Integration, decoupling and the global financial crisis: A global perspective

Miankhel, Adil Khan and Kalirajan, Kaliappa and
Thangavelu, Shandre

Australian National University, Australian National University,
National University of Singapore

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Integration, Decoupling and the Global Financial Crisis:

A global perspective

By

Adil Khan Miankhel
Research School of Economics
Crawford School of Economics and Government
Australian National University

Shandre Mugan Thangavelu
Department of Economics
National University of Singapore

Kalirajan Kaliappa
Crawford School of Economics and Government
Australian National University

Abstract

The recent global recession requires policy makers to identify the relative importance of shock transmission mechanisms in each region and devise counter policy measures against future idiosyncratic shocks. In the last decade, world dynamics have changed considerably due to increased openness and integration requiring considering business cycles at regional levels. This paper analyzes the business cycle movements of the EU, ASEAN+3, NAFTA, MERCOSUR and SAARC regions to investigate why the subprime mortgage crisis of 2007 did not spread globally compared to the crisis that began with the fall of Lehman Brothers in September 2008. Employing a Panel Vector Autoregressive framework (PVEC), this study finds that the subprime mortgage crisis shock originated in the real sector (falling US housing prices) and was transmitted through trade variables. Due to absence of short term trade variables transmission mechanism in all regions except the MERCOSUR and SAARC, the shock did not spread widely to other regions. Even in the MERCOSUR and SAARC, due to limited goods exports exposure to the US, the shock was not significant. Resultantly, these regions exhibited a decoupling phenomenon during the subprime mortgage crisis. In contrast, the second shock originated with the fall of Lehman Brothers in 2008 and was transmitted through financial variables. Due to the presence of the short term causal relationship of the financial variable with GDP in all regions except SAARC, the slowdown contagion spread to most regions. As a result, the slowdown triggered the trade variables shock transmission mechanism and the SAARC region was also affected. Consequently, a business cycle convergence phenomenon was observed in the regions. Therefore, business cycles decoupling and convergence phenomena in the regions depend not only on the origin of the shock but also on the relative importance of the transmission mechanisms in each region.

1   Introduction

The increased openness and integration across nations whether through trade liberalization or financial integration has changed world dynamics. Regional blocks are growing and new players have risen including China and India. The share of intraregional trade in world trade is more than the share of interregional trade. Europe's intraregional trade is growing faster than its external trade while in the ASEAN+3, it accounts for almost half its total trade. While MERCOSUR and SAARC have seen higher growth in their inter-regional exports compared to 2000, except for MERCOSUR, all major regions namely, EU, ASEAN+3, NAFTA and SAARC export exposure to the US has declined. Even for MERCOSUR, the proportion is not more than 20 per cent (Figure 1, Appendix). Moreover, the most significant development in the world arena was the accession of China to the WTO in 2001. Since its accession, China has increased its exports almost four times while its imports have increased three times. Some 45 per cent of its trade receipts stem from Asia while the US and European Union account for 21 per cent of its exports (WTO 2008). Given the increasing globalization, economies have enhanced their integration regionally and globally.

In this context, if economic turbulence originates from idiosyncratic shocks, so far, most research has focused on exploring whether other countries or regions are decoupled from the shock or not. However, if the disturbance is global and systemic in nature, affecting all countries at the same time, the studies focus on examining correlations among the macroeconomic variables at country or regional levels. In case of idiosyncratic shocks, the studies focus on observing the business cycle movements of countries or regions to the business cycle of the crisis affected country or region. If there is co-movement in the business cycles, then the countries or regions are said to have convergence in their business cycles. If not, then countries or regions business cycles are said to be decoupled. By focusing on outcomes and not considering transmission mechanisms, the task of designing policy for dampening the effect of shocks on a country or region's output becomes cumbersome.

Despite consensus on the spill over determinants of the business cycles that include: trade integration, financial integration, exchange rate, remittances, commodity prices and fiscal convergence, ambiguity persists on the spillover impact of these determinants on business cycle synchronization. Nevertheless, the interesting question is why the idiosyncratic shock that originated in the US in 2007 due to the subprime mortgage crisis (falling US housing prices), did not result in economic down turns in other regions compared to the US specific shock of 2008 that started with the fall of Lehman Brothers and later translated itself into global financial crisis despite the presence of the same

transmission mechanism. There may be plausible explanations regarding the spread of the shock to other regions, we hypothesize that in the case of idiosyncratic shocks, all spillover determinants of business cycles may not be relevant at the same time. Rather, the spread of contagion may depend on the origin and nature of the shock, relative importance of the transmission mechanisms and specific characteristics of each region or country due to the interplay of integration forces such as production networks[1]. To explore this, we identify the relative importance of shock propagation channels in each region and test the empirical findings for each region by observing the regions responses to the idiosyncratic shocks of 2007 and 2008.

The remainder of the paper is organized as follows: Section 2 provides a brief overview of previous studies while Section 3 sets out the methodological framework. The data sources are dealt in Section 4. Section 5 presents test results for panel unit root and panel cointegration and also traces causality and mechanism among macroeconomic variables. Section 6 provides a discussion on the results of the paper and Section 7 concludes .

2   Literature review

Apart from other explanations, we investigate, at the regional level, whether out of all the shock transmission channels, namely, trade integration, financial integration, exchange rate, remittances, commodity prices and fiscal convergence, there are any specific channels that behave like an Achilles heel for each region under different crisis scenarios. For example, the relative importance of each transmission mechanism during subprime mortgage crisis shock of August 2007 (falling US housing prices) and the shock generated with the fall of Lehman Brothers in September 2008. Due to different origins of shocks, knowing the relative importance of each channel would tell us about the special characteristics of each region (production networks) and also throw light on why the regions behaved differently to the idiosyncratic shocks of 2007 and 2008.

In the literature, there is theoretical agreement on the factors that cause movements in business cycles. However, there is no consensus on the role of these factors (channels) in bringing about convergence or decoupling among countries or regions business cycles. This is important because apart from the domestic determinants of growth such as human capital, there are exogenous channels for example FDI, exports and imports that contribute towards growth and also act in the same manner as growth destabilizing factors such as in times of crises.

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[1] However, the regional propagation dynamics may be different from the country specific channels and therefore regional and countries decoupling outcomes could be different.

Agreement is lacking among empirical theorists on the impact of international trade linkages on business cycles. Closer trade ties could result in either a tighter or looser correlation of business cycles and there will be output correlations among trading partners trading intensively (Frankel & Rose 1998; Baxter & Kouparitsas 2005). Kenen (2000) using a Keynesian model and Kose and Yi (2006) in the international business cycle model conclude a positive relationship between trade and output. Imbs (2004) finds a sizeable impact of intraindustry trade on bilateral correlations compared to the smaller inter-industry trade impact. Empirical findings also show common business cycles for the East Asian region (Sato & Zhang 2006). Shin and Sohn (2006), Rana (2006, 2007) find trade as an important determinant of business cycle synchronizations. Kumakura (2006) finds the increasing share of electronic products in foreign trade as a reason for business cycle co movements for Pacific countries while Hallet and Richeter (2008) find declining importance of the US for Asia. Arndt (2006) argues that intra industry trade in countries of the European Economic Community (EEC) was intra-industry in nature but different from production sharing as the former involved the two directional flows of finished varieties. Therefore, production sharing under a preferential trading arrangement (PTA) would be trade creating and reduce asymmetries between countries, resulting in cyclical convergence. However, the opposing view suggests that trade integration leads to more specialization based on comparative advantage in the production of goods. Consequently, the importance of asymmetric or sector specific shocks increases with economic integration leading to idiosyncratic business cycles (Krugman 1993). Hence consensus is lacking among theorists.

