International integration from capital flow and regional trade agreement perspectives

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2010

Dang, N. V. (2010). International integration from capital flow and regional trade agreement perspectives. Doctoral thesis, Nanyang Technological University, Singapore.

<https://hdl.handle.net/10356/41684>

<https://doi.org/10.32657/10356/41684>

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International Integration from Capital Flow and Regional Trade Agreement Perspectives

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School of Humanities and Social Sciences

A thesis submitted to the Nanyang Technological University
in fulfillment of the requirement for the degree of Doctor of Philosophy

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Acknowledgement

My sincere thanks go to NTU for offering me the opportunity to stay and work in the beautiful campus, which no doubt will leave a pleasing memory in me for the rest of my life. I am tremendously grateful to the School of Humanities and Social Sciences and the Economics Division at NTU for all the amenable facilities and academic events that all contribute to the completion of my Ph.D. research while at NTU. The fulfillment of my Ph.D. research would be impossible without the guide and supervision from Professor Shahidur Rahman, whom I owe a special thank. I sincerely thank Professor Liu Yunhua and Professor Yothin Jinjark for the constructive and helpful comments to my first draft. I am also deeply grateful to Professor Yothin Jinjark and Professor Choy Keen Meng for the time I consulted them and their hints for developing my research ideas.

Last but not least, I thank my family for all their love, support, and patience.

Abstract

This thesis studies international economic integration through the two major channels: capital flows and Regional Trade Agreements (RTAs). With regard to capital flows, the thesis tries to explore the responsiveness capital to gravity factors and compare it to trade flow, to use institution variable as an explanation for the Lucas Paradox, and to use specific control variables to explain the motivation of capital flow. Moreover, capital flow tend to take place in tandem with trade flow, this research will also study the mutual effect between them. With regard to the implications of RTAs, this thesis deals with both the real and financial effects of these cooperation arrangements among countries to explore whether RTAs play any role in both business cycle synchronization and financial market co-movement among member economies.

The empirical work in this research shows that capital flow is as responsive as trade is to gravity factor, that institution quality can explain the Lucas Paradox, and there is some evidence of risk diversification motivation in the international portfolio choice. In addition, trade and finance tend to mutually reinforce. The findings also indicate that RTAs play significant role in strengthening business cycle synchronization and financial market co-movement between member countries.

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Introduction

This thesis presents an empirical work on international economic integration from the perspective of capital flows and implications of Regional Trade Agreements, based on the gravity model approach. The main objective of this research is twofold. First, it will explore the effects of gravity, institution, bilateral trade, and risk diversification as determinants of capital flows. Second, it studies the comprehensive impact of Regional Trade Agreements (RTAs), a phenomenon of the last decade, on both real and financial integration of the member economies.

Given the aforesaid research objective, the thesis will consist of two parts as follows:

Part I: Gravity, Institution, Trade, and Risk Diversification as Determinants of Capital Flows. This research will explore the role of gravity factors (e.g. bilateral distance, border, size, etc.), institution, bilateral trade, and risk diversification motivation as determinants of international capital flows.

Past research clearly showed that gravity factors played critical role in determining bilateral trade. This research will explore whether the same is true for bilateral capital. The lack of capital flow from rich to poor countries, despite the big difference in marginal productivity of capital between them, gave rise to the Lucas Paradox, which could be explained by the institution quality. As economic linkages grow between countries as a result of external liberalization and globalization, it would be interesting to explore how trade and finance interact in this process, whether trade furthers finance and/or vice versa. And finally, the motivation of capital flows from one country to another would be return-chasing or risk diversification. This part of the thesis will deal with these potential determinants of capital flows.

Part II: Real and Financial Effects of Regional Trade Agreements. For this part of the thesis, the research motivation comes from the fact that the proliferation of Regional Trade Agreements (RTAs) in the past decade marks an unprecedented development in globalization, which inevitably has considerable implications on policy making and international business. This research will explore empirically what effects RTAs might have on economic integration between member economies, both in real terms and in financial market co-movement. The recent development of existing and new trading blocs transcend

far beyond trade to encompass investment, service liberalization, institution harmonization, technical standardization, labor migration, outsourcing, or even common currency in the case of the European Union. Therefore, the impacts cannot and should not be examined in isolation from non-trade issues. Most of the existing literature only looks at the trade impact of RTAs, some take further steps to study investment, exchange rates, and some policy responses, but not comprehensive economic integration, reflected in both real economic performance and financial market co-movement. The financial aspect of the RTA-based integration is a completely unexplored territory so far in the literature. This research fills in this gap by bringing both real and financial aspects of RTA-based integration into the picture.

In terms of methodology, both Parts of this research extend the application of the gravity model beyond the bilateral goods trade realm, which has been extensively studied with success for the last four decades. Recent development in the literature witnesses a growing number of researches that use gravity model to explain non-trade bilateral flows, such as different types of capital flows, trade in services, migration, business cycle correlation, financial market correlation, etc. This research makes one more contribution into this methodology in empirical studies by exploring how much this gravity model can explain flows and co-movements. The virtues of the model would intrigue further research in finding theoretical foundation for bilateral capital flows and market co-movements, the same way it has happened to trade. The gravity model was first introduced from physics by economists in the 1960s and applied successfully in explaining bilateral trade in goods. However, no theoretical foundation was established in the first place to underlie the model. The theories only came after some success in the empirics. For this research, fortunately, some theoretical foundation of financial economics is already in place to explain the capital flow pattern and market co-movement. The applied gravity model is only used to empirically explore and provide more evidence for the theories. Hopefully, findings from this research would further contribute toward future theoretical development in the economics of capital flows and market co-movement.

Given such objective in studying international integration through capital flows and RTA comprehensive integration, this thesis will deal with those two forms of integration separately. In terms of capital flows, the fact is, as shown by the literature and the statistics, that capital and trade flows usually go together and are mutually supportive. The same is true for different types of capital flows, namely portfolio, FDI, debt flows, and bank lending.

Whether these flows reinforce each other, or they are all driven by common factors, or there can be both, is an issue to be addressed econometrically in this research. Given the varying degree of information dependence of capital flows, some type of flows would probably be more responsive than others to common factors. In addition, each type of flows is influenced by specific set of determinants, which will be included in this study.

In terms of RTA comprehensive integration, this research will explore the real economic integration, as reflected in the business cycle co-movement¹, or GDP growth correlation, and the financial market co-movement, as reflected in the stock index correlation. As recent RTA negotiations and policy outcomes include comprehensive external liberalization measures, they give rise to a question about the integration impact of such liberalization on the member economies. Of course, the depth and extensiveness of liberalization differ from one RTA to another, and so do the effects on comprehensive integration. In this regard, it would be interesting, for academic purpose, policy making, and business alike, to learn about how business cycles in the member economies can be affected, if at all, by such within-RTA liberalization, how financial market in those economies might be inter-dependent, and if RTA plays any role in shock transmissions from one member economy to another in both boom and bust periods. Answers to these questions can have important implications for international economic studies, policy making, and portfolio choice of international investors. This research will provide empirical evidence about RTA role in the inter-dependence of member economies.

This research also tries new data set for control variables, such as institutions and capital controls. Most past researches used dummy for common legal origin to proxy institutional similarity, and dummy for capital control. Dummies only mark the presence or absence of certain characteristics, but do not reflect the quantitative differences or changes. This research uses more quantifiable measures of both those variables, obtained from newer dataset of more sophisticatedly constructed indexes, so hopefully more closely reflects the effect.

¹ Business cycle co-movement in the context of this thesis means the correlation of GDP growth rates between two countries.

Part I. Gravity, Institution, Trade, and Risk

Diversification as Determinants of Capital Flows

1. Introduction and Rationale

Growing trade and capital flows around the world have been the major features of the globalization process over the last two decades and hence attracted huge amount of research interest. The gravity model has been so successfully applied to explain bilateral trade in the past, and more recently applied in a growing number of researches to explain capital flows and other flows. Following this trend, this research will apply gravity model to explore how different forms of capital respond to gravity factors, and how their responses are compared to that of trade.

In terms of theoretical motivation, the research questions stem from two issues: i) the Lucas Paradox about the lack of capital flow to poor countries; and ii) two competing theoretical models in explaining international portfolio choice: risk diversification (Capital Asset Pricing Model)¹ and the home bias.

Regarding the first theoretical issue, the lack of capital flow to poor countries has been raised by Lucas (1990). Based on standard neo-classical economic theory, Lucas has reasoned that if two countries produce the same goods, with the same constant return to scale production function, the difference in labor productivity between these two countries must be due to the difference in capital intensity. Then the Law of Diminishing Returns implies that the marginal product of capital is higher in the less productive (i.e. poorer) economy. And if trade in capital good is free and competitive, new investment will occur only in the poorer economy, and this continues to be true until capital-labor ratios, and hence wages and capital returns, are equalized (Lucas 1990). However, Lucas could observe that contrary to the neoclassical model prediction, not enough capital was flowing from developed to developing countries, and suggested that human capital and political risk could be the explanation. The vast literature generated after this famously quoted paper has addressed various theoretical

¹ See Appendix I.4. for CAPM.

issues that explained the fact. This research attempts to provide more evidence and some explanation to this Lucas Paradox by using institution variables.

The second theoretical issue - two competing theories on portfolio choice - inspired further probing on capital flow destination, home versus abroad. The CAPM in finance predicted that investors would diversify risk by investing in countries where the return was uncorrelated with the home return on investment. This meant that capital would flow between national stock markets, which were uncorrelated. On the other hand, the home bias model predicted that investors would rather choose to invest in the domestic market, due to the financial friction and information asymmetry of investing abroad. This home bias constituted one of the six “puzzles” coined by Obstfeld and Rogoff (2001), asking about why home investors overwhelmingly preferred to hold home equity assets. The current research is not intended to provide evidence in support of one model against the other. It instead will provide some empirical evidence of portfolio choice motivation, reflected in the determinants of portfolio flows.

Another aspect of globalization, which is the interest of the current research, is the interaction between trade and capital flows, and among different forms of capital. Economic theories do not provide an unambiguous relationship between trade and capital flows. While the standard Heckscher-Ohlin-Mundell model shows the *substitutability* relationship between trade and factor mobility (physical capital), more recent theoretical researches support the *complementarity* between trade and financial capital flows. One of such studies is by Antras and Caballero (2009) who show that in less financially developed economies (South), trade and capital mobility are complements. This interaction implies that deepening trade integration in South raises net capital inflows (or reduces net capital outflows). In this context, a financially underdeveloped economy that opens the capital account without liberalizing trade is likely to experience capital outflows, while trade integration increases the incentives for capital to flow into South. The main message from this paper is that trade and capital flows become complements in financially underdeveloped countries. Recent empirical work also provide evidence of complementarity, or mutual reinforcement, between trade and capital flows (Aviat and Coeurdacier 2007; Hahn and Shin 2009).

However, using one flow to explain the others in an empirical exercise would run into the endogeneity problem, as they might all be driven by common factors. Distance was one of those common factors that affected any bilateral flows. Against the argument of “weightless” financial assets, Portes and Rey (2005) found that it was the information asymmetries

(proxied by telephone traffic) associated with distance that deterred financial flows. Nevertheless, Portes and Rey's (2005) research did not capture the fact that information asymmetries, if proxied by telephone traffic, would misleadingly make less developed countries more distant, as the volume of telephone traffic was inversely proportionate to the level of telecom infrastructure development as well as the overall development level.

Researches on portfolio flows (Portes and Rey 2005; Aviat and Coeurdacier 2007) found that portfolio tended to flow between highly correlated markets, hence challenging the CAPM model. Here again the endogeneity problem might arise, as large capital flows might cause market to be financially integrated, hence more correlated. This research tries to empirically explore the risk diversifying motive in international portfolio flows.

Another group of literature tried to use institutions to explain flows (Kalemli-Ozcan, Alfaro et al. 2003; Groot 2004; Papaioannou 2009), and in fact found that institutions played an important role in trade and financial flows. The current research will use new measures of institutions in explaining flows between countries.

Based on the available data, three types of flows will be studied: bilateral trade, bilateral portfolio flows, and bilateral bank lending.

In brief, motivated by the aforesaid past research and the gap thereof, this research will do the followings:

- i) To explore how different flows (trade, portfolio, and bank lending) respond to gravity variables¹;
- ii) To address the Lucas Paradox by empirically exploring the effect of institution on capital flows;
- iii) To explore the interactions between trade and different types of capital flows;
- iv) To address the particular motivation in portfolio flows and see whether it is the risk diversification or the return chasing motivation that drives the flow, thus to provide empirical support to the CAPM and/or home bias models.

Concerning the responsiveness of trade and capital to gravity variables, little can be done about geographical characteristics of the country, and GDP may not change dramatically in

¹ Gravity variables in the context of this thesis include those most commonly used in previous gravity model for trade, i.e. distance, land border, GDP, common language, and common legal origin.

the short run. But if we are aware that these variables may affect international trade and capital flows simultaneously, this effect can be factored in the policy making process.

If institution is one of those variables that explain the Lucas Paradox, then getting institution right would have important implications on the destination and management of capital flows.

At the global level, the issue of Lucas Paradox about the destination of capital flow is particularly relevant in the context of the growing global imbalance, caused by the phenomenon of “capital flowing uphill from poor to rich countries” (King 2006). The main cause of this global imbalance is the ‘flight to quality’ in asset holding behavior by sovereign investors, mostly central banks, in emerging economies, who keep growing reserves in debt instruments issued by developed countries’ governments. In fact, this indicates that a group of emerging economies do not lack funding for their own investment; they indeed lack decent investment opportunities at home. This makes the traditional role of global financial institutions such as the International Monetary Fund (IMF) that provide lending to emerging economies no longer relevant. If funds are flowing from presumably capital scarce countries to capital abundant countries, it calls for a change in the IMF’s role. There have been suggestions for the IMF to deploy funds of emerging market economies rather than lending to them, as a way of redirecting the flow of capital back into developing economies (D'Arista 2008). In this connection, changing in the function of the global financial institution would address the Lucas Paradox by correcting the global financial market failure. In the event of ‘global saving glut’, with a group of poorer countries running the current account surplus, and richer countries running the current account deficit, a global financial arrangement should be in place to channel the flows of fund to poorer economies.

At the country level, improving the overall institution quality and in particular the financial institution quality is the key to attract private capital into developing countries, or at least to keep their domestic savings at home. For those developing countries that experience the capital account surplus due to the flight to safety of capital, improvement in the domestic financial institutions would help reduce the capital outflow and maintain the capital account balance at a sustainable level.

Another aspect of the role of institution in attracting capital into capital-scarce countries, hence solving the Lucas Paradox, is the institutional capacity in dealing with capital flow, once it takes place. If findings from research indicate that good institutions invite larger capital flows, then countries also need sufficiently capable domestic institutions to manage

this capital inflow in order to avoid macroeconomic instability caused by excessive or unprecedented capital inflow. Past research have shown that large capital inflows induced by financial openness can have undesirable macroeconomic effects, including rapid monetary expansion (due to the difficulty and cost of pursuing sterilization policies), inflationary pressures (resulting from the effect of capital inflows on domestic spending), real exchange rate appreciation and widening current account deficits (Agenor 2003). The real appreciation of the exchange rate can have adverse effect on the export sector's competitiveness, hence may be harmful to economic growth.

While quality of the overall institution is a potential determinant of capital flows, quality and capacity of specific financial institutions are the key in managing the capital allocation in a growth-supportive manner. Therefore, addressing any distortion in the domestic financial sector before opening up to capital inflow is essential to avoid the misallocation of capital inflows.

The complementarities and mutual reinforcing effects between trade and capital flows, between portfolio capital and bank lending, are particularly relevant for countries that undergo external liberalization both in terms of trade and finance. Opening up the country to international trade would have implications on the need for opening up to capital flows, and vice versa, since the two interact. And this implies both benefits and challenges in terms of managing the macroeconomic stability.

The benefits of having both free trade and capital flows include international risk sharing for consumption smoothing and improved efficiency. In the event of shortage in domestic credit, trade can easily seek external finance for its own growth. In many countries that undergo liberalization, trade liberalization often results in import surge in the short run, with deteriorating current account balance. Therefore, the short-term worsening in the trade account should be somehow financed through the capital account. The challenge in managing the macroeconomic balance is that, on the one hand, if trade and capital are complementary, liberalizing trade without opening up the capital account would prevent the benefit of the former from unfolding, making it difficult to finance temporary trade deficit through capital inflow. On the other hand, opening up the capital account too quickly or too early, before the domestic institutions are ready to cope with unprecedented capital inflow, would also put the country at risk. Therefore, appropriate pace and sequencing of capital account liberalization are essential in maintaining macroeconomic stability.

Another implication of the complementarity between trade and capital flows, or between different forms of capital, is that it may exacerbate the unequal access to world capital market. This means that countries that are already deeply integrated internationally through trade and finance would further enjoy growing cross-border trade and finance, with future flows induced by current ones, while countries that are yet to access the international market would find it difficult to attract international finance, or may even be excluded from international financial market.

Although the theoretical prediction about the relationship between capital flows and macroeconomic fundamentals is ambiguous, understanding the factors behind capital flow motivation helps predict future capital flows and analyze the associated macroeconomic and balance of payment implications. It is important to understand the nature of capital flows, the conditions for access to international capital market, and how to maintain the continued flows. This research will look for evidence of two different motivations in international portfolio choice: i) risk diversification and ii) return chasing. While the risk diversification motivation would induce portfolio capital to seek markets which are uncorrelated in terms of return, the return chasing motivation would cause capital to flow to high return markets. As far as the first motivation of capital flow is concerned, as long as the domestic securities market is imperfectly correlated with the international market, the country can enjoy the benefit of portfolio inflows. For the second motivation of capital flow, if foreign investors benefit from higher returns in the host country's capital market, this benefit can translate in to a lower cost of capital for the recipient country. Past research showed that macroeconomic fundamentals mattered in determining stock return indexes and their volatility (Elhossiny 2005; Simpson, Tomljanovich et al. 2005). Moreover, both economic and political stabilities were important determinant of a country's creditworthiness and credit rating, which in turn affected the country's access to international portfolio capital and the cost of capital. Therefore, it was essential to maintain macroeconomic soundness and political stability in order to attract and manage foreign portfolio inflows.

The main contributions of this research is to bring together different bilateral flows into a comparable gravity model framework and to explore their varying responsiveness, to provide new evidence of portfolio choice behavior, using more updated data, and to use new measures of institutions and capital controls in determining capital flows.

The remaining of this essay will be organized as follows: Section 2 briefly reviews the theoretical background of international economic activities, including the economic

geography literature and the application and development of the gravity model, Section 3 provides literature review on capital flows and the determinants, Section 4 presents the methodology and data, Section 5 presents the empirical strategy and results, and Section 6 concludes this Part.

2. Theoretical Background: Economic Geography and Gravity Model

Two major streams of economic theories explain the location and density of economic activities. Those are the Economic Geography and the gravity model-related trade theories. This section will review them one by one.

2.1 Economic Geography

Economic geography literature has dealt with the agglomeration mechanisms of economic activity by using *transport cost*, *increasing return to scale*, *externalities*, and *knowledge spillovers* as explanation.

One of the most influential works along this line was by Krugman (1991), who showed that to achieve scale economies while minimizing transport costs, manufacturing firms would tend to locate in the region with larger demand, but the location of demand itself depended on the distribution of manufacturing. Emergence of a core-periphery pattern depended on transportation costs, economies of scale, and the share of manufacturing.

However, the literature also showed that the relationship between agglomeration and transport cost was not monotonic (due to the opposite roles of the two centrifugal forces), so that an even distribution of production was reached at both high and low transport costs (Alonso-Villar 2008). Very high or very low trade costs would favor the dispersion of economic activities, while agglomeration would emerge for intermediate values of these costs once the spatial mobility of workers was low (Fujita and Thisse 1996).

The on-going trade liberalization also further aided the agglomeration process through tariff reduction, which was equivalent to transport cost reduction. Behrens (2006) showed that decreasing transport costs and decreasing tariffs had the same qualitative impact on the distribution of economic activities: once they fell below some threshold, they would trigger a cumulative process of agglomeration.

Throughout the agglomeration process, the resulting production location could be the outcome of interaction between transport cost and return to scale. As shown by Fidrmuc (2004), on one hand, high transport costs for some products resulted in low levels of trade (that was, a proportional distribution of production to local markets); and on the other,

important economies of scale and differences in the costs of immobile services led to specialization and high volumes of trade.

In analyzing the factor distribution and the relationship between capital intensity and agglomeration tendency, Ihara (2005) showed that the extent of capital concentration and industrial concentration was increased with a decline of transport costs, as the industry's capital intensity rose, the economy increased the tendency to agglomerate in one region.

With regard to scale economies, Fujita and Thisse (1996) showed that the existence of scale economies at the firms' level was a critical factor for explaining the emergence of agglomeration, that it was profitable for firms to concentrate production in a relatively small number of plants producing for dispersed consumers, so that increasing returns to scale constituted a strong centripetal force.

Concerning the knowledge spillovers, Koo (2005) showed that when knowledge was not easily exchanged from a distance and spilled over locally, firms tended to locate in proximity to capitalize on the knowledge stock in neighboring firms. This tendency led to a geographical clustering of firms that utilized similar knowledge bases (e.g., Silicon Valley). In addition, firms located in proximity looking for new knowledge often created local innovation networks through which information on newly developed technologies and innovations diffused.

Although most of work on economic geography and agglomeration analyzed the location of industrial activities at firm and regional levels, this agglomeration mechanism might bear some resemblance to financial activities and investment at the international level as well. Scott and Storper (2007) showed that large scale agglomeration – and its counterpart, regional economic specialization – was a worldwide and historically persistent phenomenon that was intensifying greatly at the present time as a consequence of the forces unleashed by globalization.

This theory of agglomeration economics explained why economic activities tended to cluster in a few regions or locations, to save transport cost, to take advantage of the economies of scale and the externality of knowledge spillovers.

2.2. Gravity Model

The gravity model in economics was first introduced by (Tinbergen 1962) and (Pöyhönen 1963). In its most basic form, gravity model specified that trade between two countries depended on their sizes and the distance between them. While trade tended to increase with the size of the trading partners, it decreased with distance, due to the transport cost. As specified by Tinbergen (1962) and Pöyhönen (1963), the model then has the following form:

$$T_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} A^{\beta_4} u_{ij} \quad (\text{I. 1})$$

where T_{ij} is bilateral trade between countries i and j , Y_i and Y_j are their respective GDP, D_{ij} is the distance between their main cities, and A is any other factors that may affect trade between these countries, u_{ij} is the log-normally distributed error term. In the log form

$$\ln T_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln D_{ij} + \beta_4 \ln A + \varepsilon_{ij} \quad (\text{I. 2})$$

where ε_{ij} is the error term.

Despite its successful application in explaining bilateral flows (first and for most, trade) between two countries, this model received quite extensive criticism in the early years for lack of theoretical foundation. As research in this area evolved and various trade theories were used to explain the flows of trade between two countries, the theoretical foundation has been established. One of the first contribution in providing the theoretical foundation for the gravity model was by Anderson (1979) who introduced the properties of expenditure system, allowing for varying shares of traded goods in total expenditure. Bergstrand (1985) presented a general equilibrium world trade model, from which gravity model was derived by making assumption about perfect international product substitutability. Deardorff (1995) derived bilateral trade from two cases of the Heckscher-Ohlin model and concluded that even a simple gravity equation could be derived from standard trade theories, but its use to test any model was suspect. Evenett and Keller (2002) analyzed two main theories of international trade, the Heckscher-Ohlin theory and the Increasing Return trade theory, to explain the success of the gravity equation.

More recent research further augmented the model with more determinants of trade, such as cultural similarity, common language, colonial history (Frankel and Rose 2000), institutional similarity (Groot 2004; Linders, Slangen et al. 2005); policy variables such as currency union (Frankel and Rose 2000), regional trade membership (Aitken 1973; Frankel and Wei 1998;

Soloaga and Winters 2001; Magee 2003; Baier, Bergstrand et al. 2007). The literature that used these additional variables were simply too numerous to sufficiently cite.

As the applications of gravity model evolved, more econometric problems unfolded and were subject to different techniques of correction. Heterogeneity bias and endogeneity bias were among the estimation problems addressed by the literature. Heterogeneity bias in gravity model was addressed by Bayoumi, Eichengreen et al. (1997), Cheng and Wall (2005), Glick and Rose (1999), by using fixed effect model.

Endogeneity usually arose because some of the explanatory variables (RTA formation, institution quality, other country's characteristics, etc.) might be affected by the reverse causality from the dependent variable. RTA membership was one example of such endogeneity. Early studies included this variable as dummies for pairs of countries which were members of the same trade agreement, for the importing or exporting countries in the pairs that belonged to any trade agreement in the sample. The effect might go both ways, meaning countries that traded more with each other had higher probability of forming a trade agreement, and on the other hand, trade agreement might cause their bilateral trade to increase. This endogeneity has been addressed by Magee (2003) using a simultaneous equation system, in which trade and preferential trade agreement were mutually determined. Baier and Bergstrand (2007) addressed this endogeneity by using instrumental variable for RTA.

The application scope of gravity model in the literature has been extended beyond trade and into other bilateral flows between countries. Those flows could be equity flows (Portes and Rey 2005), international bank lending (Rose and Spiegel 2004), migration (Karemera, Oguledo et al. 2000), foreign direct investment (Gopinath and Echeverria 2004), debt securities flow (Eichengreen Barry and Luengnaruemitchai 2006), trade in services (Walsh 2008), location of FDI in services (Nefussi and Schwellnus 2007), remittances (Lueth and Ruiz-Arranz 2008), stock market correlation (Flavin, Hurley et al. 2002), business cycle synchronization (Calderón 2003). This variety of research interest, using gravity model showed the model's usefulness in explaining bilateral relationship. For the purpose of the current research, this thesis will only focus on trade, portfolio, and bank lending.

3. Literature Review

This section will review past literature along four major topics corresponding to the research questions posed earlier: i) responsiveness of trade, portfolio, and bank lending to gravity variables; ii) attempt in explaining the Lucas Paradox, using institutions; iii) interaction between trade and capital flows; and iv) motivation of portfolio flows. For a review of selected relevant literature that used gravity model, see Appendix I.5.

3.1. Responsiveness of Trade, Portfolio, and Bank Lending to Gravity Variables

This group of research addressed the interaction between trade and financial flows in determining the capital market performance.

Buch and Piazzolo (2000) studied the enlargement of EU and showed that international bank claims, portfolio investment, trade, and FDI flows shared a number of common determinants, such as EU membership.

Buch (2005) studied how distance affected international banking and showed that the importance of distance did not decline over time, despite the declining information costs; and information costs were of similar importance in banking as in other financial markets. The constant importance of distance over time found in this research raised a question about the virtue of information cost in explaining bilateral flows. Assumption that distance may capture information cost became questionable, when the cost declined so fast lately.

Eichengreen and Luengnaruengnitichai (2006) studied the one-way bond holdings, using the IMF's Comprehensive Portfolio Investment Survey (CPIS) data, controlling for source and host countries' characteristics. The paper tried to explore the effects of size (GDP), distance, common border, common language, source- and host-countries' characteristics in determining the bilateral bond holding. Among other things, the study showed that bilateral bond holdings depended positively on size, common land border, common language, and negatively on distance; control on inflow and outflow transactions also negatively affected bilateral bond holding.

