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journal homepage: [www.elsevier.com/locate/jme](http://www.elsevier.com/locate/jme)Financial integration and international business cycle co-movement<sup>☆</sup>J. Scott Davis<sup>\*</sup>

Federal Reserve Bank of Dallas, 2200 N. Pearl St., Dallas, TX 75201, United States

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## ABSTRACT

International business cycle transmission through integrated financial markets occurs through wealth and balance sheet effects. Balance sheet effects lead to business cycle convergence, but wealth effects lead to divergence. This paper shows empirically that debt market integration has a positive effect on co-movement, implying that balance sheet effects are the main conduit for international transmission through integrated debt markets. Equity market integration has a negative effect, implying that wealth effects are the main channel for international transmission through integrated equity markets. Distinguishing between wealth and balance sheet effects resolves some key discrepancies between empirical and theoretical findings in international macroeconomics.

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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-1980s (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.<sup>1</sup> 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. (2008a,b) find the same results with a dynamic latent factor model. Kaminsky and Reinhart (2000) highlight the importance of international bank lending as an international transmission mechanism, and Moto et al. (2007) find empirical evidence of a cross-country financial accelerator.

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<sup>\*</sup> Tel.: +1 214 922 5124.

E-mail address: [scott.davis@dal.frb.org](mailto:scott.davis@dal.frb.org)

<sup>1</sup> Relative to the attention paid to the effect of trade integration on cyclical co-movement.

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. These studies argue that financial integration has a negative effect on international business cycle co-movement. In a panel data study, [Kalemli-Ozcan et al. \(2013\)](#) find that financial integration leads to less synchronized business cycles,<sup>2</sup> and [Heathcote and Perri \(2003, 2004\)](#) argue that financial integration is responsible for the observed divergence between the U.S. business cycle and that in the rest of the world. [Bordo and Helbling \(2003\)](#) find a long-term trend towards greater international business cycle synchronization, but find little evidence that international financial integration, proxied by the removal of capital controls, has had an effect on this increasing synchronization.

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.

This paper shows that these seemingly contradictory empirical results are due to the fact that different types of financial integration have different effects on cyclical co-movement. In a cross-sectional regression similar to that in [Imbs \(2004, 2006\)](#), this paper shows that when a measure of bilateral financial integration is divided into separate measures of bilateral credit market integration (debt) and bilateral capital market integration (equity), credit market integration has a positive effect on cyclical co-movement and capital market integration has a negative effect.

The reason that credit and capital market integration have opposite effects on bilateral co-movement is that there are two different channels through which bilateral financial integration affects bilateral business cycle co-movement, the wealth effect and the balance sheet effect. The wealth effect serves to reduce cyclical co-movement between two financially integrated economies while the balance sheet effect serves to increase co-movement.

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. \(2003\)](#).<sup>3</sup>

Different types of bilateral financial integration may emphasize one channel over another. Bilateral equity market integration tends to emphasize the wealth effect, while bilateral debt market integration tends to emphasize balance sheet effects. Equity market financing implies that gains (or losses) from a project are shared proportionally between both the investor and the financier. Debt market financing does not lead to the same sharing of gains and losses. Only in the case of default does the financier share in the investor's loss, and when the investor gains the financier is only entitled to an interest payment, not a share of the gains. At the same time, most debt financing is through financial intermediaries, which may themselves face credit constraints. If a financial intermediary faces large losses on its loan portfolio in one country, it may be forced to curtail its lending activities in another country, restricting the supply of lending in the country that was unaffected by the original “shock” that led to the increase in loan losses.

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 is not present when discussing transmission through integrated credit markets, but the empirical results from this paper suggest that wealth effects tend to dominate when discussing transmission through capital markets, while balance sheet effects tend to dominate when discussing transmission through 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 capital market integration and should have a negative effect on international business cycle correlation, but at the same time, the theory predicts that credit market integration should lead to higher correlation through the balance sheet effect. [Section 3](#) presents the econometric model used to test this hypothesis and discusses the data and various econometric issues. [Section 4](#) provides 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

If investment projects in one country are partially financed by investors in another country, 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

<sup>2</sup> 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. \(2013\)](#).

<sup>3</sup> 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 \(2011\)](#).

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