Financial integration also presents ambiguous theoretical support for its impact on business cycle synchronization. Imbs (2004, 2006), Inklaar et al. (2008) and Kose et al. (2003) find a positive correlation between financial integration and business cycle co-movements. However, this relationship is weak in developing countries due to a plunge in stock markets distributing negative wealth effects for asset holders around the world. Bordo and Helbling (2004) find no significant effect of financial integration. Conversely, international diversification of portfolios may allow consumption smoothening due to risk sharing that may not require diversification in production bases and may lead to greater specialization and less co-movements in business cycles (Kalemli-Ozcan et al. 2001). Kose et al. (2008) find evidence for convergence of business cycle within OECD countries and emerging countries but suggest decoupling of business cycles between these two groups. Fidrmuc et al. (2009) also find little correlation between business cycle frequencies of India and China with the OECD. Again, we observe ambiguous theoretical support for the role of financial integration in bringing about business cycle synchronization.

Regarding exchange rate volatility, Leung (1997) argues that empirical evidence has failed to show any systematic link between short-term exchange rate volatility and the volume of bilateral and multilateral trade. However she further suggests that patterns of trade could be affected by exchange rate volatility: that currency invoicing of trade matters and currency hedging provides a reasonably cost effective way of managing exchange rate volatility. McKinnon (2000) comments on the East Asian currency standards by considering the financial depth in these countries. He argues that while a common monetary standard is not as good as a common currency, however, it is preferable among close trading partners compared to (unrestricted) exchange rate flexibility. Similarly, Mundell (2000) argues that free trade areas and currency areas reinforce each other. Using a gravity equation, Rose (2000), Glick and Rose (2002), Micco et al. (2003) and Baldwin (2006) find currency unions raise bilateral trade. However, Lane and Milesi-ferretti (2007) and Cappiello et al. (2006) show greater financial integration as a result of Euro introduction. Co-movements of business cycles can also occur when a country pegs its exchange rate (Patnaik et al. 2007). We witness diverging views regarding exchange rate volatility and its impact on business cycles.

Carry trade can also be used as a speculative vehicle to transmit shocks and bring co-movements in other regions. The World Bank Global Development Finance report (2009) estimates the volume of carry trade between US$200 billion and US$1 trillion. The report suggests that carry trades keep high-yielding currencies such as the Indonesian rupee, Mexican peso, South African rand, and Brazilian real at relatively high appreciated levels. However, during the global financial crisis, sudden withdrawals from affected countries led to rapid currency depreciations as investors sought safe havens in U.S. Treasury securities. Estimates of recent losses by emerging market corporations from their foreign exchange positions exceed US$40 billion, with perhaps the largest losses in Brazil (where some 200 firms incurred losses of an estimated US$28 billion, according to Marques and Moutinho 2008), Poland (where authorities estimate total losses at US$5 billion), and the Republic of Korea (where the government had spent US$1.3 billion by January 2009 to stave off bankruptcies of firms with derivative losses) (GDF 2009).

Fiscal convergence could also lead to business cycle co-movements because of lowering country specific shocks. (Inklaar et al. 2008; Darvas et al. 2005). In the current crisis, the World Bank is of the view that stimulating aggregate demand would be helpful but countries would be reluctant to do this due to its spillover effects to other countries. However, if a country such as the US does this alone, investors will lose confidence in its fiscal sustainability and withdraw financing. These constraints can be handled through global commitment to coordinated action of fiscal expansion (GDF 2009). The World Bank GDF report (2009) also mentions commodity prices and remittances as other channels affecting   business cycle co-movements. Commodities prices affect the business cycles because a fall in consumer demand results also in a fall in commodities demand due to a cut in

investment and consumption decisions. Therefore, countries highly dependent on commodity exports are affected while in other countries, it may help to buffer the adverse impacts due to improvement in the current account because of a fall in commodity prices. Furthermore, a number of Latin American and Central American countries depended on workers remittances from the US and due to the crisis, would be hit hard, as remittances account for a significant share of GDP. Declining remittances will have marked consequences for private consumption and investment. In addition to FDI and other sources; the US, Europe and UAE have become important sources of financing through remittances for developing countries of the region. The dampening of income and investment flows is likely to slow down growth in certain regions (GDF 2009).

Regarding special characteristics of each region, for example in the ASEAN+3, the global value-chain and production networks are different from those in Europe. According to Gill et al. (2007), production networks have more extensive spread in East Asia than other regions. Gill et al. (2007) suggest the spread is due to regionalism and regionalization and note that low trade barriers, a efficient duty drawback regime for exports, encouragement of export oriented FDI, good logistics and wage differentials in the country are the result of regionalism. Furthermore, proximity to production networks, scale economies and other agglomeration economies that effect cost structure of intermediate inputs is mainly due to regionalization. Because of these processes, the economies become closely integrated and one country's income growth generates demands for parts and components in other countries in the value-supply chain. Ando and Kimura (2003) describe the production networks in East Asia as vertical intra-industry trade phenomena that involve back and forth links where several countries participate in various stages of single production chains compared to the horizontal intra-industry trade pattern in Europe. The European intra-industry trade model involves bi-directional flows of finished goods varieties. Kimura et al. (2007) further find the vertical intra industry trade in East Asia that unit prices of exports and imports differ widely. In addition, Krugman (1980) and Helpman and Krugman's (1985) well established model of intra industry trade is based on horizontal product differentiation and fits the mechanics of intra industry trade among developed countries such as the core EU countries. The fragmentation theory initiated by Jones and Kierzkowski (1990) explains the structure of production networks in East Asia.

Gill et al. (2007) assert that East Asia first integrated globally and is now increasing its share regionally. Comparative intra regional trade pattern are shown in Figure 1 (Appendix) demonstrating that intra regional trade was more developed in the regions where intra industry trade was predominant such as East Asia and the EU. Gill et al. (2007) further argue that production networks require low cost, long term financing for capital investment and short term working capital for financing trade. Moreover, production networks are exposed to currency risk when the cost structure

of different components is dependent on local currency wages and credit risk and the network comprises a large and diverse number of companies governed by different contractual agreements.

In order to find convergence or decoupling phenomenon in regions with the business cycle of the crisis originating country, we employ a Panel Vector Error Correction (PVEC) framework to explore the short and long term transmission channels in the regions. To our knowledge, this methodology has not been employed so far to investigate the convergence or decoupling in regions to idiosyncratic shocks. However, our focus will be on the short run dynamics active in each region. We draw on the basic income equation and separate the financial flows (financial integration) from real economy variables such as goods exports and services exports (trade integration) and find their short and long term affects on growth. We do not consider imports in a regional framework due to the presence of intra industry trade phenomena and one country imports are reflected in other countries exports.

We consider the growth equation with its external factors only because crisis is transmitted through them. In the manner external factors contribute in regions growth, the same way they decelerate growth. So the basic framework isolates the external factors impact on the regions business cycles in the short and long term by employing PVEC. To differentiate among the external factors, we draw on the national income identity for an open economy which is

$$Y = C + I + G + Exp - Imp \qquad (1)$$

Also

$$Y = C + S + G \qquad (2)$$

Equations (1) and (2) yields

$$S = I + Exp - Imp$$

$$NCO = \text{Net Capital outflow} = \text{Net Exports} = NX \qquad (3)$$

NX represents difference between exports and imports of goods and services. Liberalization of the capital account due to financial integration enables the free flow of capital. Besides official inflows, capital account flows include long term private capital flows in the form of FDI flows and private short term inflows in the form of portfolio equity flows and private creditors that include bond and short term debt flows. The literature lacks consensus on the growth promoting aspects of capital account liberalization. For example, Bhagwati (1998) and Rodrik (1998) found evidence against the growth promoting aspects of capital account liberalization while Borensztein et al. (1998) found positive evidence between FDI and growth. The World Bank Global Development Finance report (2001) also finds that private capital flows raise domestic investment. This association is stronger in Africa compared to East Asia and the Pacific or in Latin America and the Caribbean. Furthermore, the World Bank GDF report (2001) notes that capital flows volatility significantly dampens economic

growth and its impact was visible in the form of output and consumption shocks in East Asian countries in the aftermath of the Asian financial crisis of 1990s.