Guerin (2006) used a gravity model to investigate what country characteristics determined the investment flows between them. The finding from this research suggested that geographical factors had a significant role in explaining the spatial allocation of FDI and portfolio investment flows, as well as trade, even after controlling for the macroeconomic

fundamentals. The paper also found that bilateral trade, FDI, and portfolio reacted to fundamentals in the same way, but with different degree of sensitivity .

Portes and Rey (2005) were the first authors who brought information variable into the gravity equation to explain bilateral financial asset holdings. They found that the gravity model could explain international financial asset holding at least as well as international trade. The model examined the effect of distance, information cost, and time dummies to explain bilateral financial assets. The conclusion was that distance entered the equation as information asymmetries, and that these information frictions seemed to be the dominant force shaping the international distribution of asset flows.

3.2. Explaining the Lucas Paradox Using Institutions

The Lucas Paradox has intrigued enormous research interest in finding the motivation of financial investment around the world. The literature along this line tried to find different explanations for the paradox and to solve it, theoretically and empirically.

In the growing global imbalance during the 2000s, with many developing countries running current account surplus while some developed countries running a growing deficit, especially the United States, some authors even pointed out the perverse trend of capital flow from poorer to richer countries. Rajan (2008) analyzed the average relative per capita income of surplus countries (weighted by their surpluses, with per capita income measured relative to the richest country in that year) and found that it has been trending downward. By contrast, there has been an upward trend in the relative income level of deficit countries. Indeed, in this century, the relative income of surplus countries has fallen below that of deficit countries. Not only was capital not flowing from rich to poor countries in quantities the neoclassical model would predict, but in the last few years, it has been flowing from poor to rich countries (Rajan 2008).

Poor domestic investment opportunities in developing countries could be another cause for capital to flow out of these countries in search of better alternatives. This might have necessitated savings being channelled to the deeper and more liquid financial markets in western economies (Astley, Giese et al. 2009). Caballero and Krishnamurthy (2009) gave an explanation for the phenomenon of capital flowing to the United States as non-speculative and in search of safety.

The building-up of foreign assets, especially US-dollar-denominated assets, by Asian central banks was another factor contributing to the phenomenon of capital flowing from poorer to richer countries. Since the mid-1990s after a series of financial turmoil and the rise in oil price, central banks in many emerging economies started hedging themselves against risk by building up their reserves in US dollar-denominated assets. This fact led to a swing in their net international asset position, from net borrower to net lender of the world. The paradox was that this group of poorer countries was financing richer countries, the United States in this case, for the sake of securing against financial crisis. This was what Calvo and Talvi (2006) called a “voracious appetite by Asian central banks for U.S. dollar-denominated international reserves”.

Inadequate infrastructure, poorly educated labor force, corruption, and a tendency to default on debt from abroad, among other factors – that reduced the risk-adjusted returns to investment was another explanation provided by Prasad, Rajan et al. (2007). These authors also reasoned that the risk-adjusted returns that foreign investors got from investing in these countries might be much lower than the rate of returns that might be anticipated just on the basis of the relative scarcity of capital and relative abundance of labor (Prasad, Rajan et al. 2007).

Ju and Wei (2006) developed a model using entrepreneur heterogeneity to partially restore the intuition of one-sector models in a two-sector setting that the interest rate was lower in a capital-abundant country. The quality of the financial system and expropriation risk played crucial roles in the model. This study aimed at providing solution to two opposing puzzles about international capital flows and a framework to discuss systematically the roles of financial and property rights institutions in determining patterns of gross and net capital flows. The study also introduced a non-neoclassical model which featured financial contracts and firm heterogeneity. In the model, free patterns of gross capital flow emerged as a function of the quality of the financial system and the level of protection for property rights (i.e., the risk of expropriation). A poor country with an inefficient financial system but a low expropriation risk may simultaneously experience an outflow of financial capital but an inflow of foreign direct investment (FDI), resulting in a small net flow.

Alfaro, Kalemli-Ozcan et al. (2008) tried to analyze empirically the role of different theoretical explanations behind the lacks of capital flows from rich to poor countries. This study showed that during the period 1970–2000, low institutional quality was the leading explanation for the Lucas Paradox. The ordinary least squares (OLS) estimates showed that

improving the quality of institutions to the United Kingdom's level from that of Turkey's implies a 60% increase in foreign investment. This study used an empirical model where capital flow was a function of per capita GDP and in a pre-sample period and institution quality. The result showed that institutional quality was the variable that explained the Lucas Paradox. The index of institutions could explain 52% of the cross-country variation in inflows of direct and portfolio equity investment per capita (Alfaro, Kalemli-Ozcan et al. 2008).

Papaioannou (2009) studied the effect of institutions on asset holdings. The model used in this paper was basically the standard gravity model, augmented by institution variable. The finding was that institutions mattered in determining asset flows between countries (Papaioannou 2009). However, the explanatory power of this model was quite weak (R^2 was less than 0.1).

3.3. Interaction Between Trade and Capital Flows

Beck (2001) studied how financial development affected trade in manufactures and found that financial development exerted a large causal impact on the level of both exports and the trade balance of manufactured goods.

To measure the effects of different determinants on stock returns, Forbes and Chinn (2004) used a factor model of return to show that bilateral trade flows were large and significant determinants of cross-country linkages in both stock and bond markets (Forbes and Chinn 2004).

Mishra (2007) examined the bilateral, source and host factors driving portfolio investment across countries and found that bilateral equity investment was strongly correlated with the underlying pattern of trade in goods and services. Market size and income per capital also mattered much in determining the foreign asset holdings.

Aizenman and Noy (2004) studied the two-way feedback between de-facto financial and trade openness, based on the Granger causality test and Geweke decomposition test. They showed that the *de facto* financial openness depended positively on lagged trade openness, and that *de-facto* trade openness depended positively on lagged financial openness.

Taylor and Wilson (2006) studied trade and financial flows from the United Kingdom and the United States from 1870 to 1913 in the interwar years, and showed that trade and finance were robustly correlated, even after allowing for simultaneity.

Lane and Milesi-Ferretti (2005) provided a systematic analysis of bilateral, source, and host factors driving portfolio equity investment across countries, and showed that bilateral equity holdings and bilateral trade in goods and services were highly correlated. In their model, which was a variation of gravity model, the dependent variable was the portfolio holding of source country in the host country, and explanatory variables included average imports over 1997-2001, distance, time difference, correlation of growth rate, correlation of stock return, correlation in growth-stock returns between source and host countries, dummies for common language, common colony, common currency, tax treaty, and common legal origin. In another regression of this same research, the dependent variable was fixed source country effect and maximum stock of portfolio equity assets/liabilities; the explanatory variables include GDP, GDP per capita, domestic stock market capitalization, export, Sharpe ratio¹, market beta, standard deviation of beta residuals, and dummies for capital control and financial centres. One of the major findings was the strong link between bilateral imports and bilateral investment holdings. The conclusion from this research was that the geography of bilateral portfolio equity holdings was strongly related to bilateral trade, but also to proxies for informational asymmetries and cultural-institutional proximity, such as common language and common legal origin, and that bilateral equity investment was strongly correlated with the underlying patterns of trade in goods (Lane, Milesi-Ferretti et al. 2005). The sign of correlation of stock return in this empirical research was positive, showing no support to the CAPM in terms of risk diversification in portfolio choice.

Kim, Lee et al (2006) study the economic integration for East Asian countries and showed that both bilateral portfolio and bank lending positively responded to GDP, per capita GDP, common border, common language, and negatively responded to bilateral distance. Bilateral trade also positively contributed to bilateral portfolio holdings and bank lending (Kim, Lee et al. 2006).

Aviat and Coeurdacier (2007) explored the complementarities between bilateral trade in goods and bilateral asset holdings. The starting assumption was that bilateral trade and

¹ Sharpe ratio, also known as reward-to-variability ratio, is a measure of excess return (or risk premium) in an investment asset, is defined as:

$$s = \frac{R - R_f}{\sigma} = \frac{E[R - R_f]}{\sqrt{\text{var}[R - R_f]}}$$

where R is the asset return, R_f is a return on a benchmark asset (usually called risk-free asset), $E[R - R_f]$ is the expected value of the excess of the asset return over the benchmark asset return, and σ is the standard deviation of the excess return.

financial asset holdings were driven by the same gravity variables (e.g. GDP, bilateral distance), and at the same time mutually determined each other. In addition, trade and asset holdings were determined by a specific set of exogenous variables, which were then used in the model as instruments to deal with the endogeneity problem. The estimation showed that a 10% increase in bilateral trade induced a 6 to 7% increase in bilateral financial assets holdings so that the effect of trade in goods on asset portfolios was quantitatively important. Conversely, a 10% increase in bilateral financial asset holdings induced a 2.5% increase in bilateral trade. Distance affected country portfolios mainly through its impact on trade (Aviat and Coeurdacier 2007).

Hahm and Shin (2009) studied the complementarities between different forms of asset flows, e.g. portfolio, bank lending, and FDI. Their model setup was such that bilateral flow of one form of asset (e.g. portfolio, bank lending) was a function of the lagged bilateral flow of another form of asset. The finding was that different types of asset mutually reinforced.

3.4. Motivation of Portfolio Flows

Martin and Rey (2004) developed a two-country model with endogenous number of financial assets, in which interaction between risk diversification motive and market segmentation explained international asset holding and prices. This model showed a home bias in asset holdings.

De Santis (2006) presented a simple modelling framework showing that the geography of international portfolio flows was only partly influenced by the International CAPM. Using bilateral data on international equity and bond flows, the author found evidence that investors did not hold assets of each country in proportion to the country's share in the world market portfolio. A country, which saw its market size to increase by 1 percentage point relative to the world market capitalization, would attract international equity (bond) flows amounting to 0.4% (0.2%) of the equity (bond) assets held abroad by foreigners. The author also found evidence that investors preferred portfolio assets of countries where the central bank gave relative importance to money. All in all, country's shares in the world market portfolio, home bias, initial degree of misallocation across countries, past returns, diversification benefits, monetary policy frameworks and EMU could explain 35-40% of the total variation in equity and bond portfolios over the 1998-2001 period.

Coeurdacier, Kollmann et al. (2008) used a two-country general equilibrium model with fully integrated financial markets to show that the interaction of capital accumulation, shocks to

physical investment efficiency, and international trade in stocks and bonds denominated in local and foreign goods was key for generating realistic equity home bias, without requiring strongly countercyclical terms of trade.

4. Methodology and Data

4.1. Theoretically Derived Equations and Methodology

Two theoretical models in past literature provided framework for the empirical analysis in this research. The first one was developed by Lane and Milesi-Feretti (2005). In this model, an individual agent in country j seeks to maximize the expected utility from consumption

$$EU_j = E \left\{ \frac{1}{1-\rho} \left[\left(\sum_{i=1}^N \omega_{ij} C_{ij}^{\frac{\theta-1}{1}} \right)^{\frac{1}{1-\rho}} \right] \right\} = E \frac{C_j^{1-\rho}}{1-\rho} \quad (\text{I. 3})$$

where ω_{ij} is the relative preference by consumers in country j for good i , C_j is the index of total real consumption, θ is the elasticity of substitution between any two goods and ρ is the coefficient of relative risk aversion. There are iceberg shipping costs: only a fraction $(1 - \tau_{ij})$ of a unit of a good shipped from country i to country j survives the journey.

It follows that the portfolio allocations (x_{ij}) required to generate equilibrium consumption shares are of the form

$$x_{ij}^* = \left\{ \frac{(1 - \tau_{ij})^{\theta-1} \omega_{ij}^{\theta}}{\sum_{j=1}^N [(1 - \tau_{ij})^{\theta-1} \omega_{ij}^{\theta}]} \right\} Y_i \quad (\text{I. 4})$$

The log of this expression yields:

$$\log x_{ij}^* = (\theta - 1) \log(1 - \tau_{ij}) + \theta \log(\omega_{ij}) - \log \left(\sum_{j=1}^N [(1 - \tau_{ij})^{\theta-1} \omega_{ij}^{\theta}] \right) + \log Y_i \quad (\text{I. 5})$$

Theoretically

$$\log(x_{ij}) = \log(IMP_{ij}) \quad (\text{I. 6})$$

where IMP is imports of country i from country j .

When financial frictions are introduced, it becomes

$$\log(x_{ij}) = \phi_i + \phi_j + \sigma \log(IMP_{ij}) + \gamma F_{ij} + \varepsilon_{ij} \quad (\text{I. 7})$$

where ϕ_i, ϕ_j denote “aggregate” financial frictions that apply at the level of the source and host countries and F_{ij} denotes a set of factors that generate financial frictions at the bilateral level.

The second model of bilateral asset holding was developed by Coeurdacier and Guibaud, defined as follows:

$$\log(e_{ij}^0) = \log(W_i) + \log(m_j^0) - \log(W) \quad (\text{I. 8})$$

where e_{ij}^0 is the total amount invested by agents i in country j , W_i is the total wealth of country i , m_j is the market capitalization of country j , and W is the total wealth of the world. This benchmark model is then translated into the empirical model to be estimated as follows

$$\log(e_{ij}^0) = \alpha + \beta \log(m_i m_j) + \gamma \rho_{ij} + \delta Z_{ij} + \varepsilon_{ij} \quad (\text{I. 9})$$

where m_i is the stock market capitalization, ρ_{ij} is the correlation of the stock return in US dollar, Z is a set of control variables.

Endogeneity of stock return correlation in financial integration was also addressed in Coeurdacier and Guibaud (2005) by adding instrumental variables. The paper argued that as financial markets integration rose, asset returns between countries were getting more synchronous due to the portfolio rebalancing behavior by investors between home and foreign assets. On this ground, average past return correlation was used as instrument for current return correlation. The finding was that when past return correlation was instrumented for the current one, the effect of return correlation on bilateral asset holdings turned from positive (in OLS) to negative (IV), thus indicating a large endogeneity of return correlation as a determination of bilateral asset holdings (Coeurdacier and Guibaud 2005).

4.2. Data

This research relies on bilateral trade from UNCOMTRADE, portfolio from Consolidated Portfolio Investment Survey (CPIS) of the IMF, and bank lending flows from the Bank of International Settlement for the empirical analysis. The countries are selected into the sample on the basis of availability of data on these three types of flows, and data on stock market return index. While trade statistics at the aggregate level is quite comprehensive, portfolio and bank lending statistics are available for much fewer countries, and for shorter time series. The CPIS was only launched in 1997, but the data for that year was quite limited. The more

comprehensive data are available only from 2001 onward. Bank lending data is available for longer time series, but for 26 source countries only, much fewer compared to trade and portfolio data. The current research selects 33 countries into the sample, after considering the comparability among trade, portfolio, and bank lending, so that no countries with too many missing observations are in the sample. The period studied is 2001-2007, the latest period for which data are available up to the time of research. Hence the empirical analysis in this research is based on panel data.

The portfolio data used in this research is total portfolio assets (including equity asset and debt asset) held by one country in another country. Readers may question why not to use equity asset to make it more comparable to equity return index as one of the determinants. The reason equity asset flow is not chosen is because of the much more limited availability of data at this disaggregate level. Much fewer countries have such break-down details on capital flow, and again most of them are developed countries. Such non-randomness in data availability makes the sample selection bias even worse.

It is quite common in past research to normalize trade and capital flows by GDP, due to the better econometric properties obtained, compared to the alternatives. This research, however, chooses to use trade, portfolio, and bank lending in log form, not scaled by GDP for the data reason. The CPIS data covers many small economies with disproportionately large financial sector, which are referred to as off-shore financial centers. Some of these countries are in the sample. When scaling equity holdings by GDP, offshore financial centers dominate the picture (Lane, Milesi-Ferretti et al. 2005). This bias in the CPIS data makes it unattractive to normalize the equity holdings by GDP in empirical analysis.

For bank lending, the BIS data are the best available so far. However, since they are available mostly for developed countries as a source of bank lending, the sample is dominated by developed countries, and completely misses out bank lending from developing countries. This problem of selection bias in the sample will cause some bias in the empirical results, when exploring the relationship with other variables.

More details on the sample, data definition and source are provided in Appendix I. 1.

5. Empirical Strategy and Results

5.1. Empirical Strategy

The data confirms past research findings that different types of flows are complementary and mutually reinforcing, reflected in their high pair-wise correlation (0.69 between trade and portfolio, 0.77 between trade and bank lending, and 0.81 between portfolio and bank lending, all in log form). Figures I.1 through I.3 provide a clear visual relationship among these types of flows.

Figure I. 1. Correlation between bilateral trade in goods and portfolio

Figure I. 2. Correlation between bilateral portfolio and bank lending

Figure I. 3. Correlation between trade and bank lending

A further step of this exercise of checking the causal relationship among these variables is the panel Granger tests, following Holtz-Eakin et al. (1988) approach:

$$y_{it} = \alpha_i + \sum_{l=1}^m \gamma_{lt} y_{it-l} + \sum_{l=1}^m \delta_{lt} x_{it-l} + u_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (I. 10)$$

where α_i represents the individual fixed effect, and the coefficients γ and δ are implicitly assumed to be identical for all individuals. It follows that the Granger causality from x to y can be tested with the null hypothesis:

$$H_0: \beta_1 = \beta_2 = \dots = \beta_l = 0$$

The rejection of H_0 indicates that x Granger causes y .

The panel Granger test using this method with two lags in Table I. 3, Appendix I. 3, confirms that these three flows in fact Granger-cause each other. This justifies a model that uses one flow as an explanatory variable to another flow in this essay.

Based on the research interest, the past literature using gravity model, and the available data, the model in this research will be defined as

$$\begin{aligned} T_{ij,t} &= \alpha^T + \beta_G^T G_{ij} + \beta_I^T INS + Z^T + \varepsilon_{ij,t}^T \\ P_{ij,t} &= \alpha^P + \beta_G^P G_{ij} + \beta_I^P INS + Z^P + \varepsilon_{ij,t}^P \\ L_{ij,t} &= \alpha^L + \beta_G^L G_{ij} + \beta_I^L INS + Z^L + \varepsilon_{ij,t}^L \end{aligned} \quad (I. 11)$$

where T , P , L stands for trade, portfolio, and bank lending, respectively, i and j are subscription for source and host countries, respectively; G_{ij} is a vector of standard gravity variables, INS is a vector of institution variables, and Z is a vector of control variables specific to each flow, all by source and host countries, β' are vectors of parameters to be estimated, and $\varepsilon_{ij,t}$ is the error term.

This model will be additively tried in three specifications. First it will be attempted with gravity variables only, as a benchmark to be comparable to previous research. Next, the institution variables will be added, on the assumption that institutions have cross-cutting effects on all bilateral flows. And finally, a set of control variables specific to each type of flows will be added to further explore their individual impacts.

Due to the strong mutually reinforcing effect among trade, portfolio, and bank lending, as shown by the descriptive statistics and past research, each flow will alternatively enter the right hand side to explain the others. The following system of equations will be applied to address the simultaneity and to explore the cross-flow effect:

$$\begin{cases} T_{ij,t} = \Phi^T(\alpha^T, \beta_G^T G, \beta_I^T INS) + P_{ij,t} + L_{ij,t} + e_{ij,t}^T \\ P_{ij,t} = \Phi^P(\alpha^P, \beta_G^P G, \beta_I^P INS) + T_{ij,t} + L_{ij,t} + e_{ij,t}^P \\ L_{ij,t} = \Phi^L(\alpha^L, \beta_G^L G, \beta_I^L INS) + T_{ij,t} + P_{ij,t} + e_{ij,t}^L \end{cases} \quad (I. 12)$$

where all the variables are defined as before, and $\Phi(\cdot)$ includes gravity variables and institution variable from *Equation I.11*. In the *I. 12* system, different flows enter the right hand side alternatively to capture the cross-flow effects between them.

In terms of specific control variables, transport cost is used for explaining trade; capital control, return index, and return correlation between markets are used for explaining portfolio flow; central bank reserves as a share of GDP and interest rates of both source and host countries are used for explaining bank lending.

5.2 Empirical Results Based on Gravity Model

5.2.1. Benchmark Gravity Model

The study starts with the benchmark gravity equations. Following the standard econometric steps, the empirical exercise begins with OLS before applying other techniques to address econometric problems. In Table I. 4, Appendix I. 3. the first panel reports single OLS equations and the second one reports single equations with lagged dependent variable to address the autocorrelation problem revealed by the low Durbin-Watson statistics¹. An overall remark is that the model has quite strong explanatory power (adjusted R^2 are above 0.65).

In single OLS equations (Panel 1, Table I. 4), one can see that distance matters in determining all flows, i.e. trade, portfolio, and bank lending. The coefficients of distance are all significant at 1% level, with negative sign. The coefficient for bank lending is the largest, while the one for trade is the smallest. Based on this result, distance matters for financial flows as it does for trade flows, contrary to past literature's assumption of "weightless" financial asset. This indicates that all transaction cost, information cost, and friction impacts are captured by distance, as confirmed by past research.

¹ GLS has been tried to address the same problem. The results are not much different from the OLS, hence not reported.

Size, as measured by GDP, matters as well for bilateral flows. The significant and positive coefficients of GDP of both source and host countries indicate that countries' economic activities gravitate toward each other by the mass of economic density, as predicted by the agglomeration theory, and explained by the economies of scale. Another measure of size, per capita GDP, gives the same result: richer countries tend to trade more with each other, buy more portfolio assets in and lend more to each other. This confirms Lucas' observation that capital tend to flow to the richer countries. Moreover, source country's per capital GDP has very large coefficients for portfolio and bank lending (i.e. 1.7 and 1.3, respectively), which indicates that capital mostly comes from rich countries.

Unlike distance and size, border does not matter much for financial flow as it does for trade. The coefficient of border is negative for portfolio and insignificant for bank lending. This might reflect the risk diversification nature of financial flows.

Common language significantly contributes to all flows, and mostly portfolio. This reflects the facilitating role of cultural similarity in enhancing trust and lowering the transaction cost. Common legal origin plays a similar role.

When lagged dependent variables are added to the equations (Panel 2, Table I. 4), the significance of most explanatory variables are preserved, but the size of the coefficients drops substantially. This does not change the conclusion about the effect of most variables. An overall improvement of all equations is a substantial reduction in the sum of squared residuals. However, the sign of per capital GDP in the trade equation swings from positive to negative. This result is similar to the system of equations discussed below. The coefficients of border turn insignificant in all equations.

The above exercise may miss out other important explanatory variables, and thus may give rise to suspicion about the misspecification and bias in the above results. The above benchmark gravity equations have not taken into account the effect of one flow on the others, namely the effect of trade flow on portfolio or bank lending, the portfolio flow effect on trade, etc. And the data shows that they are highly correlated. The system of equations of the benchmark gravity equations will address this concern by adding bilateral flows as explanatory variables. The results are reported in Table I. 5. One can see that in the trade equation, once controlling for portfolio and bank lending, per capita GDP turns negative for both source and host countries. This indicates that controlling for portfolio and bank lending, lower income countries would trade more. The size of distance coefficient is substantially

reduced. This result is plausible, since both portfolio and bank lending would further trade, thus make distance less deterrent. The similar reduction in size of GDP coefficients is observed, indicating that portfolio and bank lending would substitute for economy size. In other words, countries that are apart at the same distance, having the same economy size, would trade more if portfolio and bank lending flow exist between them. The coefficient of border remains unchanged, indicating that neighboring countries trade regardless of financial flows between them. Common language and legal origin experience a similar reduction in the size of coefficient, showing their weaker effect when portfolio and bank lending are in place.

The portfolio equation shows even larger magnitude in the drop of distance coefficient size, once trade and bank lending are controlled for. This confirms that the information costs, which are even more important for asset holding, are captured by distance, and can be substantially reduced with the presence of trade in goods and bank lending. A substantial reduction in size of GDP coefficient also happens, showing the similar effect as in the trade equation: other bilateral flows between countries can substitute for their size. Border still has negative coefficient as before, language is still significant and positive, but with much smaller coefficient, reflected the information role provided by trade and bank lending flows. Common legal origin turns out insignificant, probably reflecting the same information channel, which is now captured by trade and lending.

Bank lending equation shows the most different outcomes, compared to the other flows. The coefficient of distance, which used to be the largest among the three flow equations, now is the smallest, showing that the information cost is now substantially compensated for by trade and portfolio flows. Host country's GDP coefficient now turns negative, indicating that the OLS single equation in Table I. 4 might have missed out important effects from trade and portfolio. This negative coefficient of host country's GDP in this system of equations reveals that controlling for bilateral trade and portfolio flows, lenders tend to lend to borrowers in smaller economies. Furthermore, host country's per capital GDP turns insignificant. Border and language do not matter anymore, once trade and portfolio are in place.

In all three equations of the system, the coefficients of other bilateral flows as explanatory variables for any particular type of flows are always significant and positive. This result confirms past research and descriptive statistics that bilateral flows tend to be mutually reinforcing.

5.2.2. Augmented Gravity Model with Institutions

We have seen so far that the benchmark gravity model explains well both trade and financial flows between countries. But on top of gravity factors, past researches (Kalemli-Ozcan, Alfaro et al. 2003; Papaioannou 2009) also show that institutions matter in economic transactions and are the key explanation for the Lucas Paradox. The next step of this empirical exercise is to add institutions across equations, going through the similar procedures as before, to learn about their importance in determining bilateral flows. The results are reported in Table I.6, Appendix I.3. We discuss OLS equations first as a benchmark (first panel, Table I.6). Institutions enter with significant positive coefficients in all equations. We see that institution variable of source countries in the portfolio equation has the largest coefficient, followed by source country's institution in the bank lending equation. Furthermore, for host countries, the coefficients of portfolio and bank lending equations are larger than that of the trade equation. This shows that institutions may have stronger effect on financial than for trade flow. The explanation for this result might be in the fact that financial flows are likely to be more dependent on and hence vulnerable to institution quality, given the nature of risk adversity of finance. Compared to trade, financial flows are also more sensitive to rule of law, regulatory quality, and corruption control, which are all components of institution quality. To get a sense of the magnitude of the effect of institutional quality on trade, portfolio, and bank lending, we may consider two countries such as South Africa and Australia: if we move up from the 25 percentile (South Africa) to 75 percentile (Australia) in the distribution of the institution index, based on the OLS result in Table I.6, we have a 30 percent increase in trade, 84 percent increase in portfolio, and 114 percent increase in bank lending.¹ The coefficient of institution for the banking equation should be interpreted with caution, due to the missing data for bank lending data (more about this issue in sub-section 5.2.3). Regardless of this data problem, the effect of institutions on different flows is quite significant.

Most other variables turn out quite similar to the results of the benchmark model. Distance has negative and significant coefficients in all equations, and again is the highest in the bank lending equation. GDP has positive and significant coefficients across equations as before.

¹ The institution index ranges from -2.5 to 2.5. In this cross-country sample, the institution index for South Africa is 0.43, and for Australia is 1.62. An improvement of institution from South Africa's level to Australia's level means a change of 1.19. Based on the coefficients for host country's institutions (country j), as a country moves from 25 percentile to 75 percentile in the distribution of institution index, trade would increase by 30 percent ($=0.25 \times 1.19$), portfolio would increase by 84 percent ($=0.7 \times 1.19$), and bank lending would increase by 114 percent (0.96×1.19).

Border shows unstable sign and significance, thus no firm conclusion can be made about this variable. Common language does not matter for bank lending. Though remaining positive in most cases, per capita GDP has substantially smaller coefficient. This result reveals the effect of institution variable in the equations, given the high correlation (0.77) between income level and institution quality. In this sense, these equations are likely to suffer from multicollinearity, which will be addressed in the next step by dropping per capital GDP from the equations, and to examine the institution effect only.

