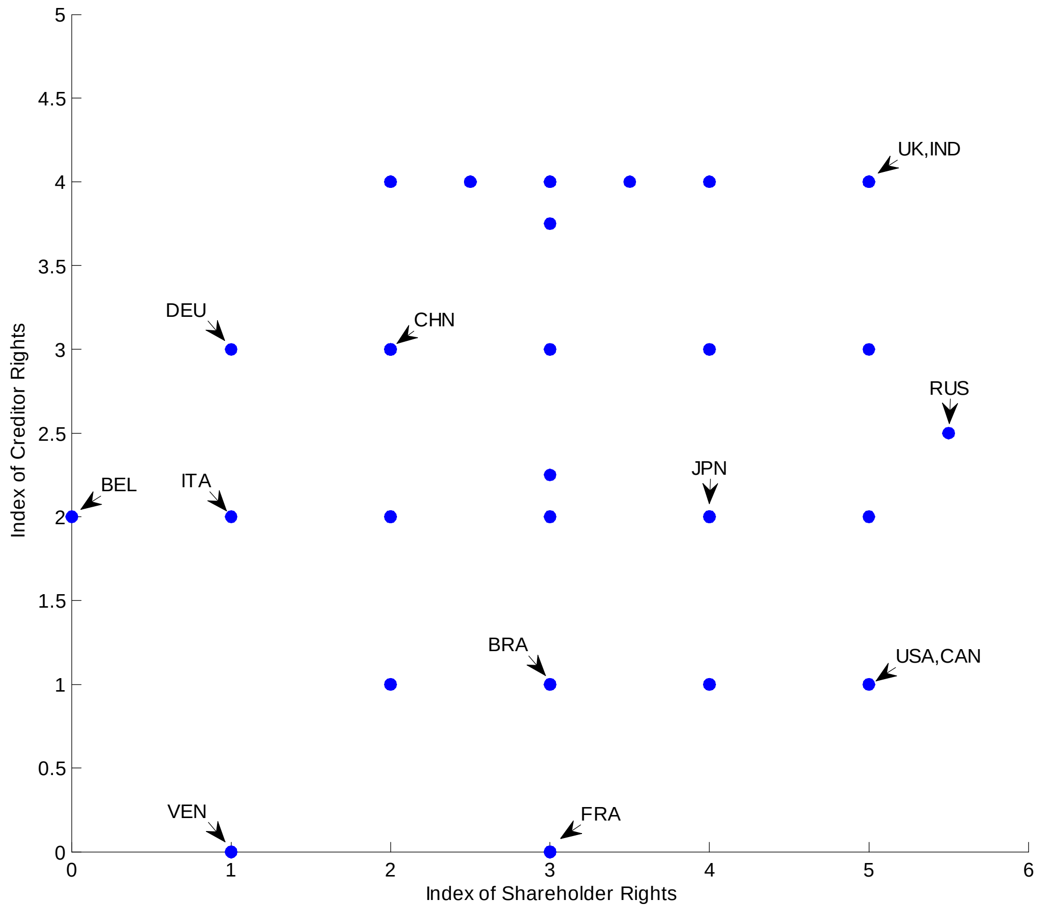

Figure 1: La Porta et al. (1998) indices of creditor rights and shareholder rights for the countries in the sample.