Based on above discussions, four external channels namely long term FDI, short term foreign equity and creditors' flows of world financial markets and goods and services exports in markets for goods and services influence economic growth. In order to answer why the subprime mortgage crisis did not spread to other regions compared to the global financial crisis that started with the fall of Lehman Brothers in September 2008, we need to analyze the effect of FDI, short term capital flows, services and goods exports on regions GDP in the short run and long run in a PVEC framework. However, we consider only FDI, goods and services exports in our empirical analysis due to unavailability of long time series data on short term capital flows. As our model in equation 3 shows that only four external factors can affect economic growth and if we know the relationships of three factors, any other unusual behaviour in GDP can be attributed to the fourth factor which is short term capital flows. Following this methodology, we do our empirical analysis in a PVEC framework.

In the literature we observe reverse causality among GDP, FDI, services exports and goods exports For example, we find a growth promoting role of FDI (Somwaru & Makki 2004; Easterly et al. 1995; Yanruni Wu 1999; Findlay 1978) and a negative effect on GDP growth due to a FDI crowding out effect (Charkovic & Levine 2005). Similarly, causality can be other way round as the market seeking FDI serves growing economies. There is also a two way causality discussion between exports and GDP growth such as the export led growth hypothesis (Somwaru & Makki 2004; Grossman & Helpman 1991) on one hand while GDP growth leads to export growth argument on the other hand (Jing & Marshal 1983). However, Rodrik (1995) and Rodriguez and Rodrik (1999) are critical of this relationship. On the relationship between FDI and exports, the economic literature (Petri & Plummer 1998; Gray 1998; Kjima 1973; Vernon 1966; Hsiao & Hsiao 2006; We, Wang & Liu 2001; Helpman, 1984; Helpman & Krugman 1985; UNCTAD 1996) highlights the bidirectional relationship between these variables. We take care of the reverse causality issue by estimating four equations, one for each variable. In addition, the effects of exchange rate changes can be reflected in the export figures and financial flows.

Private capital flows affect growth through three channels, namely, financial intermediation, bond markets and stock markets. The level of financial sector development can play an important role in growth through mobilization of savings, pooling of resources and risk, efficient allocation of resources, overcoming asymmetric information, and encouraging specialization in production bases and facilitating exchange of goods and services. The roles of other private capital flow channels, namely, the stock and bond markets on economic growth have also been considered empirically. Aretis et al. (2001) find from analysis of five developed countries that banks and stock markets

promote growth but banks are more important. Fink et al. (2004) analyze the role of three financial segments on growth by comparing a group of 18 developed countries and nine EU accession countries and find that transfer mechanisms for growth differ over the development cycle. They argue that domestic credit, real capital stocks along with bond markets stimulate growth in early transition while education attainment replaces domestic credit in the next stage. In the case of developed countries, none of the financial variables played a role in growth except labour participation, real capital stock and educational attainment.

However, the growth promoting aspect of capital flows have critics due to the presence of distortions in the financial system. It is assumed that capital flows to a country in search of investment opportunities and capital markets allocate resources efficiently in search of these opportunities. This role of capital flows has faced criticism from some economists such as McKinnon and Pill (1997). They point towards investors over borrowing due to overly optimism leading to the financial crisis, Dooley (1994) argues government guarantees rather than investment opportunities are the main reason. Powell (1998) highlights various forms of government guarantees such as fixed or quasi fixed exchange rates and domestic and international guarantees for financial support. Similarly Krugman (1998) and Corsetti et al. (1998) emphasize moral hazard arising due to government guarantees that results in channeling of capital flows into speculative investments. They conclude that the resultant speculative investments may not generate positive externalities in the economy and capital flows would lead to growth only if it results in productive investments that lead to positive spillovers in the real or financial sector of the economy.

The literature also tells us about output co-movements across various countries and regions. Kose et al. (2008) note differences in country coverage, sample period, aggregation methods for creating country groups and different econometric methods could lead to different conclusions and business cycle co-movements. For example, some empirical researchers find declining business cycle co-movements such as between US and other G-7 countries (Helbling & Bayoumi 2002); US and aggregate of Europe, Canada and Japan (Heathcote & Perri 2004); G-7 countries (Stock & Watson 2005); European countries (Kose et al. 2003a). However in contrast, some studies find strengthening of business cycle co-movements such as between individual countries aggregates and G-7 aggregates, (Kose et al. 2003 b); across industrialized countries (Bordo & Helbling 2003). Similarly, Hecq, Palm, and Urbain (2005) find output co movements among five Latin American countries , Brazil, Argentina, Mexico, Peru, and Chile. For NAFTA economies, Kose et al. (2004) find increase in business cycle co-movements in the last decade. Fidrmuc et al. (2008) favored decoupling hypothesis between OECD countries business cycles and India and China. Fidrmuc (2004) and Artis et al. (2008) find intra industry trade a better indicator for business cycle asymmetries than simple trade intensities. Sato and Zhang (2006) find common business cycles for East Asia. Hughes Hallet and Richter (2008)

observe decoupling of the US business cycle from Asia. Kose et al. (2008) find convergence of business cycles in OECD countries and emerging countries while decoupling evidence between the two groups.

3   Methodology

During the past two decades, linkages across countries at the regional level as well as across regions have transformed. Apart from bilateral and multilateral forces, the emergence of regional blocks and the resultant intra industry trade phenomena has been important in transforming the structure of economies at regional levels. Hence, the response of countries and regions to idiosyncratic shocks will be different. In view of the integration forces at work and to answer our question, we analyze separately the likely impact of the shock propagation mechanism on regional blocks business cycles. As the shocks under consideration are idiosyncratic having US origin and by knowing national income identity, we realize that shocks can spread to other regions through trade and financial variables affecting business cycles around the globe. Among trade variables, we consider services and goods exports due to the presence of intra industry trade in most regions and do not include imports figures as these are reflected in the export figures of trading partners. For financial variables, we include FDI only in analysis due to availability of long time series data on it. We do not consider exchange rate due to the prevalence of varying exchange rate regimes and their different behaviour to shocks but most importantly, the effect of exchange rate movement could be reflected in the trade and financial variables. Similarly we do not consider the impact of commodity prices as its effects could be reflected in the trade variables and deflating the macroeconomic variable would take care of the resultant price effect.

Drawing on the analogy of the income equation, we identify the likely short term and long term impact of goods and services exports along with FDI on the regions GDP. The idea is that these external factors contribute to growth and similarly, these variables would decelerate growth under any idiosyncratic negative shock. Therefore, if we identify these variables impact both in the short as well as long term, then we could answer our question of why the subprime mortgage crisis in 2007 did not become the global financial crisis compared to the crisis that started with the fall of Lehman Brothers in September 2008 despite having a common origin. In addition, analyzing the regional grouping would help to take care of the integration forces at work, mainly due to the presence of intra industry trade phenomena. However, the regional propagation dynamics may be different from the country specific channels and therefore regional and countries decoupling outcomes could be different.