Adding lagged dependent variable to the right hand side (AR(1) in second panel, Table I.6) turns the coefficients of per capita GDP insignificant or negative in some equations. Common legal origin and host country's institution also turn insignificant. This shows that these variables are fragile and the OLS results for these variables in the previous panel should be interpreted with caution.

To follow the same procedure as in the benchmark model, the next step will be to add other flows into the right hand side in a system of equations to control for their effects. The results are reported in Table I. 7. The first panel reports the system of two equations for trade and portfolio and their effect on each other. The second panel reports the mutual effect between trade and bank lending. And the third panel reports the mutual effect between portfolio and bank lending. All the other standard variables remain the same as before.

In the first panel, when trade and portfolio are simultaneously determined, both enter the respective equations with positive and significant coefficients. This is consistent with the previous results, and confirms past research findings. Distance matters more or less the same for both trade and portfolio. Economy size matters for portfolio more than it does for trade. Border still negatively affects portfolio as before. Both common language and legal origin positively affect trade and portfolio. Institutions, however, enter with negative coefficients; this outcome might be because some of the institution effects are probably captured by portfolio.

The second panel reports the mutual effects of trade and bank lending. Here institutions have insignificant coefficients in the trade equation. Combined with the above result from the trade-portfolio simultaneous equation system, the result here indicates that institutions may not really matter for trade. Border and common language enter with negative sign in the bank lending equation. This is somehow counterintuitive and could be due to the sampling bias problem. The remaining gravity variables are significant and have expected sign as before.

Both trade and bank lending have positive and significant coefficients in their respective equations, indicating that they are mutually reinforcing.

The last panel of Table I. 7 reports the mutual effects of portfolio and bank lending. Border has negative sign in the portfolio equation, and is insignificant in the bank lending equation. Common language does not matter for both, probably reflecting the fact that part of the transaction cost effect is now captured by bank lending (portfolio) in the portfolio (bank lending) equation. Other gravity variables show similar properties as before. Institutions have very significant and positive coefficients in both equations. The coefficient is especially high for source country in the portfolio equation. And both portfolio and bank lending have significant and positive coefficients in their respective equation. This outcome again shows that different types of capital flows mutually reinforce each other.

In all of the equations throughout this empirical results, trade equations always have the highest adjusted R^2 , indicating that the gravity model is more powerful in explaining bilateral trade than capital flows.

5.2.3. Gravity Model with Specific Controls

Until now we have examined only variables that have cross-cutting effects on all flows. However, each type of flows is certainly determined by a range of specific factors that are relevant to it only, and not to the other flows. Therefore, the next step in this empirical strategy is to add those variables into the model, again in single equations first, and then in systems with one flow as determinant of the others. Table I. 8, Appendix I. 3, reports single equations with standard gravity variables, institutions, and specific control variables for each type of flows. The first panel present OLS results and the second panel report the GLS with lagged dependent variables.

Both the OLS and GLS results show that transport cost enters the trade equation as trade-specific control variable. It has negative and significant coefficient, as expected. Capital control, correlation of equity return index between source and host countries, and equity return of host countries are used as portfolio-specific control variables. Capital control has negative and significant coefficient for host country, but positive for source country, indicating that it is deterrent only if applied by host countries. One remark about capital control here is that some of the control measures mean to regulate and keep record of the capital account transactions, and not necessarily to restrict them. Therefore, the positive

coefficient of capital control for source countries may instead capture the regulatory sophistication.

Contrary to past research findings (Lane, Milesi-Ferretti et al. 2005; Portes and Rey 2005; Aviat and Coeurdacier 2007), the OLS results in the first panel shows that correlation of equity return between source and host has negative and significant coefficient, indicating the risk diversification motivation of cross-border asset holdings. Lane and Milesi-Ferretti's (2005) research was based on cross-sectional data of 2001 of about 23 source countries and 172 host countries; Portes and Rey's (2005) research covered much smaller sample of countries, mostly developed, during the period of early 1990s; and the work by Aviat and Coeurdacier (2007) was based on the 2001 cross-sectional data of 28 source and 41 host countries, with less than 1000 observations. All the three aforesaid researches found a positive correlation of equity return, meaning no risk diversification pattern of bilateral asset holdings. The current research is based on a more updated database, larger sample, with more emerging markets, and uses panel data, hence may give different result. This result is a supporting evidence for the CAPM model. However, the GLS equation shows insignificant coefficient for return correlation, which makes the conclusion from OLS equation less affirmative. More empirical test is needed for this variable before a firm conclusion can be made. And that additional empirical work will be presented in the next sub-section.

Return index of host countries has statistically significant and positive coefficient. However, the coefficient is very small, thus it may not be economically significant. Hence the return chasing motive of bilateral portfolio is unclear here.

Central bank reserves as a share of GDP and interest rate, both at source and in host countries, are control variables for bank lending. Reserves of host countries have a positive and significant coefficient, showing the securing role of reserves in attracting bank lending. Reserves of source countries, however, have negative sign, which may reflect the data mismatching problem, instead of economic meaning. The BIS bilateral bank lending data are available for 26 source countries only, mostly developed countries. However, the countries that top the sample in terms of central bank reserve as a share of GDP (see Figure I.4), such as Singapore, Hong Kong, Malaysia, Thailand, Korea (who build up huge reserves after being hard hit by the financial crisis in 1997) do not report bank lending data, hence do not have their matching data on bank lending. In the top 20 countries in terms of central bank reserves, 11 do not report bank lending. Therefore, the negative OLS coefficient of central

bank reserves for source countries in this empirical exercise simply reflects the missing data problem.

Figure I. 4. Top Countries in Central Bank Reserve, Scaled by GDP

Source: World Bank, World Development Indicators

The OLS and GLS equations show different results for interest rate; hence more empirical work is needed before making firm conclusion about this variable.

Most of the gravity variables and institution variable turn out with similar results as before. Border turns out to be the most fragile variable in explaining financial flows, next come common language, which has either insignificant or negative sign. Institutions always have significant and positive coefficient in financial flows equations.

5.2.4. Mutual Effects Between Flows

The last step in this empirical analysis is to control for mutual effects among three types of flows. This is conducted in a system of two equations, in three pairs of flows, as before. The results are reported in Table I. 9, Appendix I. 3.

The first panel report simultaneous system of trade and portfolio equations. Both trade and portfolio enter with significant and positive coefficients in their respective equations. Specific control variables (transport cost for trade, capital control, return correlation, and host country return for portfolio) for each flow have their expected signs, except for capital control of source countries, the same as before. Institutions again have negative coefficient as explanatory to trade, when portfolio is controlled for. Distance and GDP have their expected sign as before. Border has negative coefficient as explanatory to portfolio. Common language and legal origin both positively affect trade and portfolio.

In the trade and bank lending system (Panel 2), both lending and trade have positive and significant coefficient, confirming their mutually reinforcing effects. Interest rates are not significant in determining bank lending, but host country central bank reserve is. Source country's reserve is suspected to have wrong sign due to the problem of missing data on source countries mentioned earlier. Transport cost obviously negatively affects trade. Institutions do not have significant coefficient in the trade equation, but they do in the bank lending equation. Border and language have negative coefficient in the bank lending equation. The remaining gravity variables behave as expected.

The portfolio and bank lending system (last panel) shows that both of these flows mutually reinforce each other, reflected in their positive and significant coefficients. Capital control of host countries negatively affect portfolio. Correlation of return between source and host countries again has negative coefficient, confirming the risk diversification pattern of portfolio flows. Return index of host countries is statistically but not economically significant in determining portfolio flows. Central bank reserve of host countries positively affects bank lending. And only interest rate of source countries matters in bank lending. Institutions have positive and significant coefficients for both source and host countries in the case of portfolio, and for source countries in the case of bank lending. Host countries' institutions do not matter in explaining bank lending. Border has negative coefficient in portfolio equation, and insignificant in lending equation. Common language has negative sign in both. The remaining gravity variables turn out with expected sign.

For robustness check, lagged dependent variables are added to the right hand side of the same systems. The results are reported in Table I. 10. The coefficients of common language turn insignificant in some equations. The coefficients of source country's institution turn insignificant in the trade and banking equations. Most control variable for the portfolio and bank lending equation also turn insignificant. But distance, host country's GDP, and to some

extent, institutions survive this check. Therefore, the conclusion about the gravity effect does not change after this additional check. Both trade and capital flows are resistant to distance and the associated transaction costs. Large economies still attract more capital, as predicted by the economic geography and agglomeration theory. Host country's institutions remain significant determinant of portfolio inflows. Regarding the cross-effect between flows, the coefficient of portfolio in the trade equation (first panel) is the only one that turns insignificant. This indicates that trade might contribute to boost portfolio flows, but portfolio may not boost trade. All other flow variables preserve their sign and significance as determinant of the respective bilateral flows.

6. Concluding Remarks

6.1. Summary of Findings

This research is the first one that put together trade in goods, portfolio, and bank lending in the same empirical framework to examine their varying sensitivity to gravity factors and their cross-effect. In this attempt, this research finds that gravity matters for both trade and financial capital flows.

The empirical findings from this research indicate that bilateral capital flows respond to gravity factors at least as much as bilateral trade does. More specifically, bilateral distance and economy size are significant determinants of bilateral trade and financial capital flows. Distance in most of the cases has larger coefficient in the capital flow equations than it does in the trade equation, which confirms past research findings about the information cost captured by distance. Size positively contributes to capital flows in all specifications. This shows some support to the agglomeration theory of clustering activities for the economies of scale and knowledge spillover. Per capita GDP enters most portfolio and bank lending equations with positive and significant coefficients. This result confirms the Lucas Paradox of more capital flow from rich to rich countries. Geographical adjacency (proxied by common border) and cultural and legal similarities also positively contribute to bilateral capital flows, though this effect is not as robust as it is in the case of trade.

Within capital types, the coefficients of distance in bank lending equations in general tend to be larger than in the portfolio equations. This might indicate a larger negative effect of distance and the associated information cost on bank lending than on portfolio. Given the default-prone nature of bank lending, the worst cost of asymmetric information could be fund loss, while that cost for portfolio asset holders could only be lower return or lower price for the asset, much more benign compared to complete fund loss. In terms of cost of acquiring information, one could expect that it is more costly to acquire information about borrowers and their creditworthiness than to obtain information about stock or bond issuers. The latter usually have to provide more transparent accounting information in their prospectus in the case of initial public offer, or make it publicly available for potential stock holders, while the former do not.

Level of development (per capita GDP) of both source and host countries matters more for portfolio than for bank lending. This is not surprising, since portfolio capital is strongly correlated with level of development. Less developed countries usually experience smaller

portfolio flows, and resorts more on bank lending for investment needs. No such clear pattern is present for responsiveness between portfolio and bank lending to size variable (GDP).

When the model is augmented with institution variable, most gravity factors turn out with similar result, except for per capita GDP. The high correlation between per capita GDP and institution quality may explain this outcome. Institutions of both source and host countries turn out with positive and significant coefficient in most equations for portfolio and bank lending. This result indicates that institutions matter more for capital flow than for trade. The overall message from these findings is that at least institution is one of the contributing factors to the Lucas' paradox.

New measures of capital control in the model indicates that only capital control of the host countries is negatively associated with capital inflow, while capital control applied by source countries either has positive or insignificant effect on capital outflow. The equity return of host country seems to have positive effect on portfolio inflow, and this is an evidence of return-chasing motivation of portfolio flows.

When equity return correlation is added as a specific control for portfolio flow, the OLS results show that portfolio assets tend to go to countries with uncorrelated equity return with home country, supporting the CAPM model on risk diversification motive in portfolio choice. However, the AR(1) equations do not provide the same results. This finding is quite different from past literature on the topic, which found no evidence of capital flowing between uncorrelated markets. The explanation for this difference may lie in the sample sizes and periods, which are larger and more recent, respectively, in this research, compared to previous ones. Based on the finding from this research about the equity return correlation, one can say that there is some evidence of risk diversification motive in international portfolio flows. However, this is not a very robust result.

In terms of bank lending determinant, central bank reserve of host countries turns out to have significant effect on loan attraction from foreign banks. Interest rates do not show significant effect on the flow of lending.

When controlling for the mutual reinforcing effects among different flows, the results in all but one specification show that trade, portfolio, and bank lending complement and reinforce each other.

In summary, this research has compared the sensitivity of trade, portfolio, and bank lending flows to gravity and institution factors. It also explores the role of institutions in trade and

capital flows. Institutions are found to be a plausible explanation for the lack of capital flow to poor countries. The result from the empirical analysis provides more evidence to support theories of international portfolio diversification in financial economics, and contributes to the literature about the behavior of capital flows. Apart from that, the research also analyzes the pattern and determinants of different types of capital, based on factors that specifically affect each, and the cross-effect between different economic linkages. This mutually reinforcing effect between different types of linkages may have quite important implications on the balance of payment, hence would be a policy relevant topic for further study in the future.

6.2. Policy Recommendations

Findings from the research presented in this part of the thesis has shed some light on the gravity effects on trade and capital flows, the effect of institution on capital flows, the interaction between trade and capital flows, between different forms of capital, and the motivation of portfolio choice. These findings are certainly relevant to policies that manage international trade, capital flows, and external macroeconomic stabilities. Along the same line with the research objectives and the empirical findings from the previous section, this sub-section will discuss policy recommendations in four main areas: i) treatment of external financing under the gravity effect; ii) institution building in connection to capital attraction and management; iii) managing the financial liberalization given the interaction between trade and finance, and between different forms of finance; and iv) better insight in capital flow pattern, with special emphasis on the role of the central bank and its policies.

As cross-border finances are subject to the country's geographical characteristics and economy size vis-à-vis its creditors and fund recipients, financial assets are not 'weightless', due to information costs, transaction costs, etc., that tend to increase with distance. In this sense, borrowing or receiving portfolio capital from a distant source country is more costly to the recipient country than acquiring fund from a country nearby. This outcome certainly has implication on the decisions regarding sovereign borrowings, debt issuing, or asset holdings. For example, all else being equal, it would be cheaper for a country to issue government bonds in securities market in the region or a financial centre nearby than in the one across the ocean. In addition, issuing debts or holding assets in a large foreign economy would be more beneficial due to the larger volume of bilateral transactions, economies of scale, spillover effects, etc., which help reduce transaction costs, as predicted by the agglomeration theory.

The second major finding from this research shows the importance of institutions in attracting capital flows, hence sends a clear message to policy makers about getting the institutions right in order to invite capital inflows. Two types of institutions will affect capital inflows. The first is the overall political and legal environment, macroeconomic policy credibility, and predictable liberalization measures. All these aspects of overall institution quality would affect the country's rating for creditworthiness, thus its cost of capital. A government that is capable of maintaining political stability, sound macroeconomic policies, has no record of default on its own debt, and has a foreseeable liberalization agenda would make the country more attractive to international capital, and hence help reduce the cost of capital, and improve economic efficiency. It is important that the government keeps an eye on policy variables that contribute to the country's international credit rating. Good credit rating would make it easier and cheaper for the country to access capital market when needed. Creditworthiness takes long time to build, but could be severely ruined by unfavourable policy signals. In this connection, it is advisable for countries that are new to the international capital market to issue debt when the government fiscal stance allows and the macroeconomic fundamentals are straight, at least to gain international recognition in creditworthiness for future need. Waiting until bad time (usually when foreign finance is most needed) to access world capital market for funding would be too late or too costly. Therefore, building good international creditworthiness is a fundamental step to build conducive institutions in the long run for the sake of capital inflow attraction. The second type of institutions that affect capital inflows is financial sector institutions, or infrastructure. This type of institutions has a direct impact on how capital inflows would be allocated to the most productive investment. For many developing countries, financial sector reform or deepening before opening up for capital inflows would be essential to avoid fund misallocation or macroeconomic instability.

Clear evidence from this research about the complementarity and mutual reinforcement between trade and capital flows, between different forms of capital raises a key policy question about the coordination between trade and financial liberalization, and sequencing of liberalization for different types of capital. Although there is no one-size-fit-all recommendation to external liberalization sequencing, certain guiding principles have been drawn from past experience of liberalizing countries and from empirical research. Sequencing matters, and 'financial liberalization first' strategy increases the country's vulnerability to crisis (Edwards 2009). Since trade invites more capital and vice versa, appropriate pace of trade liberalization first with due consideration to capital account liberalization is essential.

With regard to financial liberalization, the liberalization policy package and the consequent economic benefits depend on the current financial development of the country, the type (FDI versus portfolio) and nature of capital inflow (short-term versus long-term) it can anticipate after liberalization, the institution quality, the trade openness, labor market rigidities, and the overall development level. Kose, Prasad et al. (2009) has found that there are threshold levels of the aforesaid variables that are important determinants of the relationship between financial integration and growth. Theoretically, financial liberalization is good for economic growth and efficiency. Empirically, however, the growth outcome of countries undergoing financial liberalization is quite mixed. Policymakers may need to proceed gradually with capital account liberalization, or may have to resort to additional instruments during a transitory period, such as restrictions on short-term capital flows, to prevent excessive volatility from adversely affecting domestic stability (Agenor 2003).

In addition to sequencing of liberalization, counter-cyclical policies are the key to address the boom-bust cycle that might be precipitated by the mutual reinforcing nature of trade and capital or of different forms of capital.

Given the complex nature of capital flows and their respective exposure to different types of risks, and based on the risk diversification motivation of portfolio capital found in this research, it is critical for the government and the monetary authority to gain more insight and expertise in the analysis of financial market. During boom time, one type of capital inflows would induce other types of capital inflows, facilitated by the continuously new and more complicated financial products. Depending on the nature of capital inflows, the currency mix, and their effect on the country's external balance sheet, different policy measures can be resorted to in order to avoid the excessive exchange rate appreciation, balance of payment pressure, and most of all, the build-up of asset bubbles and exposure to financial crisis. When the country becomes a more integral part of the world financial market, it also requires the central bank to be more capable of analyzing the global capital flows and their impact on the country's exposure to balance of payment risks, and thus to tailor the monetary policy stance accordingly. Moutot and Vitale (2009) suggest that assessments of the stability of the domestic and the international financial system should be routinely taken into account in the assessment of the monetary policy stance and the risks to price stability. In order to inform the monetary policy making process, the central bank may need to conduct thorough analysis of the country's external balance sheet to understand the risk pattern the country is exposed to. Kubelec, Orskaug et al. (2007) recommend that the composition of external balance sheet

of the country be analyzed in terms of asset and liability structure (e.g. FDI, bonds, equities, loans, money market instruments), currency mix, geographical location, and maturity in order to understand the potential impact of various shocks on the domestic economy. This analytical work should be part of the policy making process of the central bank in the context of financial liberalization.

Part II. Real and Financial Effects of Regional Trade Agreement

1. Introduction and Rationale

This part of the thesis aims at exploring the effect of comprehensive economic integration under Regional Trade Agreement (RTA) on both the real and financial sides of the economies involved. The research is motivated by the proliferation of Regional Trade Agreements (RTAs) during the 1990s and 2000s, and the implications on the regional comprehensive integration.

There are huge literatures on RTAs and their trade effects, especially trade diversion and creation. The literatures on the link between growing trade and business cycle also have a long recorded history. Moreover, financial integration is another intriguing topic that inspires so many researches in the past. However, the effect of policy harmonization and external liberalization under the RTA framework on real and financial integration among RTA members is an unexplored territory.

In the context of comprehensive economic integration under RTA framework, which covers a much wider scope of integration than the traditional trade in goods, the potential shock transmissions are expected to work through both real and financial channel, or from real to financial sector and vice versa. As RTAs come into effect, as a result of lower barriers to trade in goods, trade in services, capital mobility, labor mobility, and more technical standard harmonization, member economies tend to be more closely linked through all the growing economic activities. Therefore, shocks to real sector in one economy would be more easily transmitted to another one within the RTA than they would otherwise. Shocks to one specific industry would also be transmitted throughout the RTA among countries that share the same industry or that are linked through intra-industry trade. The presence of multinational financial institutions in multiple countries within RTAs would serve as a channel for shock transmission from financial to real sector. For example, a monetary policy shock in one country (e.g. credit tightening) would cause multinational banks to relocate their lending to

another country, thus affecting the real sector in this second economy through the credit channel. In this case, financial shock in one economy causes real shock in another one.

The more correlated business cycle within RTA may also have implications on national economic policies. When the domestic economy has joined the regional business cycle, then short-term domestic interest rates would be more influenced by the regional and international business cycle, and less by the central bank. In this context, national monetary policy in the traditional sense would become less effective.

RTA may send a positive signal to investors from the rest of the world as well. The literature on RTAs in the past has discussed extensively about the trade creation and diversion effect of RTAs. In the present context, RTAs may have the financial creation and diversion effect as well. Developing RTA members of the deal could expect more foreign investment inflows after signing such agreement. Fernandez-Arias and Spiegel (1998) show that indeed as a result of the bilateral North-South trade accord, output and foreign investment in the Southern partner nation increase. Overall Southern output also grows, but the financial creation in the partner nation may be accompanied by financial diversion from the rest of the South. While the trade accord obviously benefits its voluntary parties, it may hurt the rest of the South.

Service trade liberalization has been a more and more important part of many recent RTAs. Therefore, service trade is expected to grow substantially after the liberalization under RTAs. This may exert another challenge to balance of payment management and service trade volume recording. Not all modes of supply in service trade are recorded in the balance of payment transactions. Most developing countries do not keep records of services provided by foreign affiliates (Mode 3) or foreign natural persons (Mode 4)¹. A number of OECD countries have started collecting statistics of foreign affiliates' activities and foreign natural persons who are service providers. The collected data, however, is far from satisfactory for policy management purposes. As this part of the international service trade is growing, the balance of payment data for this part of the transactions will become more severely underestimated over time, and any policy analysis based on these data would be misleading.

Harmonization of technical standard is another component that gains more weight in recent RTA negotiations. Technical standard binding may exert asymmetric impact on the developed and developing members of the RTAs. Chen and Mattoo (2004) show that technical standard harmonization causes within-RTA trade to increase significantly for the

¹ See page 63 for GATS classification of different modes of service supply.

affected industries, and exports to the developed RTA member countries increase as well, but exports to the excluded developing RTA member countries (those who do not participate in the technical standard agreement) decline. And this asymmetric effect may cause developing countries to be hurt more by an increase in the stringency of standards and benefit less from economies of scale in integrated markets.

The research presented in this part of the thesis is highly motivated by the RTA formation process and the dual effect of comprehensive regional integration and the implications on policy making within RTAs. The implications may also affect the future direction of RTAs formation in the global sense. If RTAs are found to contribute to the shock transmission across countries, then shocks are expected to spread faster in a world of more numerous RTAs. Moreover, RTA shaping without preventive measures to deal with contagious negative shocks would make member economies more vulnerable to external shocks. Findings on the effect that RTAs may have on real economic and financial linkages would be relevant for policy makers, academic research, and private investors in their decision making process.

Policy makers, legislature, executive bodies, trade negotiators, policy advisors, etc. need evidence-based arguments in the RTA-related policy processes. Impact assessment studies have been quite effective tools for multilateral and regional trade negotiation in the past. Countries can show evidence of trade and investment liberalization impact on their own economies as well as their partners' economies, both negative and positive impacts on different groups of stakeholders, to convincingly support their position at the negotiation table. Countries also need evidence of gains and losses from regional comprehensive integration before deciding whether to enter such a deal. In brief, findings on RTA role in economic impact help countries' leaders with informed decision about the participation.

Despite the ample findings from the literature about different impacts of globalization and regionalization, this research is, to my best knowledge, the first that tries to link both the real and financial effects of RTAs. The main contribution of the research is to explore empirically the extent of this dual integration in the RTA context. The second contribution is an extension of gravity model application beyond the explanation of bilateral trade, into a new area of GDP growth correlation and equity return index correlation.

For international portfolio investors, the benefit of portfolio diversification comes from the imperfect correlation among different national markets. And this correlation can be affected

by many factors, including global, country, industry, or firm specific factors. And as countries are more integrated through trade and investment links, or through a comprehensive cooperation package covered by RTAs, the effects at different levels through different channels on national return index correlation can be intertwined and more complex to untangle. And if RTAs are found to be contributing to this process, this finding would provide a guide to investors and fund manager in their portfolio diversification strategy, when RTAs are factored in.

This research attempts to fill in the existing gap about dual RTA effects by probing the role of RTAs in regional linkages through real business cycle and financial linkages. In addition, as other factors also contribute to business cycle and financial market correlations, this research will also attempt to explore those factors. Having said that, the key research interest will be:

- i) Exploring the effect of RTA membership on business cycle and financial market correlations among member economies.
- ii) Other factors contributing to business cycle correlation; and
- iii) Other factors contributing to financial market correlation

The real business cycle linkages will be represented by the correlation of GDP growth between RTA partners. The financial linkages will be represented by the correlation of equity return index between countries. This relationship is analyzed in a gravity model framework, with gravity variables to control for countries' bilateral factors. This research makes another contribution in terms of methodology of gravity model application in explaining financial linkages. In addition, most previous research (Aitken and Lowry 1973; Frankel and Wei 1998; Greenaway and Milner 2002) used dummies for each major RTA, e.g. NAFTA, EU, MECOSURE, thus only showed the effect of such individual RTAs, not effect of all RTAs.

As the issues addressed in this essay encompass RTAs development, business cycle co-movement, and financial market performance, the following sub-sections will cover all those three broad topics and some theoretical foundations. This will set a background for the empirical investigation, which combines all the three issues in the analysis. This introductory section will be organized as follows: i) an overview on RTA development around the world, the policy measure involved, ii) an overview on financial integration; and iii) a theoretical framework that may explain RTA impact on real and financial integration.

The section will be followed by a literature review on different but related topics of liberalization impact (Section 2), a theoretical background and methodology (Section 3), a main contribution in empirical findings (Section 4), and concluding remarks (Section 5).

1.1. Overview of Regional Trade Agreements

In line with Brown, Shaheen et al. (2005), a brief definition for the different terms alluded to in this bilateral or plurilateral trade arrangement could be useful, as different names are used in the literature, which may cause confusion.

1. A *Free Trade Agreement* (FTA): is where each party to the agreement reduces tariffs and other non-tariff barriers to trade, but maintains its own trade policy vis-à-vis third parties.
2. A *Preferential Trade Agreement* (PTA): is exactly the same as an FTA but the phrase highlights that the lowered trade barriers between partners are preferential to those offered to third parties.
3. A *Customs Union* (CU): is more politically ambitious requiring as it does a common external tariff and the harmonization of external trade policies.
4. *Regional Trade Agreements* (RTAs): simply refer to any of the three above when concluded between members of a regional group.

For the purpose of this research, the slight difference in tariff barriers among these different arrangements is not the main concern. Therefore, this research will refer to them all as RTAs for convenience.

Since the late 1990s the world has witnessed an unprecedented growth of RTAs around the globe in terms of number and the trading volume involved. As shown in Figure II.1, the speed of new RTAs reported to the World Trade Organization (WTO) even accelerated during 2000s. One of the contributing factors to this phenomenal growth of RTAs is the sluggishness in the multilateral trade negotiation under the Doha round of the WTO. This disappointing outcome of the multilateral trading system drives countries to turn to the plurilateral or regional trade solution. Based on the WTO's database on Regional Trade Agreements, between 1999 and 2008, at least 10 new RTAs are notified to the WTO each year, and in 2008 alone, 28 new RTAs were notified, making it the most prolific year in terms

of RTA notification. By the end of 2008, the total number of RTAs in force is 180¹. All WTO members, except Mongolia, are involved in at least one RTA. Some members are involved in as many as above 30 RTAs (e.g. old EU members). This indicates that the Most Favored Nation (MFN) rule under the WTO is either unsatisfactory or insufficient to handle countries' international trade arrangement. And RTAs are resorted to by WTO members as a trade arrangement, which is complementary to the MFN. In addition, most RTAs are also instruments of foreign policy or political and security anchor.