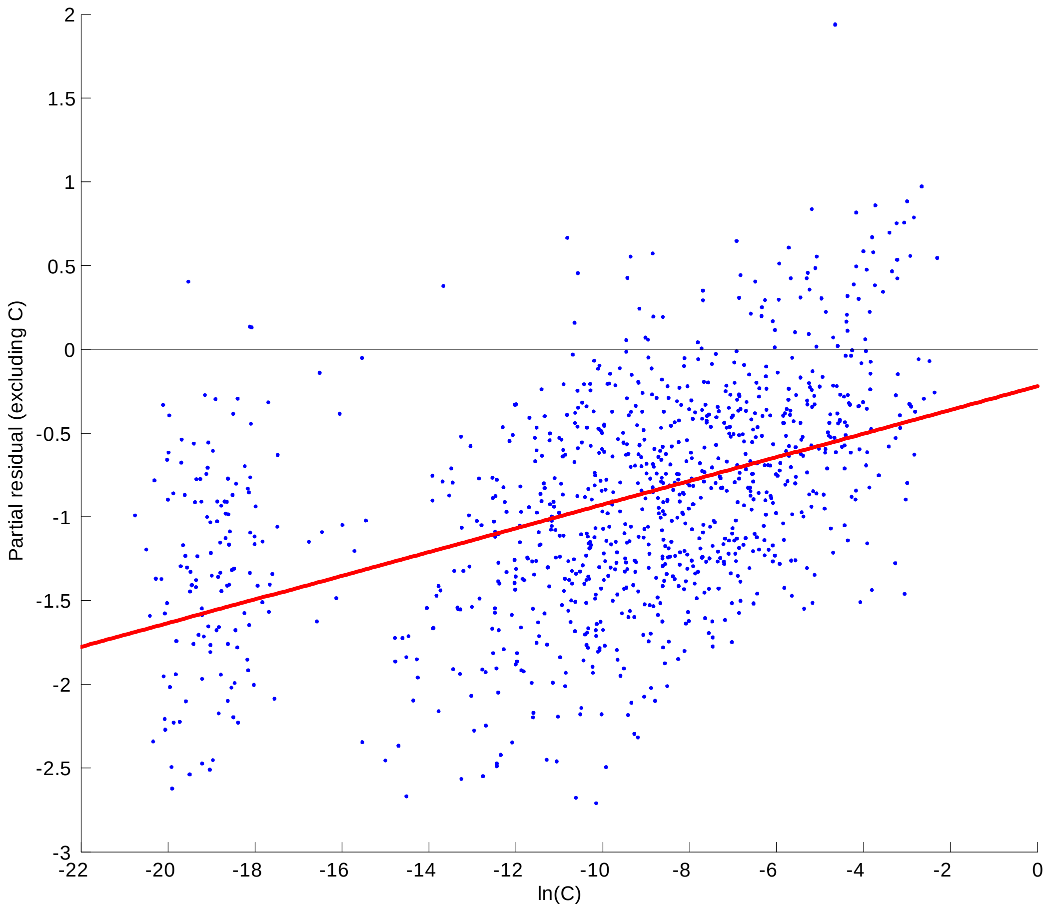

Figure 2: Partial residuals excluding credit market integration from GMM estimation where correlation is the dependent variable,

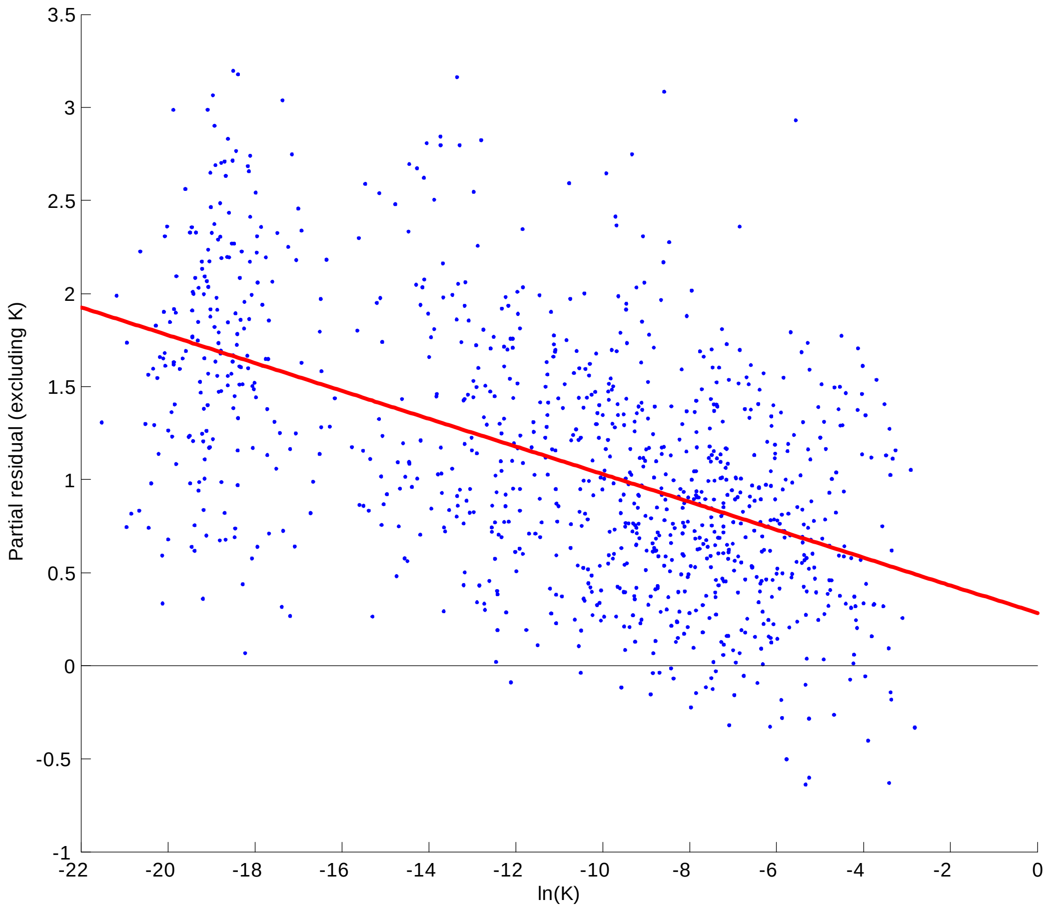

Figure 3: Partial residuals excluding capital market integration from GMM estimation where correlation is the dependent variable,