Different methodologies have been adopted for finding co-movements of business cycles. These include dynamic correlations (Croux et al. 2001; Fidrmuc et al. 2008), dynamic factor models (Kose et al. 2008; Gregory et al. 1997) which focus on the outcome. This study differentiates the transmission channels and is interested in the relative importance of these channels in the the regions GDP. Temple (1999) while presenting cross section growth regressions as the most popular method among economists highlights problems with the approach such as parameter heterogeneity, unobserved fixed effects, measurement errors and endogeneity. Ahmed (1998) emphasizes the direction of causality and suggests that cross sectional studies are not capable of revealing the dynamic relationships necessary to establish causality. In addition, neglect of reverse causality in either the cross sectional or time series modelling framework may introduce a simultaneity bias (Gujarati 1995; Shan & Sun 1998). Wachtel (2001) favors the use of dynamic panel data (panel VARs) for taking care of the simultaneity bias. Rapach (1998) emphasizes the stationarity of variables and notes that VAR should be estimated in a covariance stationary form. However, Naka and Tufta (1997) indicate that VAR is flexible enough and when two or more variables are cointegrated, VAR can be estimated in a vector error correction presentation.

To explore the relative importance of the shock propagation mechanisms and due to prevalence of different integration processes at work in each region, we employ a Panel Vector Autoregressive framework (PVEC) to find the direction of causality among the macroeconomic variables in the short and long term for each region. The direction of causality tells us about the transmission mechanisms. However, prior to using the PVEC, we also test for panel unit-roots and panel cointegration. First, we check the stationarity of the panel through panel stationarity techniques. If stationarity is not achieved at levels, then first differencing of the variables is done. After conducting panel stationarity tests, we apply the panel cointegration to find the long run relationship between goods exports, services exports and FDI with regional GDP. After finding evidence of the long run relationship as a result of the panel cointegration technique, we adopt the PVEC to find the direction of causality among the macroeconomic variables in the short and long term.

4   Data

Six regions namely the European Union (EU), Association for South East Asian Nation Plus three (ASEA+3), the South Asia Association for Regional Cooperation (SAARC), the North America Free Trade Area (NAFTA) and the Southern Common Market (MERCOSUR) have been included in the analysis. In our study, the EU includes Turkey, Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. The ASEAN +3 is

comprises China, Hong Kong, South Korea, Cambodia, Indonesia, Malaysia, the Lao People's Democratic Republic, Myanmar, the Philippines, Singapore, Thailand, Vietnam and Japan. NAFTA has three members namely the United States, Canada and Mexico while seven countries namely India, Pakistan, Bangladesh, Sri Lanka, Bhutan, Nepal and the Maldives have been included for analysis purposes. For our analysis, the MERCOSUR region comprises Argentina, Brazil, Paraguay, Uruguay, Bolivia, Peru, Chile, Colombia and Venezuela.

The data are collected from UNSTAT, UNCTAD Handbook 2008. The variables are defined in real values by deflating to 1990 prices using GDP deflators. The data cover the period 1980 to 2007. All variables are expressed in logs. For this study, 27 observations are sufficient time series to detect both the short- and long-run relationships of the FDI, goods exports, services exports and GDP growth.

5 Results

5.1 Unit Root Tests

Examination of the time series properties of the data is an important step in the empirical analysis for correct specification in the model and to avoid the risk of spurious regression. The motivations cited for testing stationarity in panel data instead of single time series are: the increase in power of the test with an increase in the number of cross sections, obtaining test statistics asymptotic normal distributions for generally encountered sample sizes and moments of asymptotic distributions are derived exactly without simulations (Hadri 2000). Campbell and Perron (1991) also highlight the limiting power of the unit root tests against the alternative of highly persistent deviations from equilibrium in the finite samples particularly small samples. In addition, due to a small time dimension of the most panels in empirical analysis, models with assumptions of homogeneous dynamics have been emphasized. However, with the recent shift of focus towards 'pseudo panels' with dynamic heterogeneous panels, the assumption of homogeneous dynamics has been questioned and inconsistency of pooled estimators has been demonstrated by Pesaren and Smith (1995), and Pesaren et al. (1996) (Im, Pesaren & Shin 2003).

Different panel unit root tests have been proposed under varying assumptions. For example, Quah (1992, 1994) devised a panel root test based on the assumption that data are identically distributed across individuals and do not accommodate heterogeneity across groups such as individual fixed effects or different patterns of residual serial correlations (Im, Pesaren & Shin, 2003). Similarly Breitung and Meyer (1991) derived Dickey-Fuller test statistics with asymptotic normality based on large cross sections and small time dimensions as long as the pattern of serial correlation is identical across individuals but cannot be extended to panels with heterogeneous errors (Levin, Lin & Chu

2002). However the test proposed by Levin, Lin and Chu (2002) allows for individual specific intercepts, time trends along with error variance and permitting patterns of higher order serial correlations to vary among individuals. The null hypothesis in this test considers each individual time series having a unit root against the alternative that each time series is stationary. The limitation of this test includes the assumption of cross sectional independence that does not take into account cross sectional correlation and all cross sections are identical with regard to the presence or absence of unit roots. Furthermore, this panel based unit root test is relevant for panels of moderate size such as individuals having more than 25 time series dimensions (Levin, Lin & Chu 2002).

Instead of Levin, Lin and Chu's (2002) assumption that all individuals are identical with respect to presence and absence of unit root; Im, Pesaran and Shin (2003) propose an alternate testing procedure based on averaging of individual (augmented) Dickey-Fuller (1979) statistics computed for each group in the panel that has standard normal distribution so long as T>5. They also suggest more general test statistics where errors may be serially correlated with different serial correlation patterns across groups, panel with T and N dimensions sufficiently large and to unbalanced panels and dynamic panels with intercepts and trends. Unlike the test statistics discussed earlier, another test statistics proposed by Hadri is based on the null hypothesis of stationary against the alternative of having a unit root. This test statistic can be applied to panel data models with large T and moderate N with fixed effects, the individual deterministic trend and heterogeneous across cross sections but serially uncorrelated errors over time and can be widely used for Penn World Tables, having time series component that are nonstationary (Hadri 2000).

There are five regions in this analysis, having different countries composition as well as cross sectional independence due to the presence of intra industry trade phenomenon. We identify the tests of Levin, Lin and Chu (2002); Im, Pesaran and Shin (2003) and Hadri (2000) as the most relevant to analyze the stationarity time series property of regions panel data. Some of the panels may have missing observations. The time period ranges from 1980 to 2007 and can be analyzed under the above tests. The test results of all six regional panels for GDP, FDI, Goods exports and Services exports variables are given in Table 1(Appendix) that show stationarity in all variables after first differencing.

5.2   Cointegration Tests

As modeling first differences alone ignores common trends, Granger discovered in 1983 that in certain situations, I (1) non stationary variables may have linear combination of I (0) which he called cointegrated variables. Furthermore, I (1) variables have an error correction mechanism (Engle & Granger 1987) that compels them to establish long run relationships. After that the cointegration testing techniques became widely used for finding the long run relationship among the I (1) variables.

After confirming that it is the span of data rather than frequency that matters for the power of tests (Perron 1989,1991; Pierse & Snell 1995), the risk of introducing regime changes by including long time series in data analysis forced the alternative of bringing in similar additional cross sectional data for a common cointegration hypothesis instead of long time series. However, under these circumstances, the existing Johansen (1988, 1991) cointegration technique may be not useful and panel methods may be more practical (Pedroni 2004). In addition, in order to handle the issue of bias generated by regressors endogeneity, Kao (1999) devised a test under the null of no cointegration that adjusted for a bias term but both slope and short run dynamics were constrained to be homogeneous among panel members. However, true slopes vary across panels.