Figure II. 1. Growing World Trade and Number of Regional Trade Agreements

Source: World Trade Organization

Another contributing factor to the RTA proliferation is the change in the world politics since the early 1990s. The fragmentation of formerly united countries such as the Soviet Union and Yugoslavia created a large number of new small countries, which seek alliance with trading partners, who are part of their former country, to secure economic linkages and other policy goals. The switching stance of the United States in the early 1990s toward preferential

¹ For a complete list of RTAs in force, please refer to <http://rtais.wto.org/UI/PublicAllRTAList.aspx>

agreements with Canada and then Mexico also caused a domino effect on RTAs negotiation and conclusion elsewhere around the world.

However, using the sheer number of RTAs as a measure of their importance in the world economic landscape is both misleading and faulty. Clearly, some RTAs are quite important, because of the size of the members' economies and the depth of integration. But many merely exist in paper without really being put in action or making much difference in the member's economic interaction, many RTAs are simply between small trading nations, which do not have any significant impact on the rest of the world. Some RTAs are between countries that already have very low tariff across the board (the CUSTA between the United States and Canada), thus have little impact on the bilateral trade flows. Some have been negotiated for long time and in effect for some time before notifying to the WTO. Others take long time after the notification to take effect. Some countries go through fundamental trade reform and unilateral trade liberalization while negotiating RTAs (sometimes more than one at a time). Thus the trade effect cannot be exclusively attributed to the RTAs. All this is to indicate that the RTA number count and the year of notification have little resemblance with the trade or other effects they may have.

Traditionally, RTAs were turned to as a regional trade solution, and the literature usually looks at the overall trade effect to measure the RTA impact. However, overall trade flows may mask variation in trade pattern at sectoral level and the intra-industry trade, which also bears the production link among countries, rather than the trade alone. Research on the intra-industry trade of RTAs has dated back since the 1960s with work by Balassa (1966), who showed the evidence of growing intra-industry trade after the customs union formation in Europe. And much later, Grubel and Lloyd (1975) came up with new measure of intra-industry trade, and Krugman (1981) provided the new trade theories to show that scale economies and product differentiation (a greater variety of products) could be a basis and source of international trade and aggregate welfare gains. This body of past research pointed out a causal link between trade integration and production network integration.

The nature of economic integration within the RTAs may vary across regions and RTAs. In some RTAs, the integration under RTAs framework is market driven, and the agreement come as a facilitating mechanism to help the marketplace. In others, forming RTAs is institutionally driven in the sense that countries decide to formally sign trade treaties to further economic integration. These two type of integration through RTAs are coined by Ng, Fung et al. (2008) as *de facto* and *de jure* integration, with the former being often more

intense than the latter (Ng, Fung et al. 2008). After the 1997 financial crisis in East Asia, initiatives of regional financial cooperation in coping with future crises have been accelerated and become an important part of RTA negotiations in this and other parts of the world. This makes the regional financial proposals move faster than any serious intention of regional economic cooperation (Ng, Fung et al. 2008). It also marks a new trend in RTA establishment of expanding into the non-goods- trade issues.

The development of new RTAs is more complex and diverse. The number of RTAs concluded among geographically distant countries is increasing. Bilateral RTAs become more common choice, and new RTAs between existing RTAs are also under negotiation. More recent RTAs often go beyond the traditional tariff and non-tariff preferences and WTO framework to include more preferential treatments in terms of investment, intellectual property, environment, labor standard, and more. New initiatives usually involve substantial “behind-the-border” measures of liberalization, such as institutional and regulatory harmonization, which all help reduce transactions costs of trade and investment among the RTA members. In addition, the economic effect of this reduction in transaction cost cannot be fully captured solely by the increase in bilateral trade. Some agreements, such as Singapore-Japan, ASEAN-China, ASEAN-Japan, and India-ASEAN, explicitly use the term “comprehensive economic partnership” (CEP) rather than “free trade agreement” to demonstrate that the commitments go beyond free trade (Feridhanusetyawan 2005). While RTAs between developing countries usually focusing on tariff, or border measures, e.g. the Commonly Effective Preferential Tariff (CEPT) under the ASEAN Free Trade Agreements (AFTA), those between developed and advanced high income developing countries tend to involve substantial service components. For example, the 2002 Japan-Singapore Economic Partnership Agreement had little to do with tariffs, which were already low on goods of interest to the two signatories, but aimed to reciprocally liberalize one another’s financial markets (Pomfret 2007). Bilateral deals between a developed and a developing country usually contain big chapters on investment, trade in services, and intellectual property right with equivalent weight and importance compared to the goods trade chapter. In fact, the negotiations of such bilateral agreements are usually toughest for the service and intellectual property right parts, which reflects the commercial interest of the developed partner in the deal.

Lower barrier to cross-border investment is another important potential benefit to partners of RTAs. As intra-industry trade and production networking among members are intensified,

countries have motivation to negotiate for investment liberalization as well. Clauses on relaxing foreign ownership restriction, taxes on profit repatriation, automatic licensing, etc. are often part of RTAs. In theory, such liberalization measures would allow capital to move more freely, both FDI and portfolio, hence causes the national markets to be more integrated.

Service negotiations in more recent RTAs have even become the most complex issue, since they involve different modes of supply. Under the GATS classification, trade in services can take place in four modes of supply:

- 1) Cross-border supply, in which the service itself crosses the border without any movement by the service provider or any other factors (e.g. overseas insurance, outsourcing, call centers, etc.)
- 2) Consumption abroad, meaning the consumers cross border to consume the service abroad (e.g. tourism, health care abroad, etc.)
- 3) Commercial presence, meaning the service provider establishes facilities in the host country to deliver service there (e.g. banking and other financial services, express mail delivery, retail chain, etc.)
- 4) Movement of natural person, which means the service workers cross border to deliver the service in the host market (doctors, nurses, professors, IT professionals, etc.).

This elaboration on the service trade part of an RTA shows the complexity of economic flows between partners, which is far beyond the flow of goods. In the service case, the cross-border movement of capital, payment, labor, and consumers can all take place, which may have implication on a more comprehensive integration between the partners. It is the service related chapters in the RTAs that contribute to the comprehensive policy liberalization and harmonization of the signatories. Restrictions of capital, labor, and people movement may be reduced, which resulted in more bilateral economic linkages.

Given the complex nature of economic integration under the RTA framework, one could expect multifaceted linkages, rather than a mere change in volume of exports and imports between the members.

1.2. Financial Integration and Market Co-Movement

Another dramatic aspect of recent globalization is the surge in financial flows around the world and the growing evidence of stronger interdependence among different national

financial markets. Figure II.2 shows the average pair-wise covariance of equity return indexes of 33 major markets over the period 1988-2007. It reveals an explosive increase in financial market co-movement since the late 1990s, roughly around the Asian financial crisis, and early 2000s. This recent development in international financial interdependence has intrigued voluminous research on this topic.

Figure II. 2. Average Pair-Wise Covariance of Weekly Equity Return Index, 33 Countries.

Note: The underlying data of this figure is obtained by taking the annual average of pair-wise covariance of equity return indexes of 33 countries.

Source: Author's calculation from Datastream.

The literature on financial integration in the past used different measures of integration. One common measure in financial economics is to use the capital asset pricing model (CAPM) to examine the difference between country's market excess return and the world excess return over the risk-free return (usually treasury bill rate), as follows:

$$E[r_i] - r_f = \beta_i^w (E[r_w] - r_f) \quad (\text{II. 1})$$

where r_i is the return on asset i , r_f is the risk-free rate, and r_w is the world portfolio. The more integrated the market is into the world, the smaller the difference between its excess return and the world excess return. The CAPM is usually a work shore of studies on benefit of risk diversification between markets. Studies on this topics include those by Lessard (1974), Harvey (1991), Bekaert, G. and Harvey (1997), among others.

Other common measures of financial integration include differences in equity risk premium, interest rate differential, cross-border asset holdings as a share of market capitalization, equity return correlation (Levy and Sarnat 1970; Grubel and Fadner 1971; De Santis and Imrohoroglu 1997), and covariance of return indices between market (Karolyi and Stulz 1996; Portes and Rey 2005; Bekaert, Hodrick et al. 2008). The last two measures are usually referred to as market co-movement, which is the interest of this research. Furthermore, the literature in the past has explored market co-movement at different frequencies. Financial economics literature often studies the high frequency co-movement between markets (e.g. hourly or daily), while international economics literature is keener on the lower frequency (e.g. monthly, quarterly, or annual) co-movement, which is more plausible in examining the link between financial integration and economic fundamental variables.

Bekaert (1995) summarized factors that affected capital market integration such as direct investment barriers, indirect investment barriers, and global economic conditions. Direct barriers were legal barriers that differentiate between foreign and domestic investors, such as foreign ownership restrictions and taxes on foreign investment. Indirect barriers included impediments to information flows, differences in available information, accounting standard, investor protection, and country risk (Bekaert 1995).

Lower legal barriers as a result of trade and investment liberalization would lead to larger capital flows or cross-border asset holdings between countries. Studying the implications of growing cross-border capital flows on financial market performance, market co-movement, and the benefit of portfolio diversification is a big topic in financial economics. An important question is whether such large capital flow would cause market to move together, hence to lower the benefit of diversifying among those highly correlated market. Studies in this subject have started in the late 1950s and early 1960s with the famous work by Markowitz (1959), Solnik (1974), and more recent work by Hui (2005), Solnik, Karolyi et al (2003), Campa and Fernandes (2006), among others.

When markets become more correlated, what are the channels through which the shock from one market can be transmitted to another? Forbes and Chinn (2004) have found that direct trade flows were the main channel of shock transmission, Forbes and Rigobon (2002) found that it was the change in market volatility that affected the co-movement estimates, holding the underlying linkages constant. Heston and Rouwenhorst (1994) showed that it was the country and industry effects that were at work in driving return index. Kaminsky and Reinhart (2000) pointed to the common bank lender as a source of shock contagion.

Calderon, Chong et al (2007) found that shocks were transmitted across countries via trade intensity, especially among RTA members, through the business cycle synchronization. Connolly and Wang (2003) found that domestic equity return was strongly influenced by foreign equity return, after controlling for macroeconomic fundamentals.

We learn from the literature that as countries are more integrated through trade, investment, and finance, and as they become more institutionally harmonized, shocks from one country or at the global level can find different channels to spread to different countries. The channels of shock transmission include intra-industry trade (Krugman 1981), more synchronized business cycle (Calderón, Chong et al. 2007; Kose, Otrok et al. 2008), more correlated financial market (Flavin, Hurley et al. 2002; Forbes and Chinn 2004), reallocation of lending or capital between markets by multinational financial institutions (Suzuki 2008), and so on.

RTAs have been found to be one of the contributing factors in this process. And the financial market linkages are multifaceted. The factors that drive financial market integration as explored in the literature include i) financial variables, ii) economic fundamentals, and iii) trade and capital flows.

Data from 1973 to 2007 of 17 developed countries' equity market showed that these markets had been quite independent from each other until the late 1990s. The average covariance between one country's equity return indexes and the remaining countries in the sample had been quite close to zero for about two decades, and then increased tremendously over the last decade (see Figure II.6, Appendix 3.1). The bold solid line in the figure shows the average covariance, the thin solid line is average of positive covariance, and the dotted line is average of negative covariance. This figure shows that the overall covariance is mostly driven by positive covariance between markets, and that not only markets have co-moved more strongly over the last decade, they have also become much more volatile than before. The rising average covariance of equity index reflects the stronger co-movement between markets, hence declining opportunities for portfolio risk diversification between them.

When we add more emerging markets into the pictures, the data still show the similar pattern of rising covariance over time, though at much smaller magnitude (not reported). However, the pattern of covariance among emerging markets does not show a clear trend toward higher co-movement as it is the case with developed markets. This indicates some potential benefit of diversifying the investment portfolio into the emerging markets.

1.3. Theoretical Background of Real and Financial Integration

The previous section has elaborated on the multifaceted integration that RTAs may contribute to, including linkages through investment and production network, trade in goods and services, and capital flows. This section presents the underlying economic theories that may explain these linkages and the channels through which RTAs may cause the different impact.

The economic theory that most closely reflects the impact of regional integration on real and financial variables is the one of business cycle synchronization between partners of a regional economic integration agreement.

The work by Kalemli-Ozcan et al (2001) set a stylized model for the real fluctuation. This model examines the per capita GDP process of countries i and j as follows:

$$\begin{aligned}\Delta \log(gdp_t^i) &= \sum_s \alpha_s^i u_{s,t} + \beta^i v_t^i \\ \Delta \log(gdp_t^j) &= \sum_s \alpha_s^j u_{s,t} + \beta^j v_t^j\end{aligned}\tag{II. 2}$$

The left hand side variable measures changes in per capita GDP of countries i and j . On the right hand side, $u_{s,t}$ represents a time t sector-specific shock to the output in sector s which is common to both countries. The shock may include changes in technology, input price, and demand composition. The terms α_s^i and α_s^j are the weights of sector s in the total output of countries i and j – they are not indexed by t to indicate that they do not change from year to year.

The variables v_t^i and v_t^j represent the time t country-specific GDP shocks that are common to all the sectors in each economy and are interpreted as country-wide policy shocks. The variables β^i and β^j represent the weights in each country of the country-wide (as opposed to sector-specific) shocks.

The variables $u_{s,t}$, v_t^i , and v_t^j are assumed to be identically distributed random variables with mean zero and unit variance. They are further assumed to be independently distributed over time. The sector-specific shocks, $u_{s,t}$, are assumed to be independently distributed of v_t^i and v_t^j , but the latter variables have a time-invariant correlation coefficient denoted ρ^{ij} . It is further assumed that the $U_{s,t}$ terms are independent of each other, and that $\sum_s (\alpha_s)^2 = 1$.

Taking the covariance of per capita GDP growth of countries i and j from Equation II. 2, we have

$$\sigma(y_i, y_j) = \sigma_u^2 \sum_s \alpha_s^i \alpha_s^j + \sigma(v_t^i, v_t^j) \quad (\text{II. 3})$$

where y_i and y_j are per capita GDP growth of countries i and j , respectively. From Equation II. 3, we can see that the correlation of GDP growth between countries i and j is determined by two components: i) sector-specific shocks and ii) country-specific shocks. As capital market become more integrated, the model predicts that the distribution of sectors in countries i and j will become more dissimilar, thus the correlation of sector-specific shocks across countries (the first term on the right hand side) will decrease, as countries are specialized in different sectors, causing the GDP growth correlation to decrease. On the other hand, the correlation of country-specific shocks (the second term on the right hand side) is expected to increase as a result of economic integration through lower barriers to trade, investment, service, and labor, etc, hence causing the GDP growth correlation to increase.

Calderon et al (2007) provide a two-dimension specialization through international trade that may lead to two opposite outcomes of business cycle synchronization. In the first dimension, based on the Heckscher-Ohlin model of trade, lower barriers to trade would lead to an inter-industry pattern of trade and more specialization, which will result in a lower correlation of sector-specific shocks. But in the second dimension, if the trade pattern is dominated by intra-industry trade, deeper trade integration may not necessarily lead to more specialization. Therefore the economic impact on sector level shock correlation is ambiguous.

The second model on regional integration and capital market integration is the correlation of economic fundamentals. Croci (2004) constructed an econometric model of equity market integration for four European countries, with macroeconomic variables as explanatory, defined as follows:

$$td_{ij} = \alpha + \beta_0 trend + \beta_1 eurotrend + \beta_2 ABS(D(ly_{ij})) + \beta_3 ABS(D(lp_{ij})) + \beta_4 ABS(s_{ij}) + \beta_5 ABS(sb_{ij}) \quad (\text{II. 4})$$

The dependent variable is the equity return correlation transformed into hyperbolic tangent. The first right hand side variable is the deterministic trend in development such as communication technology, market liberalization, institutional harmonization, etc. The second right hand side variable is a dummy for period before and after 1999. $ABS(D(ly_{ij}))$ is the absolute value of difference in the industrial production growth rate of the two countries.

$ABS(D(lp_{ij}))$ is the absolute value of difference in inflation rate, $ABS(s_{ij})$ is the three-month interest rate differential, and $ABS(sb_{ij})$ is the government bond yield differential between the two countries.

Based on this model, a regional integration effect may be captured in all the macroeconomic variables, namely, trend (due to institutional harmonization), industrial production growth differential (through trade link), inflation rate differential (in case of European Monetary Union), and interest rate differential.

Theoretical work on regionalism impact on financial integration is still a vacuum, to my knowledge. Most of the work done on the relationship between regional trading blocs and financial market integration are empirical (more on this in the Literature Review Section).

2. Literature Review

Based on the research interest of this essay, the review literature will be grouped into three major topics: i) RTA effects on trade, business cycle, and financial market correlation; ii) factors contributing to business cycle correlation; and iii) factors contributing to financial market correlation. An overall remark about this first group is that a large body of literature focused on the trade effects of RTA, and not much can be found about other effects of RTA.

2.1. RTA Effects on Trade, Business Cycle, and Financial Market Correlation

The literature on RTAs/FTAs from the trade perspective is numerous. However, research on RTAs/FTAs effect on finance is quite rare. The papers cited in this research basically cover the aspects of RTAs that may affect the empirical analysis results. Findings from the literature about trade effect of RTAs/FTAs are quite mixed and vary both across trading blocs and over time.

As elaborated in the introductory overview on RTAs, this cooperative scheme aims at multiple bilateral benefits, including economic, security, geopolitics, foreign policy, etc. As observed by Mastel (2004), “FTAs have never been entirely economic undertakings. They have always been, at least in part, tools of foreign policy aimed at cementing economic ties and building a broader relationship”. This characteristic calls for careful treatments of the RTA variable in an empirical analysis, which tries to explain the purely economic motivation or impact.

Soloaga and Winters (2001) use a gravity model to identify the separate effects of Preferential Trade Agreements on intra-bloc trade, members’ total import, and members’ total export. Their model includes three dummies: a dummy variable for both exporting and importing countries belonging to the same trade bloc, a dummy variable for exporting country belonging to a trade bloc, and a dummy for importing country belonging to a trade bloc. This specification attempts to identify the trade creation and diversion effect of regionalism. Their research finds no evidence of significant effect of regionalism on intra-bloc trade.

Magee (2003) further develops the gravity model by addressing the endogeneity of trade and the probability of forming an RTA/FTA in a system of simultaneous equations. In this research, bilateral trade and the probability of forming an RTA between countries are mutually determined by trade enhancing factors such as GDP, difference in per capita GDP,

and proxies of transaction cost, such as common language, distance, etc. The result is highly sensitive to the particular year used in cross section analysis, the variables included in the model, and even the estimation technique used in the system of equations. This outcome suggests that one should be cautious in using gravity model equation estimates to draw strong conclusions about the effect of Preferential Trade Agreement formation on trade (Magee 2003).

Another study by Magee (2008), using the dynamic form of gravity equation, shows that trade is estimated to increase by 26 percent on average in the four years leading up to the start of a trade deal, and that there are plausible differences in the effects of Customs Unions, Free Trade Agreements, and Preferential Trade Agreements. Customs Unions generate the largest long run increase in intra-bloc trade on average, with RTAs having smaller long run effects. PTAs, on the other hand, lead to much smaller (and statistically insignificant) increase in trade flows, and trade does not begin to rise until after the RTA has been in place for 5 years. On top of that, the study also shows that trade deal can have very different impacts on the countries involved (Magee 2008).

Eicher et al. (2008) also use a gravity model with country pair fixed effect to show that this specification does not rule out that Preferential Trade Agreements have been formed because of country-pair similarities, and highlights that we cannot attribute all trade creation to PTAs. Rather, PTA members exhibit other non-PTA related unobserved similarities, which enhance bilateral trade.

Baier and Bergstrand (2007) estimate the effects of RTAs on trade flows, addressing the endogeneity bias problem of RTA membership by using instrumental variables, control functions, and panel data. The important point about RTA that the authors bring to our attention is that RTA dummies are not exogenous random variables; rather, countries are likely selected endogenously into RTAs. More specifically, the authors mention the problem of correlation between RTA and gravity variables, which are in turn correlated with the error term. This research also chooses the gravity model approach with standard gravity variables on the right hand side such as GDP, distance, border, language, and RTA dummy. And the dependent variable is bilateral trade.

Findings from the reviewed literature point to the fact that RTAs/FTAs effect on trade enhancement is mixed, that endogeneity is present, whereby both the formation of RTAs/FTAs and bilateral trade are determined by third factors, such as institutional

similarities, geographical adjacency, market size, and transactions costs. Thus the formation of RTAs/FTAs may well be a result of all of the above factors and in turn will strengthen the overall economic ties.

Studies on RTA effects on business cycle of member economies, to the present knowledge of the author, were not so many. What could be found instead in the literature was studies on business cycle synchronization among major trading partners. The study by Selover (1999) was one of those. Selover analyzed the business cycle synchronization among ASEAN countries and their major trading partners, namely the U.S., Japan, and the European Union. Using the principal component and vector-autoregressive model, the author found little evidence of business cycle transmission among ASEAN countries (Selover 1999).

Inklaar, Jong-A-Pin et al, (2005) examined the relationship between trade intensity and business cycle synchronization for a sample of 21 OECD countries over the period 1970-2003, using the bilateral correlation of detrended real economic activity (GDP and industrial production) as dependent variable. The authors confirmed that trade intensity affects business cycle synchronization.

Phengpis and Swanson (2006) studied the stock market integration of NAFTA countries before and after NAFTA came into effect. The authors analyzed both short-run and long-run return correlation and cointegration of these markets during the pre- and post-NAFTA passage. The findings indicated that the passage of NAFTA brought about a substantial reduction in per-unit-of-risk diversification gains to US investors who create and hold portfolios of NAFTA stocks due mainly to the increased return volatility and return correlations. The conclusion from the study was that relaxation of trade barriers as a result of NAFTA might be a contributing factor (Phengpis and Swanson 2006).

Hooy (2008) investigated the impact of trade regionalism on stock market segmentation for the case of AFTA, EU and NAFTA. Controlling for other determinants for market integration, evidence was found that trade regionalism helped explain stock market segmentation in EU and NAFTA, which were both dominated by developed countries. For NAFTA, the higher the intra-trade ratio was, the lower the degree of market segmentation within the trading bloc was. For EU however, the intra-trade ratio contributed to higher stock market segmentation (Hooy 2008).

2.2. Factors Contributing To Business Cycle Correlation

This group of literature studies different international and bilateral factors that may cause countries' business cycle to be more integrated. These factors include global shock (e.g. commodity price, political events, crisis, etc.), bilateral FDI and trade flows, capital control, RTAs, and gravity variables.

Jansen and Stokman (2004) explore the effect of FDI on business cycle in a model defined as

$$\rho_{ij} = \alpha + \sum \alpha_i D_i + \beta FDIP_{ij} \quad (\text{II. 5})$$

where ρ_{ij} denotes measures of business cycle co-movement between countries i and j , D_i is dummies for country pairs, and $FDIP_{ij}$ is the average strength of FDI link, which is the total inward and outward FDI between countries i and j , normalized by their GDP. The results show supportive evidence for a link between bilateral FDI patterns and output co-movement patterns. Contemporaneous correlations of quarterly growth rates are significantly higher for economies that have intensive investment relations than for countries that have less intensive investment relations. Moreover, the positive association of FDI and output co-movement is more apparent in the most recent years, as evidenced by the larger point estimate and t -statistic of the slope coefficient β for the sub-period 1995–2001 (Jansen and Stokman 2004).

Bordo and Helbling (2004) use the variance decomposition technique to measure the effect of global shock, transmission, and idiosyncratic shocks on business cycle of 16 industrial countries over one and a quarter century and have found that idiosyncratic shocks become less important over time, while global shock and transmission become more important. To further break down the mechanism of shock, the authors examine the trade intensity and capital control as explanatory to output growth correlation in the following model

$$f(\text{corr}_{ij,\tau}) = \alpha + \beta \ln(\bar{w}_{ij,\tau}^y) + \delta \overline{CC}_{ij,\tau} + \varepsilon_{ij,\tau} \quad (\text{II. 6})$$

where $f(\cdot)$ is total output (or industrial output) correlation between country i and j , $\bar{w}_{ij,\tau}^y$ is era average trade intensity between countries i and j , and $\overline{CC}_{ij,\tau}$ is the number of years (as a fraction of the total number of years covered by each era) during which capital flows have been subject to restrictions. The finding from this model is that changes in trade intensity have large effect on output correlation; however, bilateral trade intensity explains only a small share of the differences found in bilateral output correlation. Capital control does not have much explanatory power.

To further probe the exchange regime effect, the authors used the following model

$$f(corr_{ij,\tau}) = \alpha + \gamma \bar{Z}_{ij,\tau} + \delta \bar{CC}_{ij,\tau} + \varepsilon_{ij,\tau} \quad (\text{II. 7})$$

where $\bar{Z}_{ij,\tau}$ is the number of years (as a fraction of the total number of years covered by each era) during which the exchange rate between two countries was pegged, the remaining variables are the same as in the previous equation. This exercise does not find a robust effect of exchange regime on the output correlation.

Bezmen and Selover (2005) did a research for Latin American countries, using a VAR model, decomposing the effect on GDP growth of a country into its own lagged GDP growth effect, partner countries' growth, and global shock such as oil price and global debt crisis. The model has the following form

$$\Delta \ln Y_t = \beta_0 + \sum_{i=1}^2 \beta_i \Delta \ln Y_{t-i} + \sum_{j=1}^k \sum_{i=1}^2 \alpha_{ji} \Delta \ln X_{j,t-i} + \sum_{i=1}^2 \gamma_i \Delta \ln Oil_{t-i} + \delta DEBT_t + \varepsilon_t \quad (\text{II. 8})$$

where $\Delta \ln Y_t$ is the growth rate of the dependent variable country, the $\Delta \ln Y_{t-i}$ are the lagged growth rates of the j explanatory countries, k is the number of explanatory countries, $\Delta \ln Oil_{t-i}$ represents the rate of change of world oil prices, and $DEBT_t$ is a dummy variable for the start of the debt crisis over the years 1982-1983. Results from this research show that the strongest ties of these Latin American countries are with their major trading partners, and suggest that at least part of the business cycle synchronization within Latin America is due to transmission (from large economies) (Bezmen and Selover 2005).

Calderon (2003) tests whether RTAs enhance the trade channel of international transmission of business cycle shocks among countries across the world in the following regression:

$$cs(i, j)_{t,t+k} = \eta_{i,j} + \beta_0 xm(i, j)_{t,t+k} + \beta_1 FTA * xm(i, j)_{t,t+k} + u(i, j)_t \quad (\text{II. 9})$$

where $cs(i, j)_{t,t+k}$ denotes the measures of cycle synchronization (as proxied by output correlations or cyclical asymmetries computed over the k periods), $xm(i, j)_{t,t+k}$ represents the average bilateral trade intensity computed over k periods, FTA is a 0-1 dummy representing the fraction of years within a decade that a free trade agreement is in place for any country pair, and $\eta(i, j)$ represents variables that capture country pair effects. The empirical result shows that the impact of higher trade intensity on cycle synchronization is even stronger among country pairs that are part of free trade or regional integration agreements. Hence, the

transmission of international business cycle shocks is further enhanced by the presence of FTAs among open economies (Calderón 2003).

Rose and Engel (2002) use a gravity model to study the currency union effect on GDP growth rate correlation, and have found that business cycles are more highly synchronized across currency union members than across countries with sovereign monies (Rose and Engel 2002). Their model is defined as

$$Cor_{ij} = \alpha + \beta CU_{ij} + \delta * Z_{ij} + \varepsilon_{ij} \quad (\text{II. 10})$$

where the dependent variable is correlation between detrended real GDP for country i and detrended real GDP for country j , CU is a binary dummy variable that is unity if both countries are members a currency union, Z is a vector of control variable, and ε_{ij} is the omitted residual factors. Like most standard gravity model, this model controls for bilateral distance, GDP per capita, real GDP, RTAs, common language, land border, common colonizer, colonial relationship, land area, island, and bilateral trade. The sample includes 160 countries for the period of 1960-1996. The coefficients for the RTAs dummy are significant and positive in all their equations, showing that RTAs in fact positively contribute to business cycle co-movement.

2.3. Factors Contributing To Financial Market Correlation

This group of research focused on financial variables, financial market characteristics, and the patterns of correlation of equity returns over time. GARCH model and variance decomposition were common techniques in research about past equity return effect on current return. Volatility (variance) of return index, size of listed firms, their inclusion or exclusion from the S&P 500 list, etc. were often factors that drove the return and hence were extensively studied. An important motivation of these studies was to find out the benefit of portfolio diversification.

Country versus industry effect in influencing equity return was one of the widely studied topics. This stream of research started with Heston and Rouwenhorst (1994) who examined the influence of industrial structure on the cross-sectional volatility and correlation structure of country index returns for 12 European countries between 1978 and 1992.

In this research, the return index has been decomposed into industry and country effect components in the following model:

$$R_{it} = \alpha_t + \beta_{jt} + \gamma_{kt} + e_{it} \quad (\text{II. 11})$$

where α_t is the base level return in period t , β_{jt} is the industry effect, γ_{kt} is country effect, and e_{it} the firm specific disturbance. This model is applied for seven industry and 12 European countries, with an industry dummy I_{ij} to be one if security i belongs to industry j and zero otherwise, and a country dummy C_{ik} that is equal to one if security i belongs to country k , and zero otherwise. Hence for each period t the equation will be as follows:

$$R_i = \alpha_i + \beta_1 I_{i1} + \beta_2 I_{i2} + \dots + \beta_7 I_{i7} + \gamma_1 C_{i1} + \gamma_2 C_{i2} + \dots + \gamma_{12} C_{i12} + e_i \quad (\text{II. 12})$$

This research showed that industry effects were much smaller than country effects in determining equity return. The implication was that one could expect securities of the same industry to be more correlated.

Brooks and Del Negro (2004) augmented the Heston and Rouwenhorst model by adding the regional level effect in the following model:

$$R_i = \alpha + \sum_{j=1}^J \beta_j I_{ij} + \sum_{s=1}^S \lambda_s M_{is} + \sum_{s=1}^S \sum_{k_s=1}^{K_s} \pi_{k_s} C_{ik_s} + e_i \quad (\text{II. 13})$$

where I_{ij} and M_{is} denoted industry and region affiliations of stock i , respectively. There were J industries and S regions in total. C_{ik_s} identified country affiliation within a given region, when there were k_s countries within region s . The author concluded from the empirical application of this model that region effects were an important source of variation, explaining half of the return variation accounted for by country effect (Brooks and Del Negro 2004).

Roll (1992) examined the country's industrial structure as an explanation for the behavior of international stock market indices. The finding was that a significant part of the international structure of country correlation could be explained by the industry compositions of the national stock market indices. Regardless of region, countries with similar industries tended to be more correlated than countries with dissimilar industries.

Fama and French (1993) examined the overall market factors, firm size, and book-to-market value to explain the common risk factors in stock and bond returns. The methodology was to divide the portfolio into six groups of stocks, based on the firm size (small and big) and their book-to-market value ratio (low, medium, high), and to empirically study the difference in

their stock return. The authors found evidence of negative relation between firm size and their average return, and positive relation between average return and book-to-market equity .

Karolyi and Stulz (1996) studied the co-movement of equity return in the US and Japanese market, where the covariance of returns of the two markets was a function of return variance in the US market. This exercise showed that correlations and covariance were high when markets moved a lot. The implication was that international diversification did not provide much diversification against large shocks to national indices.

Griffin and Karolyi (1998) examined the extent to which gains from international diversification were due to differences in industrial structure across countries, and confirmed that little of the variation in country index returns could be explained by their industrial composition. The authors also uncovered differences in the proportion of variation in industry index returns that was captured by country and industry factors and the implications for global diversification strategies. This research also exerted that distinguishing between firms in traded and nontraded-goods industries was a useful classification scheme to measure the relative importance of industry and country factors.

Drakos and Kutan (2005), using cointegration technique, studied the financial market co-movement for the particular case of Greece and Turkey. They found that the observed financial co-movement between the Athens Stock Exchange and the Istanbul Stock Exchange seemed to be due to balance-of-payments shocks arising from sharing similar trading partners and common foreign direct investors .

Dellas and Hess (2005) studied the correlation between domestic and world return in the following model:

$$y_i = \alpha + \beta f_i + \gamma x_i + \varepsilon_i \quad (\text{II. 14})$$

where y_i was the moment under consideration (mean, standard deviation, correlation with world stock return, and variability of stock return due to domestic factors), f_i was measures of financial development (private credit as a share of GDP, commercial bank assets as a share of total banking system asset, liquid liabilities, and stock market capitalization), and x_i was a control variable (capital control, total trade as a share of GDP, Grubel-Lloyd Index for intra-industry trade, variability in exchange rate, standard deviation of GDP growth, initial per capita GDP, bureaucracy, infrastructure index, and legal risk. This research showed that financial development was significantly related to the second moments of the distribution of

stock returns. In general, “deeper” and more efficient banking systems have been associated with significantly lower stock return volatility as well as a closer co-movement with world returns. Stock market liquidity, on the other hand, was only related to the international synchronization of stock returns. This research also mentioned that international trade was another important route linking the stage of financial development to stock market performance, and in particular to stock return volatility and international stock price co-movement. Another finding was that countries with high stock returns have experienced higher volatility, but at the same time they have co-moved more closely with world capital markets and have also been subject to stronger external influences, and particularly, trade openness functions similarly to international capital market integration. Trade openness reduced volatility and enhanced international stock market co-movements (Dellas and Hess 2005).

Frazcher, Thimann et al (2007) studied the transmission of emerging market shocks to global equity market in a model defined as

$$r_{it} = \alpha_i + \sum_{j=1}^{14} (\beta_j S_{jt}) + \delta X_{it} + \varepsilon_{it} \quad (\text{II. 15})$$

where r_{it} was equity return of country i , S_j was the shock from country j ($S = 1$ for positive shocks, $S = 0$ for no shock, and $S = -1$ for negative shocks), and X_{it} was a vector of control variables. The model was estimated for 29 countries. The model yielded transmission coefficients β_j for each of the 14 emerging countries, which measured the average effects of each of the 14 emerging market economies on the other 29 countries. The results showed that emerging markets had significant impact on global equity market.

Forbes and Rigobon (2002) studied the differences between unconditional and conditional correlation coefficient of stock market returns during stable and turmoil periods, and concluded that there was high level of market co-movement in all periods .

Zhumabekova and Dungey (2001) estimated a dynamic latent factor model of stock market returns to study market volatility, which was decomposed into common and idiosyncratic components. This research found that common factors played significantly bigger role in the total volatility of stock market returns during the crisis period compared to the period of relative stability, and that the international portfolio diversification strategy might not achieve its goal of risk reduction during crisis period.

Campa and Fernandes (2006) examined the determinants of the evolution of country and industry specific returns in world financial market over the last three decades, using a model that decomposed investment returns into world portfolio, industry specific factors, and country specific factors. The estimation showed that country factors were smaller for countries integrated in world financial markets and have declined as the degree of financial integration and the number of countries pursuing financial liberalization has increased. Country specific returns were large relative to the world market portfolio when economic activity in that country was more isolated from world economic activity and more subject to shocks to the country's economic situation. Countries with a more specialized production activity had higher country factor.

Swartz (2006) studied how Asian stock returns were affected by global stock returns, and by using variance decomposition technique, has found that emerging stock returns in Asia were heavily influenced by country-specific risk, that stock prices fluctuated more when domestic shocks hit, and regional and global shocks were generally less important.

The literature review in this section tried to capture the most typical aspects of financial asset return determinants and the effects of international financial integration, and to give readers an idea about the richness of topics addressed and methodologies applied in past research. This review has no ambition of capturing all the major trends in financial integration studies. The review instead picks up the research that most closely addresses the issues of interest of this current research, and tried to give an overall idea about what factors drove stock return correlation.

3. Methodology and Data

The gravity model applied in this essay has most of the standard gravity variables used in the past literature as explanatory variables. Control variables for specific effects are also included. The dependent variables will be GDP growth correlation and equity return correlation, which measure the level of real and financial integration, respectively, between any two countries.

Since both variables to be used in this research, namely GDP growth correlation and equity return index correlation, are pair-wise correlation coefficients for each country pair, they are bounded at -1 and 1, hence the error terms in the regression model are unlikely to be normally distributed. To address this issue, I use the Fisher's Z-transformation¹, after David (1949), of these two variables (see Figure II. 7, Appendix II. 2, for dependent variable summary statistics). As shown in Figure II. 7, the untransformed variables have the distribution that departs from symmetry, while the transformed variables are much closer to normal distribution. Both skewness and kurtosis of the transformed variables are improved compared to the untransformed ones.

Previous literature that used correlation as dependent variables (Flavin, Hurley et al. 2002; Rose and Engel 2002; Calderón 2003; Kose and Yi 2006) did not raise the issue of the normality in its distribution, and none has discussed how that might affect the estimation result. These researches presumably assumed that the deviation from normality was sufficiently small, hence did not affect the estimation results.

The empirical work in the current research is based on panel data of 33 countries over seven years, the same data set and sample used in Part I² of this thesis. The data is on annual basis. However, for computing annual pair-wise correlations, I use the higher frequency, such as weekly, monthly, or quarterly. For example, to obtain the annual observation for GDP growth correlation between countries i and j in year t , I use the quarterly GDP growth data of these countries; to obtain the annual observation for equity return index correlation between countries i and j in year t , I use the weekly equity return index during that year for these countries, and so on. This use of higher frequency data to compute the lower frequency

¹ Let C be the correlation coefficient of two variables, the Fisher's Z-transformation of C will be:

$$C_t = \frac{1}{2} \ln \left(\frac{1 + C}{1 - C} \right)$$

² See Appendix I.1 for countries and data source.

observations makes this research different from past researches. This method of computing correlation allows to generate a time series for variables that are pair-wise correlation between cross-sectional observations.¹ The limitation of using annual data (same frequency data) to compute pair-wise correlation is that if instead I use the annual GDP growth rate, annual equity return index for the whole sample period (seven years in the case of this research), etc. to compute pair-wise correlation, I would obtain only one observation of pair-wise correlation for the whole sample period. Then the observation for pair-wise correlation would be fixed throughout the sample period, thus making it less meaningful for empirical analysis for the pattern of changing correlation over time. The use of higher frequency data for computing lower frequency data has addressed this limitation. Most previous researches took the correlation of same frequency data, while averaging other data for the whole sample period, and ran the cross-sectional data regression, instead of panel data.

Since the research interest of this essay is the effect of regional trade agreement (or trade integration) on real integration (GDP growth correlation) and capital market co-movement (financial integration), the dependent variable in the gravity model in this research will be the correlation of GDP growth in the real integration equation and correlation of equity return indexes between two national markets in the financial integration equation.

Countries in the sample are selected on the basis of availability of stock return data. Most of them are included in the FTSE (the index company) classification for their level of stock market development. And among these FTSE listed countries, those that have data on bilateral asset holdings from the IMF will be selected. Until 2005 these countries accounted for more than 90 per cent of the world market capitalization (see Figure II. 3). The period of data is from 2001 to 2007 for most regression analysis. And since total quarterly capital inflows to countries are available only since 2004, the sample period will be 2004-2007 for equations that use total capital flows as an explanatory variable.

Data on weekly equity return index is obtained from Datastream and is used to calculate the average annual correlation. Trade data is obtained from the UNCOMTRADE database, available for 1988-2007 for most countries in the sample. The list of RTAs/FTAs and their member countries/territories is obtained from the World Trade Organization website (listed in Appendix II.4). Data on GDP and per capita GDP is obtained from the IMF's International

¹ Based on this method of construction, each annual observation for GDP growth rate pair-wise correlation is computed from 4 pairs of observations of quarterly GDP growth, and each annual observation for equity return pair-wise correlation is computed by using 51 pairs of observations of weekly equity return index.

Financial Statistics. Data on stock market capitalization (size) is obtained from the World Bank. The correlation between source country's GDP and host country's return index is calculated based on both Datastream and IMF data. For geographical variables, bilateral distance is obtained from www.indo.com/distance, and land border data is obtained from CIA World Factbook website.

Figure II. 3. Sample Countries' Share in World Market Capitalization

Source: World Bank, World Development Indicators

Common language data is taken from Wei's website. Governance indicators are obtained from Kaufman et al (2008), and the data is available for 1996-2007 period, for every two years between 1996 and 2002, and annually afterward.

The stock market concentration is calculated based on Datastream data on market value of 10 industries, using Herfindahl index. This index is a sum of squared share of each industry in a national capital market, defined as

$$H = \sum_{i=1}^{10} S_i^2$$

where S_i denotes the share of industry i in the total market capitalization, measured in whole number, e.g. 70 for 70 per cent.

Transport cost data is obtained from the UPS express delivery company website (www.ups.com). As no historical price information are available, the same cost level is

applied throughout the sample period. The limitation of using the same price throughout the sample period is that it misses any changes (usually reduction) of prices over time.

Financial depth variable is measured by stock market capitalization as a share of GDP, taken from the World Bank's World Development Indicators.

3.1 Empirical Strategy and Results

This section examines empirically how RTAs affect the real and financial market correlation. The empirical model will look at two major channels of effects from RTAs: 1) effect on business cycle correlation and 2) effect on equity return index correlation (via liberalized cross-border factor flows, e.g. asset holdings). Throughout the process, gravity factors, such as size, distance, and other bilateral factors that affect costs (e.g. transport cost, average governance quality, difference in governance quality, etc.), are controlled for (Figure II. 4).

Figure II. 4. Mechanism of RTAs' Real and Financial Effects

One of the advantages of using RTA as a liberalization measure, compared to specific measures in external liberalization (mostly trade liberalization) such as tariff reduction or the lowering of non-tariff barriers, is to avoid the endogeneity embedded in the counter-cyclical nature of protection. As documented by Bagwell and Staiger (2003), the average level of protection tended to rise in recessions and fall in booms, tariffs were higher in recessions,

because of the political pressure from the import competing firms. Bagwell and Staiger have also shown a theory that yields a prediction of countercyclical protection, in line with the empirical studies of the cyclical properties of protection, that transitory increases in import levels leads to increased protection regardless of the phase of the business cycle. In this sense, a trade agreement, or RTA, would control for the beggar-thy-neighbor behavior, hence the counter-cyclical trade protection. Therefore, in the context of this empirical research, the reverse causality effect from business cycle to RTA can be eliminated.

In order to explore the relationship between RTAs and business cycles of pairs of countries, I will use correlation of quarterly GDP growth as dependent variable. And to explore the impact on equity market co-movement, I use the correlation of weekly equity return indexes as dependent variable. Summary statistics of these dependent variables are provided in Table II. 2, Appendix II. 2. The gravity equation thus will have the following form:

$$\rho_{ij,t} = \alpha_0 + \beta RTA + \eta'X + \gamma'G + \delta'Z + \varepsilon_{ij,t} \quad (\text{II. 16})$$

of which $\rho_{ij,t}$ is the Fisher's Z-transformation of correlation coefficient, either of GDP growth rate (in the case of business cycle equation), or of weekly equity return indexes (in the case of equity market co-movement). RTA is the dummy, which takes the value of 1 if both countries are members of the same RTA, X is a set of variables that reflect bilateral flows, G is a set of geographical variables, Z is a set of control variables, $\varepsilon_{ij,t}$ is the error term, and β' , η' , δ' , γ' are vectors of parameters to be estimated.

Bilateral flows between two countries include trade in goods (imports and exports), bilateral capital asset holdings, correlation between source country's GDP growth and host country's equity return index, and correlation of total capital inflows to each country.

Geographical variables include bilateral distance, common border dummy, in the case of business cycle correlation, as standard variable used in most previous gravity models.

Control variables are those that reflect characteristics of each country and most likely affect the economic co-movement, including size (GDP, per capita GDP, market capitalization), common language, market concentration (or indicator of risk), and transport cost. These are also variables used in previous studies that have used gravity model (Frankel and Rose 2000; Flavin, Hurley et al. 2002; Eichengreen Barry and Luengnaruemitchai 2006; Aviat and Coeurdacier 2007).

Given this empirical model specification, some elaboration around the relationship between RTA and other right-hand-side variables, especially gravity variables, is necessary.

Past research showed that determinants of RTA formation between two countries included their size (GDP, population, land area) and size similarity, difference in capital-labor ratio between partners and versus the rest of the world (Baier and Bergstrand 2004), political variables (Magee 2003), third country's variables (Egger, Egger et al. 2008).

The literature on political economy indeed pointed out that political economy variables played a crucial role in RTA formation. Baldwin (2006) provided a thorough review of RTA formation theories, which included the juggernaut effect for multilateral trade liberalization, the domino effect for regional trade liberalization, and the 'race to the bottom' (RTB) unilateralism for unilateral trade liberalization. This study also indicated that a nation's decision to join a PTA was determined by its domestic political equilibrium that balanced pro-membership and anti-membership forces. In addition, the author emphasized that the non-regional RTAs were one of the newest and most curious aspects of the juggernaut-domino effect, which resulted in "leaky and fuzzy" trade blocs – leaky in the sense that each bloc's tariff wall against the others have several holes in the form of cross-bloc FTAs (Baldwin 2006).

The presence of the multilateral trading agreement, namely WTO membership, and the interaction between different domestic interest groups were another factor that may influence a country's decision to enter an RTA. Albritton (2008) has shown that a country's decision to enter a regional trade agreement when a multilateral free trade agreement was available, was driven by the extent of distortions in the policy making process, the lobbying activity of the organized industrial interest group, and the extent of trade barriers.

The type of political regime of the country was also found to be important determinant of its RTA membership. Mansfield et al. (2008) showed that the more democratic a country was, the more likely it was to sign any type of integration agreement. In addition, the author also argued that GATT/WTO members had motivation to enter RTAs in order to gain bargaining power within the multilateral trade regime.

Last but not least, the reason non-WTO-members developing countries choose to enter RTAs was that multilateral liberalization was a daunting and costly process, subject to free-rider problem, not to mention the supply side constraint (i.e. existing WTO members' willingness to admit new members). To take a few examples, the WTO accession process (from the date

of application filing to the date of final accession agreement) was 15 years for Nepal, 15 years for China, 11 years for Vietnam, 10 for Chinese Taipei, and 10 years for Cambodia.¹

In terms of the relationship between RTA and gravity variables, the descriptive statistics of the data used in the current research show that distance is the only variable that is highly correlated with RTA formation (see Table II. 3). For robustness check, I run an auxiliary regression, using the Probit model, where the dependent variable is RTA formation, and explanatory variables include distance, border, GDP, difference in GDP, and democracy. The results are reported in Table II.4, Appendix II. 2. From these results, we can see that distance has a negative and significant effect. This result is supported by theory and past research. Border and GDP have negative and significant effects, but this is not supported by any past empirical research or theory. The coefficient for difference in GDP has a fragile significance. The level of democracy, which is a political variable, has significant and positive effect, as supported by past research.

From the above discussion, based on past research and current data check, the probability of RTA formation seems to be determined more by political than by geographical variables (except distance). Political determinants of RTA formation, however, are beyond the interest area of this research. The only geographical variable that exerts significant effect on RTA formation is distance. A further look at the average bilateral distance between countries in the sample shows that it has increased from 1325 km in 1988 to 3596 km in 2007, or 171 percent increase over the period of 20 years (see Figure II.5). This means that as the number of RTAs increases, and more cross-continental RTAs are formed, distance becomes less important over time in determining the probability of RTA formation.

The conclusion from the discussion above, based on past research and current data, is that RTA formation is a complex political economy process, mostly driven by political and economic interests. The evidence about the effect of border and GDP on RTA formation is mixed. And the effect of distance, though significant, is becoming less important over time. Therefore, the empirical model in the context of this research that explores business cycle and financial market correlation that have both RTA and gravity variables on the right hand side is less likely to suffer from serious problem of multicollinearity between RTA and the rest.

¹ See WTO website: www.wto.org for accession information.

Figure II. 5. Average Distance Between RTA Members, 1988-2007

3.2. Impact on Business Cycle

The dependent variable in these business cycle equations is the Fisher's Z-transformation of correlation of quarterly GDP growth of two countries in the pair. The bilateral economic flows that theories predict to have impact on business cycle correlation include trade in goods, asset holding (or capital flows), correlation of total capital inflows to each country. Geographical variables included here are the standard distance and common border dummy. And control variables that are likely to affect the business cycle (more on justifications below) are common language, size (GDP), level of development (per capita GDP), financial depth as measured by stock market size as a share of GDP, stock market concentration, interest rate differential, and difference in per capita GDP as an indication of difference in level of development. Regression results for these business cycle equations are presented in Table II. 5 (for OLS) and Table II. 6 (for GLS), Appendix II. 3.

Bilateral trade in goods is expected to make countries' business cycle more synchronized, hence to have positive coefficient. Similarly, bilateral asset holdings are expected to be positively associated with business cycle. In addition, total capital inflows into an economy is expected to be strongly dependent on or contribute to its GDP growth, thus the correlation of total capital inflows is expected to be positively correlated with business cycles of the economies concerned. As the relationship between total capital flow correlation and GDP growth correlation might be non-linear, a squared total capital flow correlation is added to capture this non-linear effect.

Signs and significance of gravity variable coefficients will indicate whether geographical factors explain business cycle synchronization as much as they do in the case of bilateral trade. By the same token, sign and significance of size variables will tell whether size matters in determining how economies will move together. There are no deterministic economic theories behind the behaviors of these variables.

Financial depth, stock market concentration, and interest rate differential are all measures of different aspects of financial market development. Financial depth, as measured by stock market capitalization as a share of GDP, indicates the importance of the financial sector in the economy. And if the coefficient of financial depth turns out to be positive in the business cycle equation, it indicates that business cycle synchronization can be driven by the financial sector in the economies involved. Otherwise, a negative coefficient may be an indication of large financial markets having their own cycle, while the economies with less developed financial sectors tend to co-move due to non-financial factors.

Interest rate differential measures the difference in competitiveness, cost of borrowing, and efficiency of the banking sector (which is part of the financial sector), the scarcity of capital, the difference in return to capital, hence indirectly measures the magnitude of cross-border lending. A positive coefficient of this variable would imply that countries with larger difference in cost of borrowing tend to have more synchronized business cycle through the cross-border lending channel.

Stock market concentration, as measured by the Herfindahl index, is an indication of risk diversification, the higher index implies a higher concentration of market capitalization among few industries, thus higher risk and lower diversification. A positive coefficient of this variable would mean that economies with less diversified stock markets tend to move together, and that business cycle might be driven by an industry effect. To the contrary, a negative coefficient would mean that well diversified stock markets come along with business cycle synchronization.

Last but not least, the effects of all explanatory variables on GDP growth correlation may be asymmetric, meaning the patterns of correlation during boom and bust can be quite different. Therefore, it is sensible to conduct the regression analysis for the positive and negative correlation separately.

The first empirical attempt in this empirical analysis is to apply OLS regressions on the variables discussed above, and the results are reported in Table II. 5, Appendix II. 3. The

results show that RTA is positive and significant in all equations. This indicates that countries that belong to the same RTAs tend to have more synchronized business cycle, all else being equal.

Concerning geographical variables, distance has negative and significant coefficient in all specifications. This shows that distance has a similar effect on business cycle as it does on bilateral trade, and the transport and other cost that are captured by distance variable are the major hindrances of economic integration. Border has significant and negative coefficient in most equations. This shows that adjacency does not contribute to business cycle correlation, and neighboring economies do not have correlated business cycle. Common language has negative and significant coefficients in all equations, indicating that cultural similarity as proxied by common language did not contribute to business cycle synchronization.

Size, as measured by GDP, is negatively associated with business cycle synchronization in this model, as we see that it has significant and negative coefficient in most equations. This indicates that larger economies tend to have their own business cycle, while smaller economies tend to have more synchronized business cycle, other things being equal.

Bilateral trade is entered in the first equation of standard gravity model to check its effect and to compare with previous research findings. It has negative coefficient, indicating the contrary to what previous research found. However, the overall fit of the equation is quite poor. Compared to past researches that focus on trade effect of RTAs, this research has much smaller sample size (33 countries, instead of above one hundred), due to its different research interest. This research selects only countries with available financial market data into the sample. This difference in sampling strategy may be the source of this different empirical outcome.

Bilateral asset holdings (or total portfolio flow from country i to country j) have positive and significant coefficient in all equations. Furthermore, when this bilateral capital flow is entered to the regression as an alternative to trade, the overall fit improves (from 0.21 in Equation 1 to 0.23 in Equation 2, Table II. 5). This indicates that bilateral capital flow has a stronger explanatory power compared to trade for this sample.

Total capital inflow correlation has very significant positive coefficient in all equations, so does its squared term, and it improves the overall goodness of fit (adjusted R^2 rises from 0.23 in Equation 2 to 0.27 in Equation 3). This indicates that countries that are destination for large capital inflows at the same point in time also tend to have higher correlation of

economic growth. This relationship tends to intensify as the capital flow correlation increases. One may suspect the endogeneity of capital flow correlation, which can be affected by the reverse causality from business cycle synchronization. To address this concern, a one-lag Granger causality test¹ (Table II. 9) indicates that it is the capital inflow correlation that Granger-causes the GDP growth correlation, but not vice versa.

Per capita GDP, which represents the level of development, has positive and significant coefficient for host countries only (country j in the pair). This does not allow an unambiguous inference about the impact of per capita GDP on business cycle synchronization. Therefore, this variable is dropped out from the subsequent equations. Instead, difference in per capita GDP is added as an alternative, and it has a negative and significant coefficient in Equations 5 and 6, indicating that countries with similar level of development tend to have more correlated business cycle. However, this variable does not survive the robustness check, using the AR(1) model. Its coefficient is not significant either for the sample with only positive correlation in Equation 8. The conclusion about this variable is not very affirmative then.

Financial depth variable is only significant for host countries (country j) in the pair, and it has negative coefficient. This indicates that only the financial depth of host countries matters in the relationship with the business cycle synchronization between the source and host countries. And the negative coefficient means that if a country is a destination of capital flow, the more developed its financial sector is, the less its business cycle is likely to be correlated with that of the source country. On the other hand, less financially developed host country economies tend to have business cycle more correlated with their source countries. This is an indication of more dependence of less financially developed economies on the business cycle of the economies from which they receive capital. This result supports one of Aizenman, Chinn et al.'s (2008) findings about negative correlation between financial development and output volatility among less developed countries.