For practical reasons, Pedroni (2004) proposed a residual based test statistics for the null of no cointegration that allowed for heterogeneity by having varying slope coefficients among members of the panels in addition to permitting for the regressors to be endogenous. Furthermore, allowance has been made for cointegrating vectors to be different among panel members. The test considers two classes of statistics; 'within dimension of panel' and 'between dimensions of panel'. The former is based on pooling of regression residuals within the panel dimension while the later pools the regression residuals between the dimensions of the panel. To construct test statistics in both cases, the residuals are obtained from the cointegration equation of panel member as a first step. As a second step, various test statistics are constructed according to different ways of pooling of estimated residuals. For example, 'panel-rho' and 'panel-variance ratio' are both semi parametric statistics and the large negative value for panel-rho statistics and large positive values for panel-v statistics indicate rejection of the null hypothesis of no cointegration under the test (Pedroni 2004).

In order to find long run relationships among GDP, FDI, goods exports and services exports variables through the panel cointegration technique, we apply the Pedroni cointegration test (2004) for GDP, FDI, goods and services exports. The explanation is that these variables are endogenous and also the regional groupings comprising various countries permit consideration of heterogeneous slope among panel members. The panel cointegration test is conducted with and without deterministic heterogeneous trend. Out of seven panel cointegration statistics, the three summary statistics of the Pedroni (2004) cointegration test on six regions, namely; panel-v statistics, panel-ρ statistics and group-ρ statistics are reported in Table2 (Appendix). The test statistics for all regions show that there are very weak long run relationships among the variables in all regions as panel-v statistics are highly significant in all regions thus rejecting the null hypothesis of no cointegration when the test is conducted under allowing for heterogeneous intercept and deterministic trend.

5.3   Causality and Mechanisms Results

After finding very weak long run relationships among GDP, FDI, goods exports and services exports under the Pedroni (2004) panel cointegration test, we find the mechanisms among variables as the causality may be running in one or all possible directions. Then, we can identify the relative importance of each transmission channel in each region because once identified, the same channels will serve as the shock propagation mechanism in times of the idiosyncratic crisis. From the panel unit root tests for each region in Table 1, we observe that each variable is non stationary at levels in most cases, but together weakly cointegrated, as we observed under the Pedroni panel cointegration test. Moreover, as already stated, the Granger representation theorem (Engle & Granger 1987) claims that I(1) variables have an error correction mechanism that forces them to establish a long run relationship. Furthermore, as we undertake our empirical analysis under the PVEC framework for different regions, we assume that region specific integration forces have transformed the region significantly during the liberalization process and marginal effects do not vary within each region's panel. Therefore, we estimate our PVEC model under a fixed effect framework. Furthermore, for finding the relative importance of shock propagation mechanisms in the short and long run, we test for short- and long-run causality in the panel vector error-correction mechanism (PVEC) model given as:

$$\Delta y_{it} = \quad \alpha_i + \beta\, ec_{i,t-1} + \sum_{j=1}^{p} \gamma_j\, \Delta y_{i,t-j} + \sum_{j=1}^{p} \delta_j\, \Delta x_{i,t-j} + \varepsilon_{1it} \tag{4}$$

We analyze the impact of the macroeconomic variables in the short and long run along with direction of causality. First, we estimate the error correction mechanism from the cointegrating relationship ($ec_{i,t-1} = y_{it-1} - \alpha_i - \delta_{i,j} x_{i,t-1}$) then, we estimate the PVEC for each variable (Equation 1). In the general PVEC model, the β parameter captures the long-run dynamics in the system of equations for each variable (GDP, FDI, goods exports, services exports) which is distinct from the δ_j coefficients signifying the short run dynamics.

To analyze the short term impact along with the causality of these variables on each other, the basic econometric framework requires estimation of four equations for each region (GDP, FDI, goods exports and services exports as dependent variables). To assess the impact of each variable on the dependent variable in the short run, we employ the chi square Wald test on the joint significance of independent variables. For example, the short-run causality from x_i to y_i is given by the joint wald test of $\sum_{j=1}^{p} \delta_j = 0$. The estimation results have been reported in Table 3 (Appendix).

The short run analysis shows that in MERCOSUR and SAARC only, the goods exports variable has a causal relationship with GDP growth while none of the trade variable (goods exports and services exports) influences GDP growth in other regions. More importantly, in the short run, there is empirical evidence of the long term financial flows channel 'FDI' causal relationship with GDP in the EU, MERCOSUR. However, in the ASEAN+3 and NAFTA, there is neither FDI nor trade variables short term causal relationship with GDP. National Income identity in equation 3 shows that four external channels namely long term FDI, short term foreign equity and creditors' flows, goods and services exports influence economic growth. Therefore, knowing the relationships of three factors, any other unusual behaviour in GDP can be attributed to the fourth factor which is short term capital flows. Table 8 (Appendix) shows decline in the ASEAN and NAFTA GDP in 2008 and 2009 which is attributed to the short term capital flows and is justified in Table 7 (Appendix). In short, financial flows has short term causal relationship with GDP in the EU, the ASEAN+3, NAFTA and MERCOSUR.

This general PVEC model(Equation 1), β parameter captures the long-run dynamics in the system of equations for each variable (GDP, FDI, goods exports, services exports) The error term given by $\beta \, ec_{i,t-1} = \beta \, (y_{it-1} - \alpha_i - \delta_{i,j} x_{i,t-1})$ in the equation generates forces for attaining long run equilibrium. Therefore in a cointegrated framework, at least one of the β parameter should be significant. The long run relationship is established by the joint significance of the error correction parameter and the parameters in the respective cointegrating vectors. The test results for establishing long run dynamics are reported in Table 4 (Appendix). The analysis shows that in the ASEAN+3 and the EU, trade variables (goods and services exports) and FDI have a long run causal relationship with GDP. However in the case of NAFTA and MERCOSUR, only goods exports affect GDP in the long run while in SAARC it is services exports. More importantly, the numbers of relationships are more in the regions where an intra industry trade phenomenon is pronounced such as in the ASEAN+3 and the EU.

As we try to analyze the impact of the financial crisis on regions, the transmission mechanisms in the short run are more significant from the policy perspective. Our empirical analysis demonstrates that any idiosyncratic shock transmitted through goods exports will affect GDP growth in MERCOSUR and SAARC only while the rest of the regions will exhibit the decoupling phenomenon. On the other hand, the shocks transmitted through the long term financial flows channel 'FDI' will affect the GDP of EU, ASEAN+3, MERCOSUR and NAFTA. SAARC seems to be insulated from long term financial flow shocks. Additionally, the transmission variable impact level on each region's GDP will depend on the level of each region's exposure in the shock transmitting variable to the shock originating country as well as the spillover effects coming from other regions. For example if the negative shock originated in the financial sector in the US, it will affect other regions GDP that

exhibit the short term causal relationship between the financial channel such as FDI with GDP and spillover effects generated by the dampening of the other regions outputs. Figure 1 (Appendix) illustrates the level of each region's goods exports exposure to the US.

6   Discussion

We claim that business cycles convergence or the decoupling phenomena in regions subject to idiosyncratic disturbances depend on the relative importance of the shock propagation mechanisms in regions and whether the shock is transmitted through trade or financial variables. The response of each region may be different depending on the integration forces at work in each region. In addition, country wise responses may be different from regions responses as these depend on the type of integration forces at work and the position of the country on the intra industry trade ladder. So while observing regions responses to two shocks (subprime mortgage crisis, fall of Lehman brothers), two considerations have to keep in mind. First, in order to answer our question, we focus on short run dynamics due to the short duration between the two shocks. Second, we find the impact of short term capital flows by relying on national income identity and for long term capital flows by considering FDI causal relationship with other macroeconomic variables in a PVEC framework. Both short term and long term capital flows will convey information about financial shock transmission mechanisms in each region.