Interest rate differential has significant and positive coefficient, indicating that differences in the cost of capital, which are likely to induce cross-border lending, tend to bring the source and host countries' business cycle together.

Stock market concentration by industries has significant and positive coefficients. However, this variable is fragile and does not pass the robustness check with AR(1) model, and the

¹ Since the data for total capital inflows are available for 2004-2007 period only, a shorter sample period compared to all other variables, I chose the one-lag test, instead of the standard two-lag test, in order to preserve more information.

coefficients are so small they may not have an economically significant impact on business cycle synchronization.

Equation 7 adds an AR(1) term to address the autocorrelation problem, revealed by the low Durbin-Watson statistics in the previous equations. The overall goodness of fit is improved, but the t-statistics of most variables are lowered, which might indicate a more efficient estimation. However, this AR(1) model has its own disadvantage of throwing away good amount of information. Therefore, alternative remedies are needed and will be discussed later.

To further explore the pattern of GDP correlation during good and bad time, Equation 8 has the same specification as Equation 6, but it selects only positive GDP correlation observations into the sample (the number of observation is 2,624 out of the total 3,544 in the full sample). Most variables have the same sign as before, but some turn insignificant. For this positive business cycle equation, RTA membership, common language, bilateral distance, GDP, bilateral capital flow, total capital flow correlation, difference in per capita GDP, financial depth of host countries, and interest rate differential are variables with statistically significant coefficients that matter during good time. I have also tried the negative business cycle correlation case, but the equation does not show any significant result, hence not reported here. Thus the message from this correlation asymmetry exploration is that business cycle synchronization is mostly driven by boom time (as positive correlation observations represent about two-third of the sample), and most of the variables that affect or are affected by this positive correlation remain the same, hence the asymmetric business cycle correlation tilts in favor of positive correlation.

Since this is a panel data with large cross-section and short time-series sample, one may suspect a heteroscedasticity problem. The suspected variables that may entail heteroscedasticity include bilateral asset holding, GDP, and per capita GDP, since their values can vary quite substantially from one country to another. The Park test for heteroscedasticity (which runs a regression with the squared error term from Equation 6 in Table II. 5 as dependent variable) reveals that bilateral asset holding and difference in per capita GDP are the source of heteroscedasticity. This test results show that OLS estimates in Table II. 5 may not be efficient. In addition, the Durbin-Watson statistics of Equations 1 through 6 are quite low, signaling the presence of autocorrelated error terms. To deal with these common problems in panel data, I try GLS with cross-section weights as an alternative for equations that contain the potentially heteroscedastic variables and autocorrelated error terms, and the results are reported in Table II. 6.

Compared to the OLS results in Table II. 5, the GLS results in Table II. 6 show the same sign of all coefficients. However, as the standard errors are weighted by cross-section to account for the heteroscedasticity, the statistical significance of a number of variables change. RTA remains significant and positive in all equations. Most variables preserve their OLS results. Those that show different results include difference in per capital GDP and stock market concentration. These variables, which have insignificant coefficient in some OLS equations, turn out with significant coefficients in more equations using GLS with cross-section weights. This indicates that in fact these variable might have certain impact, though not quite robust as the others.

This indicates that the OLS results in Table II. 5 are credible, and the GLS does not lead to substantial change in the main conclusion made from the OLS results.

One last effort in evaluating this model is to test for multicollinearity. As many explanatory variables are related to economic development, readers may suspect that they are all mutually determined, or collinear to certain extent, hence may render the OLS results misleading due to the large coefficient variance and indistinguishable effects from one variable versus the others. To evaluate whether multicollinearity is severe enough to invalidate the OLS results, I use the variance inflation factor (VIF) estimates. The steps taken were to run auxiliary regressions of all the suspected explanatory variables X_i from the main regression that may be potentially collinear,

$$X_i = \beta_0 + \beta_1 X_1 + \dots + \beta_j X_j, j \neq i \quad (\text{II. 17})$$

The coefficients of determination R_i^2 were then obtained from each auxiliary regression. The VIFs will then be computed as follows:

$$VIF = 1/(1 - R_i^2) \quad (\text{II. 18})$$

High VIFs (above the standard level of 5) would indicate a serious multicollinearity problem. The results from this test for Equation 6 (Table II. 5), turn out with all the R_i^2 smaller than 1. This test ensures us that multicollinearity is not disturbingly severe to the point it would circumvent the results in these business cycle correlation regressions.

3.3. Impact on Equity Market Co-movement

The purpose of the empirical exercise in this section is to examine how different economic linkages and gravity factors may be associated with the financial market co-movement, or if the gravity model can explain this kind of relationship, as it did in the case of bilateral trade and business cycle co-movement. Since the dependent variable in this model is a financial market variable, while the key explanatory variable of interest is RTA membership, which is non-financial in nature, a number of financial variables need to be included on the right hand side to control for their respective effects.

The dependent variable in this model will be the Fisher's Z-transformation of the correlation of weekly equity return index between two countries. The transformation again aims at addressing the non-normality of the distribution. The key economic relationships that may affect this correlation are similar to the business cycle correlation model, including same RTA membership, bilateral asset holdings, total capital inflow correlation, correlation between source country's GDP growth and host country equity return index. As far as size is concerned, because of its main interest in the financial market, this model uses stock market capitalization, instead of GDP, to represent size, since the former would more accurately measure the financial market size. For geographical variable, border is still included as before. However, distance is replaced with transport cost, based on the assumption that this transport cost could proxy transaction and information cost in financial asset trade. In addition, other variables that may affect transaction costs include common language, average governance quality of both countries in the pair, and the difference in governance quality between them. Per capita GDP is included to control for the level of development. The Herfindahl index is included to control for the level of risk diversification, similarly to the business cycle correlation case discussed in the previous section.

Having justified the presence of all the variables in the equation, it would be then useful to discuss their expected behaviors, based on the underlying economic theories or intuitions. Empirical results from the previous section show that RTAs are associated with business cycle synchronization, either because they contribute to it or countries with correlated business cycle tend to form RTAs. In this section, the purpose is to see whether RTAs play any role in financial market co-movement. If the relationship is found to be positive, one could conclude that RTAs have both real and financial effect in economic integration of the countries involved. If the relationship is found to be negative or insignificant, it means that

RTAs does not contribute to financial integration, despite all the institutional harmonization and behind-the-border liberalization measures discussed earlier in this part of the research.

Intuitively, bilateral asset holdings would bring more financial linkages to the countries involved; hence one of the consequences could be more correlated financial markets. But if the coefficient of this variable is found to be negative or insignificant, one might suspect that the linkages work through other channels, such as bank lending, FDI, shared dominant industries in the stock index, cross-listing, shock from common creditors, etc., rather than portfolio asset holdings.

Correlation of total capital inflows to any two countries would indicate the contemporaneous attractiveness of these countries to international portfolio investment, which would have immediate connection with the stock return. If return to capital is the key motivation of international investors, then higher return would attract more capital inflows, and the correlation of flows is likely to resemble the correlation in return index. In addition, capital inflows are measure of the volume of transactions, which in turn affect stock return index due to the demand and supply effect.

Talking about capital flows, one should relate the pull and push factors between the source and host countries in order to understand why the flows take place. The correlation between source country's GDP growth and host country's stock return index addresses this concern. Stronger GDP growth would generate more savings, channeled into investment, which in turn seeks high return opportunities where available. Therefore, source country's GDP growth is the push, while host country's return index acts as pull factor. But the relationship between return index correlation and growth-return correlation may not be linear in growth-return correlation. Thus it would be justifiable to add the squared correlation between source's GDP growth and host's return index. Two scenarios are possible, corresponding to the positive and negative coefficient of the squared term, respectively: i) high source GDP growth-host return correlation would induce more asset holdings by source in host country, which in turn further feeds to the source-host stock return correlation; ii) high source GDP growth-host return correlation would attract asset holdings by source from host up to the point the supply of capital in host is large enough to decelerate the rise in return correlation, hence the effect will be decreasing.

The way correlation between source country's GDP growth and host country's return index is constructed is also worth some further clarification. Let R_i^w and R_j^w be weekly equity return indexes of country i and j , respectively. Then the dependent variable will be

$$Cor(R_i^w, R_j^w)_t, t = 1, \dots, T \text{ for time period (year in this case)} \quad (\text{II. 19})$$

And let $\dot{Y}_i^q$ be quarterly GDP growth of source country, R_j^q be quarterly equity return index of host country, then the explanatory variable will be

$$Cor(\dot{Y}_i^q, R_j^q)_t \quad (\text{II. 20})$$

From this variable construction, one can see that although equity return index of host country seems to appear in both side of the equation, it is not identical in both cases, one is the weekly return, and the other is quarterly. Higher frequency indexes (the dependent variable) tend to have more variability, while lower frequency indexes (the explanatory variable) tend to show trend, especially in the relationship with economic fundamental variables such as GDP growth.

The OLS regressions for financial co-movement are reported in Table II. 7, Appendix II. 3. Equations 1 through 7 additively try the variables discussed earlier, while Equation 8 includes only positive observations of the dependent variable, again to check for the asymmetry in the correlation pattern.

RTA has significant and positive coefficient in all equations, indicating that it is strongly associated with financial market co-movement of the countries involved.

Transport cost, which proxies the transaction and information cost in financial asset trade, has negative and significant coefficient in all equations. This finding supports past research findings (Portes and Rey 2005; Aviat and Coeurdacier 2007) that international transaction and information cost is an important determinant of the pattern of international asset holdings.

Border has significant and positive coefficients in all equations, indicating the importance of geographical adjacency in determining financial market correlation. This shows that countries that share border tend to have more correlated financial market indexes.

Common language does not show any significant role in financial market linkages.

Bilateral portfolio asset holdings is positive and significant, but the overall fit in the equation where it is included is quite poor, hence having little explanatory power vis-à-vis the variation of financial market co-movement.

Market size, as measured by stock market capitalization, is significant in most equations, indicating that the mass of transactions indeed plays a gravity role in financial market correlation as well. This implies that financial market size matters in determining the return index correlation between markets.

Total capital flow correlation is significant and positive in all equations, which confirms the hypothesis of connection between contemporaneous attractiveness to capital and return correlation. This also means that the volume of capital inflows to any two countries tends to affect the return correlation between them.

Correlation between source country's quarterly GDP growth and host country's quarterly equity return index is significant and positive in all equations, so is its squared. This result confirms the self-feeding pattern of return correlation induced by high source GDP growth-host return correlation.

Governance quality, as measured by the average of six governance criteria, does not really show a consistent effect. The average overall governance quality of the two countries in the pair has a positive and significant coefficient in only one equation (Equation 7). The absolute value of the difference between the two countries' governance indexes has negative and significant coefficients (Equations 5 and 6). A plausible interpretation of this result could be that high governance quality (i.e. good accountability, political stability, effective government, high regulatory quality, good rule of law, low corruption) would reduce transaction costs, hence makes financial transactions smoother and denser, which causes higher correlation between financial markets. On the other hand, the difference in this governance quality between countries would increase transaction costs, thus pushing their financial market apart.

Stock market concentration has quite fragile significance, and the coefficients are too small to have economic meaning.

Per capita GDP enters the equation with significant and positive coefficient, indicating that income level can be a strong determinant of financial market co-movement, that high income or more developed countries tend to have their financial markets more correlated than low income ones.

To evaluate how credible these OLS results might be, one needs to test for the common problem in panel data model, including heteroscedasticity, multicollinearity, autocorrelation, and endogeneity.

The Park test shows the presence of heteroscedasticity in the disturbance variance. Hence the Panel Corrected Standard Error (PCSE), after Beck and Katz (1995), was attempted to overcome the problem. The results are reported in Table II. 8, Appendix II. 3. The advantage of this technique is that it preserves the coefficient, since heteroscedasticity tends to increase the standard errors while leaving the coefficient unbiased. Hence the coefficients, the R-squared, and the summed squared of residuals in PCSE equations remain the same as in OLS equations. The only difference is the standard errors of the coefficients, hence their statistic significance.

Compared to the OLS results, the PCSE results for transport cost and market capitalization of source countries show an improvement in their coefficient significance. No other variables show substantially different results compared to the OLS results.

The check for multicollinearity by using VIFs again shows no severe multicollinearity among the regressors.

The Durbin-Watson statistics of most equations are between 1.8 and 2.2, showing no sign of first order autocorrelation problem, hence no remedies are necessary.

The Hausman test for endogeneity (not reported) does not reveal any correlation between the error term and the explanatory variables. This test confirms that OLS estimates are credible.

4. Concluding Remarks and Implications

4.1. Summary of Findings

In terms of methodology, this research is an extension of gravity model application that has started in bilateral trade, and then extended to capital flows, migration, etc., and now to GDP and equity return index correlation analysis. Empirical work using gravity model, with correlation as a dependent variable is still quite rare. But this type of model can open a new direction for future application and augmentation of gravity model. This research makes one step in contribution to this direction of empirical methodology.

The main issue studied in this essay is RTA effect on business cycle and financial market co-movement. The empirical results show that RTA membership is strongly associated with both business cycle and financial market co-movement between member economies, controlling for gravity variables and countries characteristics. And the gravity model applied in this research can explain about 30 percent of the impact on integration (the adjusted R-squared ranges between 0.16 and 0.45). The explanatory power of this model in explaining correlation is substantially lower compared to the model that has capital flow or bilateral trade as the dependent variable (with typical adjusted R-squared about 0.7). The nature of distribution of the dependent variable might be the reason. This research uses the Fisher's Z-transformation of the GDP growth correlation and equity return index correlation, instead of the original form, as dependent variables in order to address the non-normality in the distribution of the correlation coefficient (bound from -1 to 1).

The robustness check on the collinearity between RTA and gravity variables that distance is the only variable that may be collinear with RTA, but the collinearity is not severe enough to undermine the major empirical results.

Apart from the main findings about the RTA effects, this research also finds evidence of effects from other control variables on business cycle and financial market behavior. These effects in most of the cases are consistent with what theories predict.

Business cycle correlation is clearly negatively affected by distance. Countries that share border tend to have more correlated business cycle, while countries that speak the same language do not. Economy size, as measured by GDP, negatively affects business cycle correlation in most specifications. Bilateral capital flows between countries and the total capital inflows to countries positively contribute to business cycle correlation among them.

GDP per capita shows a mixed effect: only host country per capita GDP is a positive and significant contributing factor to business cycle correlation between two countries, source country's per capita GDP does not matter. A possible interpretation from this result is that if two countries are economically integrated through trade and investment and so on, the income level of the country that receives capital inflows or export earnings tends to cause the business cycle between the two countries to correlate more.

The difference in income level between two countries tends to negatively affect business cycle correlation between them. This means that countries with similar income level are expected to have more correlated business cycles. Financial depth of host countries tends to negatively affect business cycle correlation. Difference in interest rates positively contributes to business cycle correlation between two countries. Stock market concentration seems to have positive impact on business cycle correlation, but this impact is quite small.

In the case of financial integration effect, transport cost negatively affects equity return index correlation between countries. Border positively contributes to this financial market integration. Language does not seem to play any role in this process. Market capitalization, total capital inflow correlation, and correlation between source country growth and host country return index are all positive contributing factors to equity return index correlation. The higher the average governance quality of the countries involved, the more their financial market tend to be correlated. However, countries with very different governance quality would see their financial market not so integrated. Income level has a significant implication on financial market correlation, higher income countries tend to have more correlated financial market. There is some sign that stock market concentration has a positive effect on financial market correlation, but this effect is negligible.

4.2. Policy Recommendations

Findings about stronger business cycle correlation between RTA partners would be a useful input to policy planning process. Since economic performance tends to be more affected by RTA partner's economy, domestic policy making should factor in anything that may affect the partner's economy as well. Private economic agents are also better equipped with knowledge about correlation and contagion effect from an RTA partner's economy, to adjust their business decision accordingly.

In addition, if countries could agree on comprehensive cooperation under the RTA framework, they should also develop cooperation scheme to keep records of trade in services

among them, especially those that are not reflected in the traditional balance of payment statistics. This would provide better data to inform policy decisions.

For RTAs that look forward to further integration in terms of monetary union (so far achieved by the European Union only), the finding about positive effect of RTAs on business cycle synchronization among members would be an encouraging message, since the more correlated business cycle among RTA members would make it easier to form and implement common monetary policies. The topic of common currency for a region has been time and again discussed for the ASEAN countries, especially after the financial crisis started in the region in 1997. Therefore, this finding would be relevant for policy discussion at the regional level for future RTA negotiations.

More correlated financial markets as a result of RTA apparently reduces the benefit of portfolio diversification within RTA. This finding helps both sovereign and private investors alike in managing their international portfolio. Future RTA packages or negotiations may also need to put in place counter-measures to cope with financial shock transmissions among RTA member markets.

More correlated business cycle and financial markets among RTA member economies as a result of more correlated total capital inflows to them would complicate policy response from individual member governments. Moderate capital inflows could be benign. However, in the case of excessive or highly volatile capital inflows that may destabilize the macroeconomic fundamentals of the recipient countries, the government of each country may respond differently, depending on the nature of capital inflows (temporary versus long-term, debt versus equity), the level of domestic financial development, balance of payment sustainability, exchange rate regime, etc. Response by one country to curb the excessive capital inflows may affect the capital inflow to and thus policy reaction by other countries as well. For example, capital control by one government may divert more capital inflows to another country and require appropriate policy response in the latter. Therefore, RTA members may need to cooperate in designing concerted policy responses to capital inflows to the RTA.

Finally, based on one of the findings from this research, high economic growth in one country generates more savings to be invested in another country with higher return, hence causes the two financial markets to be more correlated. This message would affect sovereign

and private fund managers in their decision to hedge their portfolio against the source country's output fluctuation.

Conclusion and Direction for Future Research

The findings from empirical exercise in this research show that capital flows respond to gravity variables at least as much as trade does. Capital seems to be more information-dependent than trade, hence is more significantly affected by information cost (captured by distance) and institution quality. Institution quality clearly contributes to explaining the Lucas Paradox, as countries with good institutions can attract more capital inflows. Different bilateral flows between countries strengthen each others, as they can compensate for the information cost. In this sense, bilateral economics linkages through trade and capital flows seem to be complementary. This research also shows that risk diversification motivation is one determinant of capital flows.

Regarding the RTA integration effect, the empirical results in this research show that RTA membership is associated with stronger business cycle and financial market co-movements among members, controlling for gravity factors and other specific variables. This result survives most robustness checks. In addition, the research also finds that the density of bilateral economic linkages through trade and capital flows also contribute to business cycle co-movement. In addition, the research also finds that the mass of total capital flow, correlation between source GDP growth and host return index, and institutions significantly contribute to financial integration as well.

This thesis has studied determinants of capital flow and the effect of Regional Trade Agreement, which are important developments in international economic integration. The relationships are empirically explored by using gravity model approach. The explanatory power of the model is much stronger in the case of capital flow (with typical adjusted R-squared at 0.7), compared to the case of RTA impacts on business cycle (adjusted R-squared at 0.23 - 0.45) and financial market co-movement (adjusted R-squared at 0.16 - 0.25). The nature of the dependent variable's distribution may be one source of this difference. The Fisher's Z-transformation of correlation partly addressed this limitation. In the business cycle correlation case, a country's business cycle does not only depend on its economic partners' business cycle, but also on common shock to all economies such as energy price, technology shock, etc. The hypothesis of common shock effect on business cycle correlation was initiated by Dellas (1986). Exploring common shocks versus bilateral linkages on business

cycle correlation could be a future direction for strengthening the finding from this research. In the case of equity return index correlation, past research using GARCH and VAR models showed that past innovation could explain present variation of stock return correlation. Bollerslev and Ole Mikkelsen (1996), Bekaert and Harvey (1997), Berben and Jansen (2005) are among the authors who applied these models to study the equity return index volatility. Incorporating these modeling elements into the current research issue would be another future direction for expanding this research.

The econometric problem of multicollinearity between RTA formation and distance as explanatory variables may need further check by other econometric techniques. This issue is left to future research to address, probably by using an appropriate instrumental variable.

The empirical findings from the model show the pattern and behavior of different types of capital flow, their determinants and interactions, the comprehensive effect of regional trading arrangements that go far beyond the trade domain, and different determinants of both real and financial integration. In addition, institutions play a key role in determining the economic linkages through the effect on transaction costs. This is not surprising, as international business, trade, and finance are all vulnerable to risk and transaction costs, which are influenced by institution quality.

The empirical findings from this research also tell some stories beyond the main objective of research. Such additional findings are reflected in the outcomes of the control variables in the gravity equations. This is a promising sign for future research. One of such extra stories is that bank lending tends to go to countries with high central bank reserve. The result reflects the risk adversity of lenders to the risk of default and the role of the central bank as the lender of the last resort in the host country.

Regarding business cycle co-movement, countries that are geographically closer to each others, have smaller size of the economy, have more economic ties through portfolio investment, and enjoy similar volume of capital inflows tend to have more correlated business cycle.

Regarding financial market co-movement, the extra findings include: countries that enjoy similar volume of total capital inflows, exhibit pull-push factors (high GDP growth of source and high return of destination), and have high institution quality tend to have more correlated financial market.

Despite all the robust empirical results, the limitation of this research is that it is not based on a theoretical model that links regional trading arrangement with financial integration. The theoretical work in this area still leaves a vacuum in the literature to be filled in the future.

To more thoroughly explore the responsiveness of different types of capital flows to gravity factors, institutions, etc., it would be desirable for future research to add FDI and more disaggregate portfolio funds (i.e. equity and debt) into the analysis. The current research only limits itself to total portfolio and bank lending, due to the unavailable data for other forms of capital for the same sample period. Future CPIS data with broader coverage and more disaggregate data may make such expansion possible. Data on FDI breakdown by source countries are available from UNCTAD for the 1992-2003 period.

Another direction of improving the current research in the future is to find a better measure of information cost, or other deterrent factors that might be captured by distance. Past researchers found that information cost, captured by distance, is a deterrent to bilateral capital flows. However, information costs decline considerably with the IT development, while the negative effect of distance on bilateral flows does not. The question then is what else can be captured by distance, other than information?

The current research uses the free World Bank data on institutions and governance, which may not fully reflect all the risks involved in a country's institutions. The International Country Risk Guide provides a more comprehensive coverage of institution quality, such as political risk, financial risk, and economic risk, with more detailed break-downs, hence may provide better measure of institutions. This data set is a commercially oriented and has to be subscribed. Future expansion of this research may try this data set to improve the results.

Other than that, the possible future research that this thesis may unfold includes study on the self-feeding pattern of different economic linkages, e.g. trade, capital flows, business cycle, financial market correlation. The current research has found that they are mutually reinforcing. What is left for further research is how much of the reinforcing effect each of the linkages can have on the others. Moreover, what would be the implications of this self-feeding nature of economic linkages on the balance of payment and global imbalances that have been so persistent since the early 2000s?

Appendix I. 1. Countries and Their Data Source

Countries in the sample: from FTSE (index company) list of countries with active capital market, and selected based on data availability:

Developed markets:

Australia, Austria, Belgium, Canada, Hong Kong, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, USA.

Advanced emerging markets:

Israel, Mexico, Rep. of Korea, South Africa.

Secondary emerging markets:

Chile, India, Malaysia, Philippines, Thailand, Turkey

Data Source:

Bank lending: Bank of International Settlement (BIS), www.bis.org

Bilateral Capital Flows: International Monetary Fund, Coordinated Portfolio Investment Survey (CPIS);

Capital Control: (Gwartney and Lawson 2008), based on IMF's Annual Report on Exchange Arrangements and Exchange Restrictions.

Central bank reserve: World Bank, World Development Report

Common Language: (Wei);

Common Legal Origin: (LaPorta, de-Silanes et al. 1996);

Countries' Land Border: CIA World Factbook;

Distance Between Financial Centers: www.indo.com/distance;

Equity Return Index: Datastream;

GDP Per Capita: International Monetary Fund, International Financial Statistics;

GDP: International Monetary Fund, International Financial Statistics;

Herfindahl Index of market concentration: computed from Datastream market values by 10 industries (Basic Materials, Oil and Gas, Consumer Goods, Consumer Services, Telecom, Health Care, Financial Services, Industrial, Technology, and Utilities).

Institution Indicator (also known as Governance Indicator): (Kaufmann, Kraay et al. 2008), cover the following aspects of institutional environment quality: 1) Voice and Accountability; 2) Political Stability and Absence of Violence; 3) Government Effectiveness; 4) Regulatory Quality; 5) Rule of Law; 6) Control Corruption.

Interest rate: three-month inter-bank lending rates, Datastream

Quarterly GDP: International Monetary Fund, International Financial Statistics;

RTAs/FTAs' Name, Dates of Force Entry, And Number: World Trade Organization, www.wto.org;

Stock Market Capitalization: World Bank, World Development Indicators;

The indicators range from -2.5 to 2.5 from the lowest to the highest quality of each index.

This essay uses the average indicator for all the six criteria as the overall institution quality indicators.

Total Monthly Equity Flow: Emerging Portfolio Fund Research;

Trade Data: UN Comtrade Database;

Transport Cost: measured as US\$ per kilogram to be transported by air between two major cities. UPS website: www.ups.com

Appendix I. 2. Summary Statistics & Tests

Table I. 1. Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob	Sum	Sum Sq. Dev.
Capital Control	0.965	0.829	3.952	-0.016	0.542	1.070	4.470	379	0	1302	396
Distance	6070	5877	19857	171	5113	0.666	2.444	117	0	8194776	35300000000
GDP (log)	27.296	27.014	30.259	24.932	1.228	0.574	2.520	87	0	36850	2035
GDP p.c. (log)	10.293	10.433	11.001	7.892	0.504	-2.162	8.712	2887	0	13896	342
Institution	1.399	1.518	1.947	-0.295	0.412	-1.459	5.816	925	0	1888	229
Interest Rate	3.602	2.946	52.971	0.054	4.660	7.152	66.260	236615	0	4863	29296
Lending (long)	21.531	21.742	27.678	13.816	2.582	-0.388	3.006	34	0	29067	8992
Portfolio (log)	21.546	21.922	27.450	6.762	2.935	-1.067	5.287	551	0	29088	11618
Reserve/GDP	0.314	0.092	12.560	0.000	0.963	7.797	73.855	296079	0	424	1251
Transformed Return Correlation	1.136	1.136	1.136	1.136	1.136	1.136	1.136	1.136	1.136	1.136	1.136
Return Index	3172.177	2142.950	19624.480	0.648	3331.429	1.991	7.705	2137	0	4282438	15000000000
Trade (log)	21.342	21.342	25.749	16.380	1.748	0.001	2.502	14	0	28812	4120
Transport Cost	15.635	13.535	53.463	1.474	7.837	1.001	3.776	259	0	21107	82850

Table I. 2. Cross-Correlation Matrix

	Capital Control	Distance	Institution	Interest	Trade (log)	Lending (log)	Portfolio (log)	GDP pc (log)	Reserve/G DP	Return Index	Return Correl	Transport Cost
Cap Control	1											
Distance	0.441	1										
Institution	0.043	-0.011	1									
Interest	-0.030	-0.082	-0.469	1								
Trade (log)	-0.375	-0.360	-0.079	0.006	1							
Lending (log)	-0.393	-0.331	0.129	-0.111	0.763	1						
Portfolio (log)	-0.359	-0.307	0.306	-0.299	0.692	0.814	1					
GDP pc (log)	-0.158	-0.018	0.590	-0.485	0.145	0.361	0.505	1				
Reserve/GDP	0.052	0.103	-0.008	-0.060	-0.092	-0.052	-0.109	0.033	1			
Return Index	-0.066	-0.140	0.272	-0.005	0.230	0.377	0.359	0.372	-0.019	1		
Return Correlation	-0.074	-0.111	0.078	-0.017	0.075	0.077	0.078	0.017	-0.089	0.084	1	
Transport Cost	0.917	0.619	-0.005	0.014	-0.453	-0.493	-0.479	-0.143	0.034	-0.117	-0.189	1
GDP (log)	-0.105	0.138	-0.188	-0.100	0.541	0.508	0.437	0.303	0.071	0.227	0.002	-0.091

Appendix I. 3. Empirical Results for Capital Flows

Variable Notations and Their Definitions

Border: Dummy variable, 1 if the two countries share a land border, 0 otherwise

Contr_i: Capital control index of country i, higher value means more control measures

Distance_{ij}: Distance between major cities of countries i and j

GDP_i: GDP of country i, in log form

GDPPC_i: Per capita GDP of country i, in log form

INS_i: Institution quality index of country i, higher value means higher quality

Intrate_i: Three-month inter-bank interest rate in country i

Language: Dummy variable, 1 if the two countries share a common language, 0 otherwise

Legal: Dummy variable, 1 if the two countries have the same legal origin, 0 otherwise

Lending_{ij}: Total bank lending of country i to country j, in log form

Portfolio_{ij}: Total portfolio flow from country i to country j, in log form

Reserv_i: Central bank reserve as a share of GDP of country i

Ret_j: Equity Return Index of country j (the host country)

Ricor_{ij}: Correlation of Weekly Equity Return Index between countries i and j

Trade_{ij}: Bilateral trade between countries i and j, in log form

Trcost: Transportation cost between major cities of countries i and j

Table I. 3. Panel Granger Causality Test, Two-Lags

(All variables are in log form)

Variables	Dependent Variables					
	Trade	Portfolio	Trade	Lending	Lending	Portfolio
Constant	5,22**	-6,50**	4,60**	-4,29**	6,31**	8,69**
	(0,23)	(1,04)	(0,26)	(0,86)	(0,50)	(0,70)
Trade(-1)	0,57**	0,41**	0,59**	0,32**		
	(0,02)	(0,07)	(0,02)	(0,06)		
Trade(-2)	0,16**	0,62**	0,19**	0,46**		
	(0,02)	(0,07)	(0,02)	(0,07)		
Portfolio(-1)	0,03**	0,28**			0,08**	0,19**
	(0,00)	(0,02)			(0,02)	(0,02)
Portfolio(-2)	0,01**	-0,04*			0,10**	0,06**
	(0,00)	(0,02)			(0,02)	(0,02)
Lending(-1)			0,01*	0,48	0,56**	0,20**
			(0,01)	(0,02)	(0,02)	(0,03)
Lending(-2)			0,00	-0,08	-0,02	0,17**
			(0,01)	(0,02)	(0,02)	(0,03)
Observations	4281	4234	2776	2750	2592	2623
F-statistics	648	95	778	180	173	100

Notes: (**) and (*) indicate statistical significance at 1% and 5%, respectively. Numbers in parentheses are standard errors.

Table I. 4. Benchmark Gravity Model, Single Equations

	OLS			AR(1)		
	Trade	Portfolio	Lending	Trade	Portfolio	Lending
<i>Constant</i>	-17.949*	-39.572*	-35.052*	-0.164†	-3.690*	-2.252*
	(0.233)	(0.778)	(0.913)	(0.084)	(0.480)	(0.371)
<i>Distance_{ij}</i>	-0.631*	-0.765*	-0.825*	-0.025*	-0.095*	-0.061*
	(0.0084)	(0.025)	(0.027)	(0.003)	(0.013)	(0.014)
<i>GDP_i</i>	0.774*	0.763*	1.050*	0.026*	0.076*	0.047*
	(0.006)	(0.020)	(0.022)	(0.003)	(0.011)	(0.016)
<i>GDP_j</i>	0.768*	0.898*	0.721*	0.027*	0.110*	0.056*
	(0.006)	(0.020)	(0.022)	(0.003)	(0.012)	(0.010)
<i>GDPPC_i</i>	0.137*	1.703*	1.292*	-0.007*	0.200*	0.091 [^]
	(0.007)	(0.027)	(0.047)	(0.002)	(0.018)	(0.047)
<i>GDPPC_j</i>	0.161*	0.475*	0.184*	-0.010*	0.026†	0.025†
	(0.007)	(0.023)	(0.026)	(0.002)	(0.012)	(0.011)
<i>Border</i>	0.334*	-0.245†	-0.011	0.008	-0.062	-0.007
	(0.041)	(0.123)	(0.120)	(0.013)	(0.061)	(0.024)
<i>Language</i>	0.885*	1.105*	0.368*	0.030*	0.164*	0.014
	(0.019)	(0.060)	(0.081)	(0.006)	(0.031)	(0.017)
<i>Legal</i>	0.1217*	0.262*	0.620*	0.014†	0.010	0.052*
	(0.019)	(0.058)	(0.065)	(0.006)	(0.029)	(0.013)
<i>Lagged Dependent Variable</i>				0.963*	0.875*	0.949*
				(0.002)	(0.006)	(0.009)
<i>Observations</i>	19041	6351	4133	17979	5248	3415
<i>Adjusted R²</i>	0.752	0.694	0.653	0.977	0.931	0.963
<i>SSR</i>	19306	20830	10756	1630	3559	919
<i>D-W</i>	0.121	0.297	0.154			

Notes:

All dependent variables are in log form.

(*) indicates significance at 1% level, (†) indicates significance at 5% level, and (ˆ) indicates significance at 10% level. Numbers in parentheses are standard errors.

Table I. 5. Benchmark Gravity Model, Three-Equation Systems, OLS

	Trade	Portfolio	Lending
<i>Constant</i>	-4.520*** (0.516)	-32.425*** (0.956)	-4.606*** (1.035)
<i>Distance_{ij}</i>	-0.497*** (0.013)	-0.244*** (0.031)	-0.067** (0.030)
<i>GDP_i</i>	0.624*** (0.012)	0.276*** (0.032)	0.121*** (0.031)
<i>GDP_j</i>	0.496*** (0.011)	0.424*** (0.027)	-0.068** (0.027)
<i>GDPPC_i</i>	-0.327*** (0.026)	1.836*** (0.048)	0.220*** (0.053)
<i>GDPPC_j</i>	-0.086*** (0.012)	0.378*** (0.023)	0.009 (0.023)
<i>Border</i>	0.466*** (0.049)	-0.355*** (0.104)	-0.136 (0.099)
<i>Language</i>	0.203*** (0.033)	0.274*** (0.070)	-0.035 (0.067)
<i>Legal</i>	0.111*** (0.027)	0.041 (0.057)	0.330*** (0.054)
<i>Trade_{ij}</i>		0.212*** (0.033)	0.634*** (0.030)
<i>Portfolio_{ij}</i>	0.049*** (0.008)		0.410*** (0.014)
<i>Lending_{ij}</i>	0.160*** (0.008)	0.450*** (0.015)	
<i>Observations</i>	3927	3927	3927
<i>Adjusted R²</i>	0.844	0.785	0.745
<i>SSR</i>	1658	7208	6567
<i>D-W</i>	0.061	0.335	0.168

Notes:

All dependent variables are in log form.

(***) indicates significance at 1% level and (**) indicates significance at 5% level. Numbers in parentheses are standard errors.

Table I. 6. Augmented Gravity Model with Institution Variable, Single Equations

	OLS			AR(1)		
	Trade	Portfolio	Lending	Trade	Portfolio	Lending
<i>Constant</i>	-11.500*** (0.355)	-36.841*** (0.747)	-34.283*** (0.861)	0.619*** (0.135)	-3.743*** (0.479)	-2.325*** (0.394)
<i>Distance_{ij}</i>	-0.694*** (0.012)	-0.812*** (0.024)	-0.846*** (0.026)	-0.087*** (0.005)	-0.110*** (0.014)	-0.066*** (0.014)
<i>GDP_i</i>	0.749*** (0.010)	0.947*** (0.020)	1.278*** (0.025)	0.073*** (0.004)	0.108*** (0.013)	0.062*** (0.020)
<i>GDP_j</i>	0.744*** (0.010)	0.996*** (0.020)	0.847*** (0.022)	0.071*** (0.004)	0.132*** (0.012)	0.063 (0.013)
<i>GDPPC_i</i>	-0.053*** (0.019)	0.794*** (0.048)	0.471*** (0.069)	-0.088*** (0.007)	0.105*** (0.027)	0.056 (0.073)
<i>GDPPC_j</i>	-0.123*** (0.020)	0.115*** (0.043)	-0.301*** (0.047)	-0.072*** (0.007)	-0.016 (0.023)	0.012 (0.023)
<i>Border</i>	0.311*** (0.059)	-0.479*** (0.117)	-0.117 (0.114)	0.029 (0.020)	-0.094 (0.061)	-0.010 (0.026)
<i>Language</i>	0.739*** (0.027)	1.006*** (0.057)	0.002 (0.078)	0.026** (0.010)	0.161*** (0.031)	0.001 (0.019)
<i>Legal</i>	0.126*** (0.026)	0.382*** (0.055)	0.861*** (0.063)	0.031*** (0.009)	0.029 (0.029)	0.062*** (0.016)
<i>INS_i</i>	0.179*** (0.030)	1.583*** (0.069)	1.400*** (0.082)	0.127*** (0.011)	0.193*** (0.039)	0.062 (0.078)
<i>INS_j</i>	0.254*** (0.030)	0.705*** (0.066)	0.960*** (0.072)	0.085*** (0.011)	0.089** (0.035)	0.026 (0.032)
<i>Lagged Dependent Variable</i>				0.896*** (0.003)	0.864*** (0.007)	0.945*** (0.010)
<i>Observations</i>	7347	6351	4133	7344	5248	3415
<i>Adjusted R²</i>	0.756	0.724	0.692	0.970	0.931	0.963
<i>SSR</i>	5724	18774	9546	691	3538	918
<i>D-W</i>	0.042	0.313	0.158			

Notes:

All dependent variables are in log form.

(***), (**), (*) indicate significance at 1%, 5%, and 10% levels, respectively. Numbers in parentheses are standard errors.

Table I. 7. Augmented Gravity Equations with Institution Variable and Cross-Flow Effects, Two-Equation Systems

	Trade and Portfolio Simultaneous System		Trade and Lending Simultaneous System		Portfolio and Lending Simultaneous System	
	Trade(P)	Portfolio(T)	Trade(L)	Lending(T)	Portfolio(L)	Lending(P)
<i>Constant</i>	-6.513*** (0.406)	-28.386*** (0.761)	-9.221*** (0.428)	-23.062*** (0.905)	-31.778*** (0.881)	-12.694*** (1.015)
<i>Distance_{ij}</i>	-0.546*** (0.013)	-0.536*** (0.028)	-0.514*** (0.012)	-0.363*** (0.031)	-0.500*** (0.025)	-0.459*** (0.026)
<i>GDP_i</i>	0.579*** (0.011)	0.740*** (0.025)	0.651*** (0.013)	0.734*** (0.033)	0.925*** (0.026)	0.700*** (0.029)
<i>GDP_j</i>	0.557*** (0.011)	0.675*** (0.024)	0.535*** (0.010)	0.323*** (0.028)	0.717*** (0.021)	0.331*** (0.024)
<i>Border</i>	0.431*** (0.057)	-0.767*** (0.115)	0.432*** (0.050)	-0.376*** (0.108)	-0.382*** (0.101)	0.149 (0.103)
<i>Language</i>	0.598*** (0.028)	0.533*** (0.058)	0.212*** (0.034)	-0.153** (0.074)	-0.044 (0.070)	0.021 (0.071)
<i>Legal</i>	0.125*** (0.027)	0.308*** (0.055)	0.169*** (0.028)	0.615*** (0.060)	0.261*** (0.057)	0.550*** (0.058)
<i>INS_i</i>	-0.312*** (0.023)	2.541*** (0.036)	-0.004 (0.026)	1.621*** (0.051)	2.345*** (0.057)	0.430*** (0.069)
<i>INS_j</i>	-0.032* (0.017)	0.803*** (0.033)	-0.020 (0.017)	0.513*** (0.037)	0.667*** (0.036)	0.128*** (0.038)
<i>Trade_{ij}</i>		0.519*** (0.025)		0.720*** (0.032)		
<i>Portfolio_{ij}</i>	0.126*** (0.006)					0.425*** (0.015)
<i>Lending_{ij}</i>			0.155*** (0.007)		0.410*** (0.014)	
Observations	6315	6315	4105	4105	3954	3954
Adjusted R ²	0.762	0.732	0.844	0.719	0.794	0.722
SSR	4376	18044	1836	8532	7076	7333
D-W	0.055	0.276	0.062	0.148	0.322	0.159

Notes:

All dependent variables are in log form.

(***), (**), (*) indicate significance at 1%, 5%, and 10% levels, respectively. Numbers in parentheses are standard errors.

Table I. 8. Augmented Gravity Model with Institutions and Specific Controls, Single Equations

	OLS			GLS, AR(1)		
	Trade	Portfolio	Lending	Trade	Portfolio	Lending
<i>Constant</i>	-11.044*** (0.334)	-35.456*** (0.717)	-31.140*** (1.644)	0.382*** (0.074)	-1.750*** (0.171)	-1.337*** (0.175)
<i>Distance_{ij}</i>	-0.532*** (0.013)	-0.374*** (0.029)	-0.907*** (0.040)	-0.046*** (0.03)	-0.039*** (0.005)	-0.066*** (0.005)
<i>GDP_i</i>	0.711*** (0.008)	1.019*** (0.017)	1.242*** (0.043)	0.036*** (0.003)	0.068*** (0.005)	0.045*** (0.005)
<i>GDP_{2j}</i>	0.682*** (0.008)	0.957*** (0.018)	0.870*** (0.033)	0.037*** (0.003)	0.070*** (0.004)	0.058*** (0.005)
<i>Border</i>	0.422*** (0.056)	-0.154 (0.114)	-0.069 (0.180)	0.057*** (0.013)	-0.024 (0.015)	-0.101*** (0.018)
<i>Language</i>	0.723*** (0.026)	0.750*** (0.055)	-0.295** (0.126)	0.032*** (0.006)	0.057*** (0.010)	-0.012 (0.013)
<i>Legal</i>	0.082*** (0.025)	0.348*** (0.053)	0.953*** (0.108)	0.016*** (0.006)	0.042*** (0.009)	0.122*** (0.014)
<i>INS_i</i>	0.099*** (0.015)	2.314*** (0.040)	1.686*** (0.113)	-0.001 (0.003)	0.157*** (0.011)	0.033** (0.016)
<i>INS_j</i>	0.065*** (0.015)	1.059*** (0.037)	0.411*** (0.069)	-0.019*** (0.003)	0.051*** (0.007)	0.038*** (0.007)
<i>Trcost_{ij}</i>	-0.033*** (0.001)			-0.003*** (0.000)		
<i>Contr_i</i>		0.296*** (0.055)			0.007 (0.010)	
<i>Contr_j</i>		-0.199*** (0.009)			-0.008*** (0.002)	
<i>Ricor_{ij}</i>		-0.143** (0.069)			0.042*** (0.012)	
<i>Ret_j</i>		0.000*** (0.000)			0.000*** (0.000)	
<i>Reerv_i</i>			-4.505*** (0.688)			0.000*** (0.000)
<i>Reserv_j</i>			0.166*** (0.043)			0.000*** (0.000)
<i>Intrate_i</i>			0.023** (0.009)			-0.003*** (0.001)
<i>Intrate_j</i>			-0.009 (0.008)			0.002* (0.001)
<i>Lagged Dependent Variable</i>				0.920*** (0.003)	0.915*** 0.004	0.959*** (0.004)
<i>Observations</i>	7346	6351	1396	7344	5248	1159
<i>Adjusted R²</i>	0.776	0.75	0.74	0.969	1.000	1.000
<i>SSR</i>	5222	17299	2850	723	3259	284
<i>D-W</i>	0.045	0.310	0.169			

Notes:

All dependent variables are in log form.

(***), (**), (*) indicate significance at 1%, 5%, and 10% levels, respectively. Numbers in parentheses are standard errors.

Table I. 9. Augmented Gravity Equations with Specific Controls and Cross-Flow Effects, Two-Equation Systems, OLS

	Dependent Variables					
	(1) Trade and Portfolio		(2) Trade and Lending		(3) Portfolio and Lending	
	<i>Trade(P)</i>	<i>Portfolio(T)</i>	<i>Trade(L)</i>	<i>Lending(T)</i>	<i>Portfolio(L)</i>	<i>Lending(P)</i>
<i>Constant</i>	-7.066*** (0.395)	-30.968*** (0.746)	-9.301*** (0.426)	-20.269*** (1.801)	-34.683*** (0.881)	-11.040*** (1.789)
<i>Distance_{ij}</i>	-0.430*** (0.014)	-0.154*** (0.031)	-0.463*** (0.014)	-0.481*** (0.052)	-0.242*** (0.029)	-0.495*** (0.042)
<i>GDP_i</i>	0.594*** (0.011)	0.730*** (0.024)	0.651*** (0.013)	0.641*** (0.064)	0.940*** (0.025)	0.608*** (0.051)
<i>GDP_j</i>	0.565*** (0.010)	0.681*** (0.024)	0.539*** (0.010)	0.439*** (0.049)	0.752*** (0.021)	0.376*** (0.039)
<i>Border</i>	0.503*** (0.055)	-0.317*** (0.111)	0.476*** (0.050)	-0.254*** (0.172)	-0.149*** (0.099)	0.237 (0.159)
<i>Language</i>	0.596*** (0.027)	0.470*** (0.056)	0.203*** (0.034)	-0.297** (0.120)	-0.117* (0.068)	-0.264** (0.112)
<i>Legal</i>	0.101*** (0.026)	0.290*** (0.052)	0.160*** (0.028)	0.668*** (0.107)	0.311*** (0.056)	0.559*** (0.098)
<i>INS_i</i>	-0.203*** (0.023)	2.294*** (0.040)	0.008 (0.026)	1.359*** (0.111)	2.451*** (0.056)	0.470*** (0.122)
<i>INS_j</i>	-0.029* (0.017)	1.012*** (0.036)	-0.019 (0.017)	0.435*** (0.066)	0.870*** (0.039)	-0.034 (0.066)
<i>Trcost_{ij}</i>	-0.031*** (0.002)		-0.012*** (0.002)			
<i>Contr_i</i>		0.419*** (0.057)			-0.047 (0.063)	
<i>Contr_j</i>		-0.189*** (0.009)			-0.108*** (0.009)	
<i>Ricor_{ij}</i>		-0.112* (0.067)			-0.229*** (0.070)	
<i>Ret_j</i>		0.000*** (0.000)			0.000*** (0.000)	
<i>Reserv_i</i>				-4.796*** (0.655)		-4.261*** (0.634)
<i>Reserv_j</i>				0.123*** (0.041)		0.146*** (0.038)
<i>Intrate_i</i>				0.010 (0.009)		0.069*** (0.009)
<i>Intrate_j</i>				0.004 (0.008)		-0.004 (0.007)
<i>Trade_{ij}</i>		0.410*** (0.024)		0.641*** (0.054)		
<i>Portfolio_{ij}</i>	0.094*** (0.006)					0.428*** (0.024)
<i>Lending_{ij}</i>			0.143*** (0.007)		0.330*** (0.015)	
<i>Observations</i>	6315	6315	4105	1387	3954	1330
<i>Adjusted R²</i>	0.776	0.758	0.846	0.760	0.808	0.768
<i>SSR</i>	4128	16267	1817	2557	6569	2066
<i>D-W</i>	0.050	0.317	0.060	0.171	0.360	0.185

Notes:

All dependent variables are in log form.

(***), (**), (*) indicate significance at 1%, 5%, and 10% levels, respectively. Numbers in parentheses are standard errors.

Table I. 10. Augmented Gravity Equations with Specific Controls and Cross-Flow Effects, Two-Equation Systems, WLS, AR(1)

	(1) Trade and Portfolio		(2) Trade and Lending		(3) Portfolio and Lending	
	<i>Trade(P)</i>	<i>Portfolio(T)</i>	<i>Trade(L)</i>	<i>Lending(T)</i>	<i>Portfolio(L)</i>	<i>Lending(P)</i>
<i>Constant</i>	0.373**	-3.642***	0.246	-0.200	-4.894***	0.654
	(0.149)	(0.481)	(0.188)	(0.763)	(0.628)	(0.735)
<i>Distance_{ij}</i>	-0.049***	-0.032*	-0.065***	-0.053***	-0.041**	-0.054***
	(0.005)	(0.017)	(0.007)	(0.021)	(0.017)	(0.017)
<i>GDP_i</i>	0.046***	0.094***	0.060***	-0.008	0.147***	-0.009
	(0.005)	(0.015)	(0.007)	(0.027)	(0.018)	(0.022)
<i>GDP_j</i>	0.046***	0.096***	0.049***	0.043**	0.115***	0.040**
	(0.005)	(0.014)	(0.005)	(0.020)	(0.014)	(0.016)
<i>Border</i>	0.061***	-0.084	0.076***	-0.106	-0.051	-0.043
	(0.020)	(0.061)	(0.021)	(0.068)	(0.058)	(0.063)
<i>Language</i>	0.037***	0.109***	-0.001	-0.019	-0.012	-0.014
	(0.010)	(0.031)	(0.014)	(0.050)	(0.040)	(0.046)
<i>Legal</i>	0.029***	0.022	0.029**	0.114***	0.048	0.110***
	(0.010)	(0.029)	(0.012)	(0.044)	(0.033)	(0.040)
<i>INS_i</i>	0.013	0.327***	0.006	0.002	0.466***	-0.064
	(0.009)	(0.028)	(0.011)	(0.047)	(0.040)	(0.049)
<i>INS_j</i>	-0.008	0.104***	-0.017**	0.037	0.110***	-0.021
	(0.006)	(0.021)	(0.007)	(0.027)	(0.024)	(0.027)
<i>Trcost_{ij}</i>	-0.004***		-0.001*			
	(0.001)		(0.001)			
<i>Contr_i</i>		0.080**			-0.101***	
		(0.032)			(0.036)	
<i>Contr_j</i>		-0.028***			-0.006	
		(0.005)			(0.006)	
<i>Ricor_{ij}</i>		0.007			-0.049	
		(0.037)			(0.040)	
<i>Ret_j</i>		0.000***			0.000	
		(0.000)			(0.000)	
<i>Reserv_i</i>				-0.867**		-0.837***
				(0.287)		(0.275)
<i>Reserv_j</i>				0.000		0.007
				(0.016)		(0.015)
<i>Intrate_i</i>				-0.002		0.006*
				(0.004)		(0.004)
<i>Intrate_j</i>				0.003		0.002
				(0.003)		(0.003)
<i>Trade_{ij}</i>		0.060***		0.056**		
		(0.014)		(0.023)		
<i>Portfolio_{ij}</i>	0.002					0.045***
	(0.002)					(0.011)
<i>Lending_{ij}</i>			0.028***		0.052***	
			(0.003)		(0.009)	
<i>Lag. Depend. Variable</i>	0.897***	0.846***	0.861***	0.935***	0.837***	0.919***
	(0.004)	(0.007)	(0.006)	(0.011)	(0.010)	(0.011)
<i>Observations</i>	6314	5213	4104	1150	3371	1109
<i>Adjusted R²</i>	0.970	0.931	0.974	0.967	0.941	0.968
<i>SSR</i>	549	3474	310	286	1629	230

Notes:

All dependent variables are in log form.

(***), (**), (*) indicate significance at 1%, 5%, and 10% levels, respectively. Numbers in parentheses are standard errors.

Appendix I.4. Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) was introduced by Jack Treynor (1961, 1962), William Sharpe (1964), John Lintner (1965) and Jan Mossin (1966) independently, building on the earlier work of Harry Markowitz on diversification and modern portfolio theory. The model looks at the difference between country's market excess return and the world excess return over the risk-free return (usually Treasury bill rate), as follows

$$E[r_i] - r_f = \beta_i^w (E[r_w] - r_f)$$

where r_i is the return on asset i , r_f is the risk-free rate, and r_w is the world portfolio.

The β_i^w , usually referred to in the literature of financial economics as “market beta”, is defined as:

$$\beta_i = \frac{\text{Cov}(r_i, r_M)}{\sigma_M^2}$$

where r_i is the return in excess of risk-free return, M is the market portfolio. The beta at firm level is sometimes defined as:

$$\beta_i = \frac{\sigma_i}{\sigma_M} \rho_{iM}$$

i.e. a company's beta depends on its stand-alone risk as measured by its own standard deviation, the market risk as measured by market deviation, and its correlation with the market.

The more the market is integrated to the world, the smaller the difference between its excess return and the world excess return is expected to be. The CAPM is usually a work shore of studies on benefit of risk diversification between markets.

Appendix I.5. Selected Empirical Model Review

<i>Authors</i>	<i>Dependent Variable/ Data Source</i>	<i>Right-Hand-Side Variables</i>	<i>Equations/Sample/ Methodology</i>
On endogeneity of return correlation (Coeurdacier and Guibaud 2005)	log(equities _{ij}) from CPIS	log(market capitalization), standard gravity variables, trade, equity return in destination, fiscal treaty	IV: mean past return correlation, cross sectional, 2001, 28 source countries, 41 destination countries
On determinants of cross border equity (Portes and Rey 2005)	Log of asset, normalized by product of market capitalization	standard gravity variables, phone cost, information variables, equity return covariance,	OLS, Panel, cross-section, 14 countries, 1989-1996
Buch. 2005	Bilateral bank assets (liabilities)	GDP, distance, capital control dummy, financial center dummy, GDP growth correlation, exchange rate volatility	Five source countries, 54 recipient countries, 1983-1999, individual country's time series, cross-section, and panel
On determinants of bilateral bond holdings (Eichengreen et al, 2006)	Log(Bond _{ij}), from CPIS	standard gravity variables, central bank reserves, interest rate, listed companies, HI for banking, bond transaction control dummy, bond return, bond return correlation, FX volatility, public bank asset share, capital market size, banking sector size, phone traffic, phone cost	OLS, FE, RE ¹ , 2SLS, SUR across groups, 2001-2003
On the role of geography in trade, FDI, and portfolio	Log(trade), Log(FDI), Log(Portfolio) (from CPIS 2000)	Standard gravity variables, split sample into North-North, North-South, and South-North	OLS, 50 countries, cross-sectional, 1997

¹ FE: fixed effect, RE: random effect.