Without any ambiguity, integration forces have changed the regional dynamics especially the EU and the ASEAN+3 (Figure 1, Appendix). Since 2000, except for the NAFTA and MERCOSUR, intraregional trade has increased in other regions. There has been significant progress in the ASEAN+3 where with the entry of China to the WTO in 2001, its intraregional goods trade grew to 48.5 per cent compared to 42.5 per cent. In the EU, the level of intraregional trade stands almost the same at 68 per cent of total trade. The other major development is that except for MERCOSUR, all regions have lessened their exposure to the US market compared to 2000. So except for MERCOSUR and SAARC, intraregional trade is the dominant phenomenon.

We know that two shocks occurred, one in the latter part of 2007 during the subprime mortgage crisis (falling US housing prices) and the second in September 2008 with the fall of Lehman Brothers. Table 5 (Appendix) shows that the shock that originated due to the subprime mortgage crisis in 2007 was idiosyncratic in nature because it originated in the US. As a result, the fall in US real GDP and domestic demand was considerable compared to the advanced economies and Euro area. As highlighted in Table 6 (Appendix), despite the contraction of global trade volumes, the US slowdown did not significantly affect advanced countries or emerging and developing countries exports.

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Furthermore, positive terms of trade were observed in 2007. Our empirical analysis demonstrates that in the short run, goods exports will affect the regions GDP only in MERCOSUR and SAARC and that too depends on the level of exposure to the crisis country. In the case of the US, MERCOSUR and SAARC export goods not more that 20 per cent as shown in Figure 1(Appendix).

The other transmission mechanism that could affect the regions GDP is the financial transmission mechanism. Table 7 (Appendix) shows that both short term and long term capital flows in absolute terms have increased in the major groupings around the world. Overall, except NAFTA, all major regions experienced modest growth in 2007 as shown in Table 8 (Appendix) because negative shock came through the fall in goods exports to the US that could affect only MERCOSUR and SAARC regions GDP in the short run. However, given the low level of exposure of these regions to the US economy in goods exports, these regions maintained modest growth in 2007. Therefore, the level of co movements of the business cycles of the regions with the US in 2007 was very low and some regions exhibited the decoupling phenomenon.

However, the story is different in 2008 when the second idiosyncratic shock originated with the fall of Lehman Brothers. The shock originated in the financial sector in the US that triggered the sharp reversal of financial flows from each region as shown in Table 7 (Appendix). However, Private Direct Investment showed laggard reversal movements due to its long term nature compared to other financial flows in 2008, but again joined the momentum with other financial flows in 2009. Our empirical analysis illustrates, the reversal of financial flows could affect negatively the regions GDP in the case of the EU, ASEAN+3, NAFTA and MERCOSUR. As can be seen in Table 5 (Appendix), the advanced economies, the US and the Euro Area saw a dramatic decline in their real GDP and domestic demand in 2008. The situation deteriorated in 2009. As a result, advanced economies and emerging and developing economies experienced a sharp fall in trade flows in 2008 and 2009 as Table 6 shows. As observed before, the goods exports variable shock transmission mechanism affects only SAARC and MERCOSUR GDP in the short run. Therefore in MERCOSUR, in addition to the goods exports variable, the financial flows variable also has short term causal relationship with GDP due to which MERCOSUR can be severely affected. Table 8 (Appendix) demonstrates that all regions GDP slowed in 2008 and worsened in 2009 when all types of financial flows were exhibiting reversal signs in unison. Therefore, in 2008, when the shock originated in the financial sector, most regions exhibited co movements of the business cycles highlighting the relative importance of the shock propagation mechanism and the nature of origin.

7   Conclusion

The world has changed considerably in the last two decades. Economies have integrated regionally and globally. The major regions such as the EU, ASEAN+3 and NAFTA are now trading more intra regionally than inter regionally while this is not the case for MERCOSUR and SAARC. The primary reason for the former countries trading more with each other is the presence of the intra industry trade phenomenon. Therefore, the response of each region to any idiosyncratic shock such as the current global financial crisis will be different and will depend on the special characteristics of the region and the transmission mechanism through which the shock is propagated. Trade and financial integration have been identified as the two most important idiosyncratic shock propagating mechanisms. Therefore, each region's business cycle co-movement will depend on the type of linkage with the idiosyncratic shock origin country.

We find that the global financial crisis which started in 2007 was due to idiosyncratic shocks generated in the US because of the 2007 subprime mortgage crisis (falling US housing prices). The shock originated in the real sector and was transmitted through trade variables. Empirically, only MERCOSUR and SAARC regions GDP has a causal short term relationship with goods exports and any negative goods exports shock affects only these two regions GDP and that too depends on the level of exposure to the shock originating country. Due to the limited goods exports exposure of these regions to the US, these regions may exhibit the decoupling phenomenon to the subprime mortgage crisis shock Furthermore, due to the absence of the causal short term relationship between goods exports and GDP; the other regions may demonstrate decoupling with the US business cycle. On the other hand, the shock generated with the fall of Lehman Brothers in September 2008 was different in nature and was transmitted through financial variables. The empirical analysis shows that in the EU, ASEAN+3, NAFTA and MERCOSUR, the financial variable has a short term causal relationship with regions GDP. As the reversal of financial flows took place with the fall of Lehman Brothers, most regions showed business cycles synchronization with the US business cycle. In the EU, ASEAN+3, NAFTA and MERCOSUR, GDP has the short term causal relationship with financial variable and any reversal in financial flows could affect the regions GDP negatively. The resultant negative growth in GDP in these regions could again trigger the goods exports shock transmission mechanism and could negatively affect GDP growth in SAARC and MERCOSUR. Therefore, due to the 2008 crisis, we could experience convergence in business cycles of the major regions in contrast to the 2007 shock.

Decoupling and convergence in business cycles depends not only on the origin of the idiosyncratic shocks, whether originates in the real sector or financial sector, but also on the transmission mechanisms through which shocks are transmitted. Knowing the relative importance of the shocks

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propagating mechanisms has important policy implications not only in the form of timely devising the policy to stave off recessionary impacts but also in strengthening the buffers to insulate regions from future idiosyncratic shocks. Due to the integration process in the regions, the importance of trade channels in transmitting idiosyncratic shocks from the major economies such as US has lessened. On the other hand, the recent shock has reemphasized financial variables as the most significant channels for idiosyncratic shock transmissions. Knowing the correct transmission mechanism will help in tailoring an appropriate response to the idiosyncratic disturbance and is helpful in achieving the long term regional development goals.

Appendix

Table 1 **panel unit root tests**

Gross Domestic Product (GDP)			Level		Ist Difference	
			Individual intercept	Individual intercept and trend	Individual intercept	Individual intercept and trend
European Union	Null: Unit Root	Levin, Lin, Chin (t stat)	2.15	-2.16**	-7.2***	-3.63***
		Im, Pesaren and Shin W-Stat	8.25	-2.04**	-8.9***	-5.39***
	Null: Stationary	Hadri	15.21***	8.02***	3.85***	4.5***
ASEAN +3	Null: Unit Root	Levin, Lin, Chin (t stat)	0.72	1.37	-7.49***	-6.7***
		Im, Pesaren and Shin W-Stat	4.92	2.09	-8.16***	-8.38***
	Null: Stationary	Hadri	12.02***	8.07***	3.86***	1.87**
NAFTA	Null: Unit Root	Levin, Lin, Chin (t stat)	0.42	0.52	-6.61***	-6.2***
		Im, Pesaren and Shin W-Stat	3.08	-1.8**	-5.4***	-4.65***
	Null: Stationary	Hadri	5.8***	2.7**	-0.36	0.97
MERCOSUR	Null: Unit Root	Levin, Lin, Chin (t stat)	4.6	-1.32	-5.5***	-3.95***
		Im, Pesaren and Shin W-Stat	7.02	-3.1**	-6.37***	-5.27***
	Null: Stationary	Hadri	9.5***	4.1***	0.92	0.92
SAARC	Null: Unit Root	Levin, Lin, Chin (t stat)	3.67	1.91	-3.53**	-3.62***
		Im, Pesaren and Shin W-Stat	6.01	3.18	-3.45**	-4.89***
	Null: Stationary	Hadri	9***	4.53***	0.96	0.9
Foreign Direct Investment(FDI)						
European Union	Null: Unit Root	Levin, Lin, Chin (t stat)	-2.2**	-5.11***	-18.87***	-13.76***
		Im, Pesaren and Shin W-Stat	-1.13	-3.9***	-17.3***	-11.76***
	Null: Stationary	Hadri	14.4***	6.82***	1.65**	4.45***
ASEAN +3	Null: Unit Root	Levin, Lin, Chin (t stat)	-1.63*	3.28	-14.89***	-9.63***
		Im, Pesaren and Shin W-Stat	-0.74	-1.33*	-15.17***	-11.55***
	Null: Stationary	Hadri	10.87***	6.31***	-0.75	0.94
NAFTA	Null: Unit Root	Levin, Lin, Chin (t stat)	-1.1	-2.13**	-6.9***	-6.08***
		Im, Pesaren and Shin W-Stat	-0.1	-2.3**	-6.91***	-5.74***
	Null: Stationary	Hadri	5.31***	0.35	-0.17	2.88**
MERCOSUR	Null: Unit Root	Levin, Lin, Chin (t stat)	-1.98**	-1.11	-8.11***	-6.39***
		Im, Pesaren and Shin W-Stat	-0.21	-1.42*	-10.05***	--6.58***
	Null: Stationary	Hadri	7.38***	3.18***	1.23	5.73***
SAARC	Null: Unit Root	Levin, Lin, Chin (t stat)	-0.72	-2.85**	-9.65***	-11.44***
		Im, Pesaren and Shin W-Stat	0.26	-2.53**	-8.39***	-5.77***
	Null: Stationary	Hadri	6.56***	4.37***	4.17***	15.64***
Goods Exports						
European Union	Null: Unit Root	Levin, Lin, Chin (t stat)	1.3	-5.69**	-16.65***	-16.35***
		Im, Pesaren and Shin W-Stat	5.2	-1.98**	-13.61***	-7.67***
	Null: Stationary	Hadri	14.01***	7.84***	2.11**	4.77***
ASEAN +3	Null: Unit Root	Levin, Lin, Chin (t stat)	1.31	-0.61	-13.34***	-11.71***
		Im, Pesaren and Shin W-Stat	6.14	-0.58	-13.06***	-10.69***
	Null: Stationary	Hadri	11.64***	5.98***	1.33*	6.08***
NAFTA	Null: Unit Root	Levin, Lin, Chin (t stat)	0.2	-0.5	-4.8***	-4.26***
		Im, Pesaren and Shin W-Stat	1.18	-1.55*	-3.56***	-2.46***
	Null: Stationary	Hadri	5.47***	0.52	-0.67	0.66
MERCOSUR	Null: Unit Root	Levin, Lin, Chin (t stat)	2.61	-0.82	-12.42***	-9.42***
		Im, Pesaren and Shin W-Stat	3.85	0.17	-11.9***	-10.08***
	Null: Stationary	Hadri	7.43***	6.38***	2.67**	1.5*

SAARC	Null: Unit Root	Levin, Lin, Chin (t stat)	0.75	0.1	-10.84***	-9.4***
		Im, Pesaren and Shin W-Stat	3.09	-1.17	-10.64***	-9.32***
	Null: Stationary	Hadri	8.68***	3.87***	0.07	2.71**
Services Exports						
European Union	Null: Unit Root	Levin, Lin, Chin (t stat)	2.97	-2.66**	-15.82***	-14.69***
		Im, Pesaren and Shin W-Stat	5.34	-1.64**	-13.93***	-8.96***
	Null: Stationary	Hadri	14.95***	10.28***	5.35***	5.47***
ASEAN +3	Null: Unit Root	Levin, Lin, Chin (t stat)	-1.23	-1.7**	-10.38***	-7.94***
		Im, Pesaren and Shin W-Stat	2.68	-0.46	-10.06***	-8.06***
	Null: Stationary	Hadri	10.87***	5.52***	0.89	3.38*
NAFTA	Null: Unit Root	Levin, Lin, Chin (t stat)	-1.97**	0.71	-3.24**	-1.48**
		Im, Pesaren and Shin W-Stat	-1.04	1.02	-3.86**	-3.2***
	Null: Stationary	Hadri	5.43***	3.12**	0.2	1.73**
MERCOSUR	Null: Unit Root	Levin, Lin, Chin (t stat)	-0.5	-1.88**	-14.05***	-12.2***
		Im, Pesaren and Shin W-Stat	0.89	-1.21	-12.13***	-10.96***
	Null: Stationary	Hadri	7.34***	6.35***	1.82**	1.7**
SAARC	Null: Unit Root	Levin, Lin, Chin (t stat)	2.96	-0.44	-9.27***	-7.89***
		Im, Pesaren and Shin W-Stat	3.79	-0.96	-8.24***	-4.6***
	Null: Stationary	Hadri	8***	4.53***	1.74**	3.55***

Note: *, **, *** represent significance level at 10%, 5% and 1% respectively. Also high autocorrelation leads to severe size distortion in Hadri test leading to over-rejection of null.
Source: Author's estimations.

Table 2 **Results of panel cointegration**

Null Hypothesis: No cointegration (Pedroni Residual Cointegration Test)						
	Heterogeneous intercept			Heterogeneous intercept and Trend		
	Panel v-stat	Panel ρ-stat	Group ρ-stat	Panel v-stat	Panel ρ-stat	Group ρ-stat
European Union	-0.26	2.87	5.18	5.41***	6.09	7.04
ASEAN +3	-0.28	3.24	4.39	7.24***	4.83	5.67
NAFTA	-0.36	1.24	2.31	8.59***	0.73	1.29
MERCOSUR	0.27	0.74	2.12	2.1**	2.33	3.2
SAARC	1.27	1.94	3.27	20.93***	3.04	4.06

Note: *, **, *** represent significance level at 10%, 5% and 1% respectively**.**

Table 3 **Short run dynamics**

	European Union	ASEAN+3	NAFTA	MERCOSUR	SAARC
GDP as dependant variable					
$\Delta FDI \rightarrow \Delta GDP$	0.002*	0.002	-0.005	0.01**	0
$\Delta X_{goods} \rightarrow \Delta GDP$	0.006	-0.01	0.06	0.04**	0.03**
$\Delta X_{services} \rightarrow \Delta GDP$	-0.003	-0.001	-0.09	0	-0.02
FDI as dependent variable					
$\Delta GDP \rightarrow \Delta FDI$	-1.22	-0.77	2.69	0.56	4.11
$\Delta X_{goods} \rightarrow \Delta FDI$	-0.02	0.24	1.03	0.24	-0.54
$\Delta X_{services} \rightarrow \Delta FDI$	0.35	-0.004	-3.82	0.19	-0.61
Goods exports as dependent variable					
$\Delta GDP \rightarrow \Delta X_{goods}$	0.85**	0.09	0.3	-0.21	-0.42
$\Delta FDI \rightarrow \Delta X_{goods}$	-0.01**	-0.03**	0.05**	-0.03**	0
$\Delta X_{services} \rightarrow \Delta X_{goods}$	0.03	-0.01	-0.53	0.07	-0.07
Services exports as dependent variable					
$\Delta GDP \rightarrow \Delta X_{services}$	0.16	-0.76	-0.27	0.37	-0.33
$\Delta FDI \rightarrow \Delta X_{services}$	-0.01	-0.02	0.03**	-0.02	0
$\Delta X_{goods} \rightarrow \Delta X_{services}$	0.26**	-0.08	0.22	-0.11	-0.02

Note: *, **, *** represent significance level at 10%, 5% and 1% respectively**.**

Source: Author's estimations.

Table 4 **Long run dynamics among variables**

	European Union	ASEAN+3	NAFTA	MERCOSUR	SAARC
GDP as dependant variable					
Error Correction Term (ec_{it-1})	-0.99***	-0.07***	-0.32**	-0.11**	-0.09**
FDI→GDP	-0.009***	-0.01**	0.005	0.001	-0.01
X_{goods} →GDP	0.19***	0.3***	-0.09**	0.13**	0.006
$X_{services}$ →GDP	0.13***	0.09*	0.007	0.06	0.16**
FDI as dependent variable					
Error Correction Term (ec_{it-1})	-0.09	-0.44***	-1.04	-0.18	-0.92
GDP→FDI	-1.67**	-0.95*	1.38	0.12	-1.48**
X_{goods} →FDI	0.6**	0.39	0.1	0.03	2.92***
$X_{services}$ →FDI	0.9***	0.68**	0.33	-0.01	0.49*
Goods exports as dependent variable					
Error Correction Term (ec_{it-1})	0.147	0.55	0.08	0.04	-0.19
GDP→ X_{goods}	1.13***	1.14***	-2**	0.78**	0.02
FDI → X_{goods}	0.02**	0.02	0.008	0.002	0.01***
$X_{services}$ → X_{goods}	0.1**	0.14**	-0.21	0.51***	0.2**
Services exports as dependent variable					
Error Correction Term (ec_{it-1})	0.49***	0.03**	0.19	0.08	0.5
GDP → $X_{services}$	1.31***	0.79**	0.25	0.43	1.22***
FDI → $X_{services}$	0.05***	0.11**	0.04	0	0.03
X_{goods} → $X_{services}$	0.17**	0.32**	-0.37	0.61***	0.37**

Note: *, **, *** represent significance level at 10%, 5% and 1% respectively**.**
Source: Author's estimations.

Table 5 **Gross domestic product (GDP), domestic demand and private expenditure,** (real, per cent change)

	Annual				Fourth Quarter	
	2006	**2007**	**2008**	**2009**	**2008**	**2009**
Real GDP						
Advanced Economies	3	2.7	0.9	-3.8	-1.7	-2.6
United States	2.8	2	1.1	-2.8	-0.8	-2.2
Euro Area	2.9	2.7	0.9	-4.2	-1.4	-3.5
Domestic Demand						
Advanced Economies	2.8	2.3	0.4	-3.3	-1.6	-2.4
United States	2.6	1.4	-0.3	-3.3	-1.9	-2.3
Euro Area	2.8	2.4	0.9	-2.9	-0.1	-3.2

Source: World Economic Outlook (WEO, April 2009)

Table 6 **Summary of trade in goods and services**
 (volumes, annual per cent change)

		Trade	**Exports**	**Imports**	**Terms of Trade**
World	2006	9.2	-	-	-
	2007	7.2	-	-	-
	2008	3.3	-	-	-
	2009	-11	-	-	-
Advanced Countries	2006	-	8.5	7.6	-1.1
	2007	-	6.1	4.7	0.4
	2008	-	1.8	0.4	-2
	2009	-	-13.5	-12.1	1.5
Emerging and Developing Countries	2006	-	10.9	13.2	4.1
	2007	-	9.5	14	1.2
	2008	-	6	10.9	4.4
	2009	-	-6.4	-8.8	-8

Source: World Economic Outlook (WEO, April, 2009).

Table 7 **Emerging and developing economies** (US$ billions)

|		2006	2007	2008	2009
Emerging and Developing Economies	Private Direct Investment, net	241.4	359	459.3	312.8
	Private Portfolio Flows, net	-100.7	39.5	-155.2	-234.5
	Other Private Capital Flows, net	62.2	219.2	-194.6	-268.5
Central and Eastern Europe	Private Direct Investment, net	58.9	72	64.1	30.1
	Private Portfolio Flows, net	9.4	-7.4	-13.2	-6.1
	Other Private Capital Flows, net	51.7	108.9	96.2	-62.2
Emerging Asia including Newly Industrialized Asian Economies	Private Direct Investment, net	20.7	138.5	222.6	161.6
	Private Portfolio Flows, net	12.9	11.2	-65.9	-192.1
	Other Private Capital Flows, net	21.5	15.2	-28.7	-16.3

Source: World Economic Outlook (WEO, April, 2009).

Table 8 **Regions gross domestic product (GDP) growth rates** (annual per cent change)**, constant prices** (national currency)

Region	2007	2008	2009	Countries showing negative growth rates in 2008
EU	4.13	1.58	-4.3	Denmark, Ireland, Italy, Portugal, Sweden
ASEAN+3	7.47	4.25	0.3	Japan
NAFTA	2.67	0.73	-4.18	NA
MERCOSUR	6.97	5.89	-0.75	NA
SAARC	6.42	5.64	3.45	NA

Source: World Economic Outlook (WEO, October, 2009) and author's calculations (Direction of Trade, IMF).

Figure 1 **Share of export   to intra region and the US** (per cent of total exports)
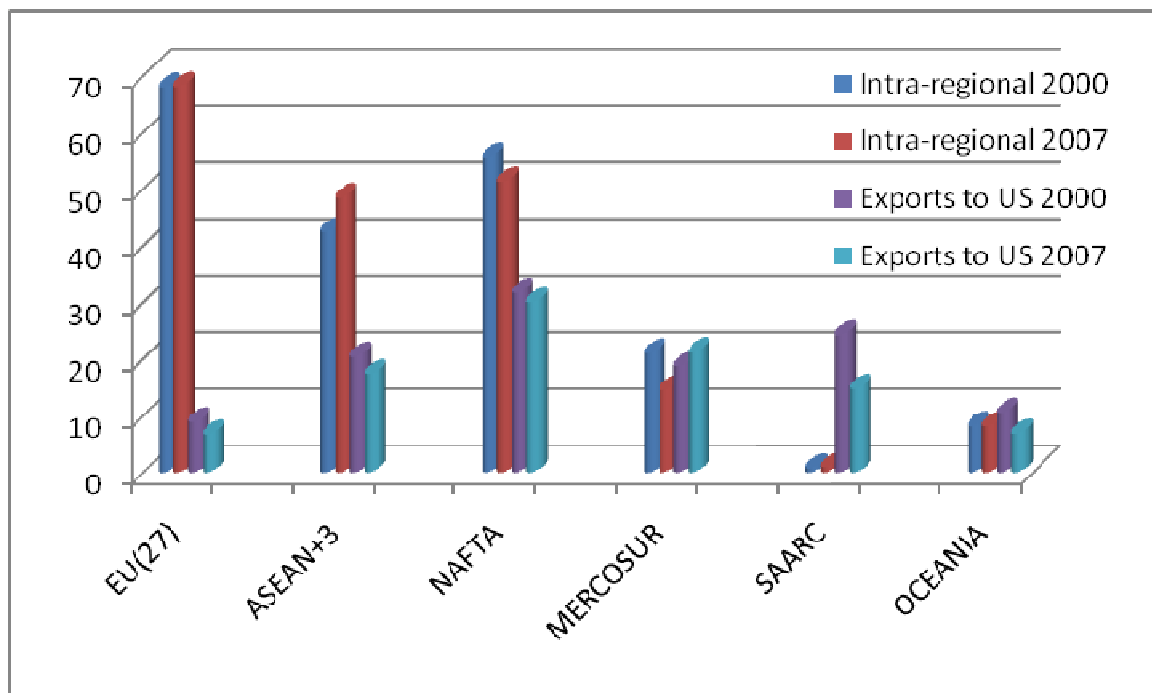
Source: Author's calculations

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