<i>Authors</i>	<i>Dependent Variable/ Data Source</i>	<i>Right-Hand-Side Variables</i>	<i>Equations/Sample/ Methodology</i>
(Guerin, 2006)			
On simultaneity of trade in goods and trade in assets (Aviat, Coeurdacier, 2007)	Log of import (asset), normalized by product of GDP, from CPIS and BIS	banking assets (from BIS), bilateral equity holdings (CPIS), standard gravity variables, transport cost, fiscal variables, tax treaties, common legal origin, corruption	Simultaneous equation system, OLS, IV, 19 source countries and 63 destination countries, 2001 cross sectional
Mishra, 2007	$\log(1+\text{equity})^1$, from CPIS	$\log(1+\text{Import})$ for asset equation, $\log(1+\text{export})$ for liability equation, standard gravity variables, GDP growth correlation, RI correlation, source GDP-host RI correlation, phone cost, market capitalization, capital control	41 countries, 1997, 2001, 2002 panel
On complementarity between portfolio asset and bank lending (Halm and Shin, 2009)	$\log(\text{Asset})_{\text{sd,it}}$, from CPIS and BIS	$\log(\text{Asset})_{\text{sd,jt}}$, standard gravity variables, lagged asset holdings, lagged trade, law and order, their interaction,	Random Effect, 36 countries, 1997-2003 panel
On institution quality effect, poor explanatory power (Papaioannou, 2009), (R^2 less than 0.05 for most specifications)	$\text{Log}(\text{NetBankFlow})$ from BIS	Standard gravity variables, institutions variables from ICRG and the lagged	Panel, initial value, sample period average regressions, IV, 19 source countries and 140 recipient countries

¹ This method of taking log of 1+equity aims at addressing observations with zero value.

Appendix II. 1. Pattern of Equity Index Covariance

Figure II. 6. Covariance of Weekly Return Index, Developed Markets, 1973-2007

(Covariance between individual countries' index and the average index of the remaining developed countries in the sample)

Notes:

Countries included in the above figure: Australia (Aus), Austria (Aut), Belgium (Bel), Canada (Can), Denmark (Dnk), France (Fra), Germany (Deu), Hong Kong (Hkg), Ireland (Irl), Italy (Ita), Japan (Jpn), Netherlands (Nld), Singapore (Sgp), South Africa (Zaf), Switzerland (Che), United Kingdom (Gbr), United States (Usa).

The bold solid line is the covariance of average indexes, the thin solid line is positive covariance, and the star-dotted line is negative covariance.

Appendix II. 2. Variable Notation Definition and Summary Statistics

Variable Definitions:

AVGGOVN: average governance indicator of both countries

DGOVN: absolute value of difference in governance indicator between countries i and j

DIR: Interest rate differential

FINDEPT: Financial depth, measured by market capitalization as a share of GDP

GROWCOR: GDP growth correlation

GROWRICOR: Correlation between source country's GDP growth and host country's return index

HI: Herfindahl Index indicating the level of market concentration among 10 industries by FTSE classification.

KFCOR: correlation of total capital inflow to countries i and j

KFNOR: log of total portfolio flow from country i to country j , normalized by the product of their GDP

MCAP: Market capitalization of country i

RICOR: correlation of weekly equity return index

TPF: Total portfolio asset holdings of country i in country j

TRCOST: Transport cost between countries i and j

YPC: Per capita GDP

Table II. 1. Summary Statistics of Selected Variables

[illegible]

Table II. 2. Dependent Variable Summary Statistics

	GROWCOR	RICOR	Transformed GROWCOR	Transformed RICOR
Mean	0.34	0.705	0.80	1.136
Median	0.61	0.828	0.71	1.181
Maximum	1.00	0.995	6.69	2.991
Minimum	-1.00	-0.765	-3.45	-1.008
Std. Dev.	0.66	0.315	1.45	0.648
Skewness	-0.68	-1.800	0.32	-0.266
Kurtosis	1.98	6.130	3.05	2.798
Jarque-Bera	886.22	7008.057	125.91	99.927
Probability	0.00	0.000	0.00	0.000
Sum	2536	5212	5945	8398
Sum Sq. Dev.	3206	733	15608	3107
Observations	7392	7392	7392	7392

Figure II. 7. Histograms of Dependent Variables and their Fisher's Z-Transformation

Table II. 3. Descriptive statistics for RTA and gravity variables – Correlation Table

	<i>BORDER</i>	<i>DGDP</i>	<i>DIST</i>	<i>GDP</i>	<i>DEMOC</i>
<i>BORDER</i>	1.00				
<i>DGDP</i>	-0.04	1.00			
<i>DIST</i>	-0.29	0.15	1.00		
<i>GDP</i>	0.03	0.43	0.02	1.00	
<i>DEMOC</i>	0.04	0.05	-0.09	0.16	1.00
<i>RTA</i>	0.24	-0.13	-0.58	-0.10	0.20

Note:

DGDP: difference in *GDP*, *DIST*: bilateral distance, *DEMOC*: level of democracy.

Table II. 4. Probit model for determinants of RTA formation

	(I)	(II)	(III)
<i>C</i>	8.953*	13.361*	7.290*
	(0.203)	(0.638)	(0.229)
<i>LOG(DIST_{ij})</i>	-1.088*	-1.073*	-1.057*
	(0.023)	(0.024)	(0.025)
<i>BORDER_{ij}</i>	-0.572*	-0.448*	-0.545*
	(0.121)	(0.127)	(0.124)
<i>LOG(GDP_i)</i>		-0.115*	
		(0.016)	
<i>LOG(GDP_j)</i>		-0.114*	
		(0.016)	
<i>LOG(DGDP_{ij})</i>	-0.024		-0.065*
	(0.016)		(0.017)
<i>DEMOCRACY_i</i>		0.087*	0.077*
		(0.007)	(0.006)
<i>DEMOCRACY_j</i>		0.098*	0.087*
		(0.007)	(0.007)
<i>McFadden R-squared</i>	0.361	0.413	0.404
<i>Sum of Squared Residuals</i>	972	880	903
<i>Obs with Dependent Variable = 0</i>	4621	4623	4621
<i>Obs with Dependent Variable = 1</i>	2768	2769	2768

Notes: (*) indicates significance at 1% level, number in parentheses are standard deviations.

Data on democracy is obtained from Marshal, M.G. and Jagers, K., *Polity IV Project*, Center for Systemic Peace, George Mason University and Colorado State University, <http://www.systemicpeace.org/polity/polity4.htm>

Appendix II. 3. Empirical Results for RTA Effects

Table II. 5. Dependent Variable: Fisher's Z-Transformation of GDP Growth Correlation, OLS

	Eq1	Eq2	Eq3	Eq4	Eq5	Eq6	Eq7	Eq8(sym)
<i>Constant</i>	4.749*** (0.572)	6.601*** (0.629)	7.070*** (0.775)	5.776*** (0.881)	8.436*** (0.782)	8.463*** (1.074)	5.607*** (0.960)	4.529*** (1.083)
<i>RTA</i>	0.389*** (0.042)	0.442*** (0.046)	0.316*** (0.052)	0.281*** (0.052)	0.247*** (0.052)	0.456*** (0.057)	0.174*** (0.051)	0.582*** (0.060)
<i>BORDER</i>	-0.340*** (0.086)	-0.294*** (0.088)	-0.352*** (0.105)	-0.350*** (0.105)	-0.342*** (0.105)	-0.263*** (0.107)	-0.155 (0.095)	-0.018 (0.098)
<i>LANG</i>	-0.219*** (0.038)	-0.329*** (0.039)	-0.404*** (0.047)	-0.359*** (0.049)	-0.367*** (0.047)	-0.413*** (0.048)	-0.273*** (0.043)	-0.271*** (0.047)
<i>LOG(DIST_{ij})</i>	-0.524*** (0.025)	-0.431*** (0.024)	-0.418*** (0.027)	-0.416*** (0.028)	-0.396*** (0.027)	-0.327*** (0.029)	-0.170*** (0.026)	-0.184*** (0.029)
<i>LOG(GDP_i)</i>	0.013 (0.018)	-0.069*** (0.016)	-0.080*** (0.019)	-0.069*** (0.019)	-0.084*** (0.019)	-0.095*** (0.024)	-0.071*** (0.021)	-0.041* (0.024)
<i>LOG(GDP_j)</i>	0.013 (0.018)	-0.059*** (0.015)	-0.072*** (0.019)	-0.079*** (0.020)	-0.131*** (0.020)	-0.122*** (0.024)	-0.084*** (0.022)	-0.070*** (0.024)
<i>LOG(TRADE_{ij})</i>	-0.012 (0.017)							
<i>LOG(TPF_{ij})</i>		0.063*** (0.007)	0.055*** (0.008)	0.039*** (0.011)	0.073*** (0.008)	0.069*** (0.009)	0.033*** (0.008)	0.069*** (0.009)
<i>KFCOR</i>			0.148*** (0.055)	0.172*** (0.055)	0.166** (0.055)	0.238*** (0.055)	0.288*** (0.049)	0.13** (0.056)
<i>KFCOR²</i>			0.592*** (0.083)	0.536*** (0.084)	0.585*** (0.083)	0.484*** (0.083)	0.417*** (0.074)	0.354*** (0.081)
<i>LOG(YPC_i)</i>				0.046 (0.029)				
<i>LOG(YPC_j)</i>				0.106*** (0.021)				
<i>DYPC</i>					-0.072*** (0.015)	-0.044** (0.019)	-0.016 (0.017)	-0.054*** (0.018)
<i>FINDEPT_i</i>					0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
<i>FINDEPT_j</i>					-0.191*** (0.020)	-0.197*** (0.020)	-0.115*** (0.018)	-0.1426*** (0.022)

	Eq1	Eq2	Eq3	Eq4	Eq5	Eq6	Eq7	Eq8(sym)
<i>DIR</i>						0.011***	0.008*	0.011**
						(0.005)	(0.005)	(0.005)
<i>HIi</i>						0.000***	0.000*	0.000
						(0.000)	(0.000)	(0.000)
<i>HIj</i>						0.000***	0.000	0.000
						(0.000)	(0.000)	(0.000)
<i>Lagged Dependent Variable</i>							0.434***	
							(0.014)	
<i>Adjusted R²</i>	0.207	0.234	0.270	0.275	0.289	0.302	0.447	0.326
<i>SSR</i>	12338	10746	5347	5310	5159	4766	3769	2396
<i>Durbin-Watson</i>	1.434	1.430	1.092	1.097	1.113	1.120	2.107	1.303
<i>Observations</i>	7347	6351	3748	3748	3704	3544	3544	2624

Note: (***) indicates significance at 1% level, (**) at 5%, and (*) at 10%. Numbers in parentheses are standard deviations.

Table II. 6. Dependent Variable: Fisher's Z-Transformation of GDP Growth Correlation, GLS

	Eq1	Eq2	Eq3	Eq4	Eq5 (Sym)
<i>Constant</i>	5.423***	3.862***	6.901***	6.913***	4.833***
	(0.552)	(0.555)	(0.561)	(0.704)	(0.580)
<i>RTA</i>	0.277***	0.201***	0.180***	0.422***	0.418***
	(0.043)	(0.044)	(0.042)	(0.047)	(0.036)
<i>BORDER</i>	-0.435***	-0.437***	-0.417***	-0.272***	0.032
	(0.093)	(0.094)	(0.095)	(0.098)	(0.096)
<i>LANG</i>	-0.364***	-0.318***	-0.323***	-0.394***	-0.291***
	(0.032)	(0.029)	(0.029)	(0.031)	(0.022)
<i>LOG(DIST_{ij})</i>	-0.408***	-0.412***	-0.388***	-0.298***	-0.220***
	(0.022)	(0.022)	(0.021)	(0.023)	(0.016)
<i>LOG(GDP_i)</i>	-0.052***	-0.048***	-0.061***	-0.066***	-0.039***
	(0.013)	(0.013)	(0.013)	(0.014)	(0.012)
<i>LOG(GDP_j)</i>	-0.040***	-0.044***	-0.099***	-0.100***	-0.073***
	(0.012)	(0.013)	(0.014)	(0.017)	(0.012)
<i>LOG(TPF_{ij})</i>	0.048***	0.021***	0.069***	0.066***	0.071***
	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)
<i>KFCOR</i>	0.205***	0.247***	0.196***	0.266***	0.155***
	(0.034)	(0.029)	(0.037)	(0.036)	(0.014)
<i>KFCOR²</i>	0.639***	0.501***	0.642***	0.575***	0.377***
	(0.053)	(0.049)	(0.055)	(0.057)	(0.031)
<i>LOG(YPC_i)</i>		0.107***			
		(0.016)			
<i>LOG(YPC_j)</i>		0.114***			
		(0.012)			
<i>DYPC</i>			-0.069***	-0.052***	-0.059***
			(0.009)	(0.011)	(0.008)
<i>FINDEPT_i</i>			0.000	0.000	0.000
			(0.000)	(0.000)	(0.000)
<i>FINDEPT_j</i>			-0.194***	-0.190***	-0.138***
			(0.011)	(0.011)	(0.004)
<i>DIR</i>				0.009***	0.010***
				(0.003)	(0.002)
<i>HI_i</i>				0.000***	0.000**
				(0.000)	(0.000)
<i>HI_j</i>				0.000***	0.000***
				(0.000)	(0.000)
<i>Weighted Statistics</i>					
<i>Adjusted R²</i>	0.422	0.426	0.459	0.474	0.900
<i>SSR</i>	5291	5251	5107	4712	2351
<i>Durbin-Watson</i>	1.375	1.393	1.416	1.416	1.581
<i>Unweighted Statistics</i>					
<i>R²</i>	0.268	0.273	0.288	0.300	0.324
<i>SSR</i>	5375	5337	5187	4795	2419
<i>Durbin-Watson</i>	1.089	1.090	1.108	1.119	1.285
<i>Observations</i>	3748	3748	3704	3544	2624

Note: (***) indicates significance at 1% level, (**) at 5%, and (*) at 10%. Numbers in parentheses are standard deviations.

Table II. 7. Dependent Variable: Fisher's Z-Transformation of Weekly Equity Return Correlation, OLS

	Eq1	Eq2	Eq3	Eq4	Eq5	Eq6	Eq7	Eq8(sym)
<i>Constant</i>	-0.486*** (0.156)	0.077 (0.184)	0.154 (0.175)	0.168 (0.176)	0.356** (0.179)	0.387* (0.209)	0.104 (0.124)	0.046 (0.116)
<i>RTA</i>	0.141*** (0.018)	0.151*** (0.020)	0.157*** (0.019)	0.161*** (0.019)	0.148*** (0.019)	0.151*** (0.019)	0.132*** (0.019)	0.112*** (0.018)
<i>TRCOST_{ij}</i>	-0.005*** (0.001)	-0.004*** (0.001)	-0.002** (0.001)	-0.003** (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002*** (0.001)	-0.003*** (0.001)
<i>BORDER</i>	0.179*** (0.039)	0.147*** (0.045)	0.143*** (0.043)	0.146*** (0.043)	0.126*** (0.043)	0.125*** (0.043)	0.137*** (0.042)	0.121*** (0.039)
<i>LANG</i>	-0.025 (0.019)	0.006 (0.020)	0.004 (0.019)	0.003 (0.019)	0.009 (0.019)	0.008 (0.020)	0.017 (0.020)	-0.004 (0.018)
<i>LOG(TPF_{ij})</i>	0.023*** (0.003)							
<i>LOG(MCAP_i)</i>	0.003** (0.001)	0.003* (0.001)	0.002* (0.001)	0.002* (0.001)	0.002* (0.001)	0.002 (0.001)		
<i>LOG(MCAP_j)</i>	0.042*** (0.006)	0.029*** (0.007)	0.020*** (0.006)	0.020*** (0.006)	0.015** (0.006)	0.015*** (0.007)		
<i>KFCOR</i>		0.425*** (0.018)	0.453*** (0.017)	0.454*** (0.017)	0.449*** (0.017)	0.451*** (0.018)	0.470*** (0.017)	0.307*** (0.018)
<i>GROWRICOR</i>			0.222*** (0.013)	0.222*** (0.013)	0.224*** (0.012)	0.224*** (0.012)	0.223*** (0.012)	0.181*** (0.012)
<i>GROWRICOR²</i>			0.264*** (0.025)	0.265*** (0.025)	0.260*** (0.025)	0.260*** (0.025)	0.258*** (0.025)	0.253*** (0.023)
<i>AVGGOVN</i>				0.007 (0.007)			0.017** (0.008)	0.012 (0.008)
<i>DGOVN</i>					-0.071*** (0.014)	-0.071*** (0.014)		
<i>HI_i</i>						0.000 (0.000)	0.000** (0.000)	0.000** (0.000)
<i>HI_j</i>						0.000 (0.000)	0.000* (0.000)	0.000 (0.000)
<i>LOG(YPC_i)</i>							0.044*** (0.009)	0.054*** (0.009)
<i>LOG(YPC_j)</i>							0.039*** (0.008)	0.048*** (0.008)
<i>Adjusted R²</i>	0.075	0.162	0.242	0.242	0.246	0.246	0.251	0.193

	Eq1	Eq2	Eq3	Eq4	Eq5	Eq6	Eq7	Eq8(sym)
SSR	2450	1309	1184	1184	1177	1177	1188	951
Durbin-Watson	1.889	2.215	2.076	2.078	2.089	2.091	2.093	2.060
Observations	6307	4169	4169	4169	4169	4169	4221	4025

Note: (***) indicates significance at 1% level, (**) at 5%, and (*) at 10%. Numbers in parentheses are standard deviations.

Table II. 8. Dependent Variable: Fisher's Z-Transformation of Weekly Equity Return Correlation, PCSE

	Eq1	Eq2	Eq3	Eq4	Eq5	Eq6	Eq7	Eq8(sym)
<i>Constant</i>	-0.486*** (0.157)	0.077 (0.188)	0.154 (0.179)	0.168 (0.180)	0.356* (0.185)	0.387*** (0.221)	0.104 (0.120)	0.046 (0.115)
<i>RTA</i>	0.141*** (0.018)	0.151*** (0.020)	0.157*** (0.019)	0.161*** (0.019)	0.148*** (0.019)	0.151*** (0.019)	0.132*** (0.020)	0.112*** (0.018)
<i>TRCOST_{ij}</i>	-0.005*** (0.001)	-0.004*** (0.001)	-0.002** (0.001)	-0.003** (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.003*** (0.001)
<i>BORDER</i>	0.179*** (0.040)	0.147*** (0.048)	0.143*** (0.042)	0.146*** (0.042)	0.126*** (0.042)	0.125*** (0.042)	0.137*** (0.041)	0.121*** (0.040)
<i>LANG</i>	-0.025 (0.018)	0.006 (0.020)	0.004 (0.019)	0.003 (0.019)	0.009 (0.019)	0.008 (0.019)	0.017 (0.019)	-0.004 (0.018)
<i>LOG(TPF_{ij})</i>	0.023*** (0.003)							
<i>LOG(MCAP_i)</i>	0.003*** (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)		
<i>LOG(MCAP_j)</i>	0.042*** (0.006)	0.029*** (0.007)	0.020*** (0.006)	0.020*** (0.006)	0.015** (0.007)	0.015** (0.007)		
<i>KFCOR</i>		0.425*** (0.019)	0.453*** (0.019)	0.454*** (0.019)	0.449*** (0.019)	0.451*** (0.019)	0.470*** (0.019)	0.307*** (0.018)
<i>GROWRICOR</i>			0.222*** (0.012)	0.222*** (0.012)	0.224*** (0.012)	0.224*** (0.012)	0.223*** (0.012)	0.181*** (0.012)
<i>GROWRICOR²</i>			0.264*** (0.025)	0.265*** (0.025)	0.260*** (0.025)	0.260*** (0.025)	0.258*** (0.025)	0.253*** (0.023)
<i>AVGGOVN</i>				0.007 (0.007)			0.017* (0.009)	0.012 (0.008)
<i>DGOVN</i>					-0.071*** (0.014)	-0.071*** (0.014)		
<i>HI_i</i>						0.000 (0.000)	0.000** (0.000)	0.000** (0.000)
<i>HI_j</i>						0.000 (0.000)	0.000* (0.000)	0.000 (0.000)
<i>LOG(YPC_i)</i>							0.044*** (0.009)	0.054*** (0.009)
<i>LOG(YPC_j)</i>							0.039*** (0.008)	0.048*** (0.008)
<i>Adjusted R²</i>	0.075	0.162	0.242	0.242	0.246	0.246	0.251	0.193

	Eq1	Eq2	Eq3	Eq4	Eq5	Eq6	Eq7	Eq8(sym)
SSR	2450	1309	1184	1184	1177	1177	1188	951
Durbin-Watson	1.889	2.215	2.076	2.078	2.089	2.091	2.093	2.060
Observations	6307	4169	4169	4169	4169	4169	4221	4025

Note: (***) indicates significance at 1% level, (**) at 5%, and (*) at 10%. Numbers in parentheses are standard deviations.

Table II. 9. Granger Causality Test for Capital Flow and GDP Growth Correlation

Pairwise Granger Causality Tests			
Sample: 2004 2007			
Lags: 1			
Null Hypothesis:	Observation	F-Statistic	Probability
Total capital flow correlation does not Granger cause GDP growth correlation	3169	19.6	0.00
GDP growth correlation does not Granger Cause total capital flow correlation		3.30	0.07

Appendix II.4. List of RTAs/FTAs

Agreement	Date of entry into force	Date notified by Parties*	Type of agreement **
EC (Treaty of Rome)	01-01-58	10-Nov-95*	EIA
EFTA (Stockholm Convention)	03-05-60	14-Nov-59*	FTA
CACM	12-10-61	24-Feb-61*	CU
TRIPARTITE	01-04-68	23-Feb-68*	PS
EFTA accession of Iceland	01-03-70	30-Jan-70*	FTA Accession
EC-OCTs	01-01-71	14-Dec-70*	FTA
EC-Switzerland and Liechtenstein	01-01-73	27-Oct-72*	FTA
EC accession of Denmark, Ireland and United Kingdom	01-01-73	7-Mar-72*	CU Accession
PTN	11-02-73	9-Nov-71*	PS
EC-Iceland	01-04-73	24-Nov-72*	FTA
EC-Norway	01-07-73	13-Jul-73*	FTA
CARICOM	01-08-73	14-Oct-74*	CU
APTA	17-06-76	2-Nov-76*	PS
PATCRA	01-02-77	20-Dec-76*	FTA
EC-Syria	01-07-77	15-Jul-77*	FTA
SPARTECA	01-01-81	20-Feb-81*	PS
EC accession of Greece	01-01-81	24-Oct-79*	CU Accession
LAIA	18-03-81	1-Jul-82*	PS
CER	01-01-83	14-Apr-83*	FTA
United States-Israel	19-08-85	13-Sep-85*	FTA
EC accession of Portugal and Spain	01-01-86	11-Dec-85*	CU Accession
CAN	25-05-88	01-10-90	CU
CER	01-01-89	22-Nov-95*	EIA
GSTP	19-04-89	25-Sept-89*	PS
Laos-Thailand	20-06-91	26-11-91	PS
EC-Andorra	01-07-91	23-02-98	CU
MERCOSUR	29-11-91	17-02-91	CU
AFTA	28-01-92	30-Oct-92*	FTA
EFTA-Turkey	01-04-92	6-Mar-92*	FTA
EFTA-Israel	01-01-93	30-11-92	FTA
Armenia-Russian Federation	25-03-93	17-06-04	FTA
Kyrgyz Republic-Russian Federation	24-04-93	15-Jun-99*	FTA
Faroe Islands-Norway	01-07-93	12-02-96	FTA
Faroe Islands-Iceland	01-07-93	14-12-95	FTA
MSG	22-07-93	03-08-99	PS
ECOWAS	24-07-93	06-07-05	PS
EEA	01-01-94	13-09-96	EIA
NAFTA	01-01-94	29-01-93	FTA
Georgia-Russian Federation	10-05-94	08-02-01	FTA
COMESA	08-12-94	04-05-95	FTA
CIS	30-12-94	29-06-99	FTA
Costa Rica-Mexico	01-01-95	17-07-06	EIA

Agreement	Date of entry into force	Date notified by Parties*	Type of agreement **
Costa Rica-Mexico	01-01-95	17-07-06	FTA
EC accession of Austria, Finland and Sweden	01-01-95	20-Jan-95*	EIA Accession
Faroe Islands-Switzerland	01-03-95	12-02-96	FTA
Kyrgyz Republic-Armenia	27-10-95	12-12-00	FTA
Kyrgyz Republic-Kazakhstan	11-11-95	29-06-99	FTA
SAPTA	07-12-95	21-04-97	PS
Armenia-Moldova	21-12-95	17-06-04	FTA
EC-Turkey	01-01-96	22-Dec-95*	CU
Georgia-Ukraine	04-06-96	08-02-01	FTA
Armenia-Turkmenistan	07-07-96	17-06-04	FTA
Georgia- Azerbaijan	10-07-96	08-02-01	FTA
Kyrgyz Republic-Moldova	21-11-96	15-Jun-99*	FTA
Armenia-Ukraine	18-12-96	17-06-04	FTA
EC-Faroe Islands	01-01-97	17-02-97	FTA
Canada-Israel	01-01-97	15-01-97	FTA
Turkey-Israel	01-05-97	16-04-98	FTA
CARICOM	01-07-97	17-01-03	EIA
EC-Palestinian Authority	01-07-97	29-05-97	FTA
Canada-Chile	05-07-97	30-07-97	EIA
Canada-Chile	05-07-97	30-07-97	FTA
EAEC	08-10-97	21-Apr-99*	CU
Pan-Arab Free Trade Area	01-01-98	03-10-06	FTA
Kyrgyz Republic-Ukraine	19-01-98	15-Jun-99*	FTA
EC-Tunisia	01-03-98	15-01-99	FTA
Kyrgyz Republic-Uzbekistan	20-03-98	15-Jun-99*	FTA
Mexico-Nicaragua	01-07-98	17-10-05	FTA
Georgia-Armenia	11-11-98	08-02-01	FTA
CEMAC	24-06-99	21-07-99	CU
EFTA-Palestinian Authority	01-07-99	23-07-99	FTA
Georgia-Kazakhstan	16-07-99	08-02-01	FTA
Chile-Mexico	01-08-99	27-02-01	FTA
EFTA-Morocco	01-12-99	20-01-00	FTA
Georgia-Turkmenistan	01-01-00	08-02-01	FTA
EC-South Africa	01-01-00	02-11-00	FTA
WAEMU/UEMOA	01-01-00	27-10-99	CU
EC-Morocco	01-03-00	13-10-00	FTA
EC-Israel	01-06-00	20-09-00	FTA
EFTA-Mexico	01-07-00	25-07-01	FTA
Israel-Mexico	01-07-00	22-02-01	FTA
EC-Mexico	01-07-00	25-07-00	FTA
EAC	07-07-00	09-10-00	CU
SADC	01-09-00	02-08-04	FTA
Turkey-Former Yugoslav Republic of Macedonia	01-09-00	05-01-01	FTA
EC-Mexico	01-10-00	21-06-02	EIA
New Zealand-Singapore	01-01-01	04-09-01	FTA
EFTA-Former Yugoslav Republic of Macedonia	01-01-01	11-12-00	FTA
Guatemala-Mexico	15-03-01	03-07-06	FTA
El Salvador-Mexico	15-03-01	23-05-06	EIA

Agreement	Date of entry into force	Date notified by Parties*	Type of agreement **
El Salvador-Mexico	15-03-01	23-05-06	FTA
Honduras-Mexico	01-06-01	10-07-06	FTA
EC-FYROM	01-06-01	23-10-01	FTA
India-Sri Lanka	15-12-01	17-06-02	FTA
United States-Jordan	17-12-01	15-02-02	FTA
Armenia-Kazakhstan	25-12-01	17-06-04	FTA
APTA-Accession of China	01-01-02	30-04-04	PS Accession
EFTA-Jordan	01-01-02	17-01-02	FTA
EFTA-Croatia	01-01-02	14-01-02	FTA
Chile-Costa Rica	15-02-02	16-04-02	FTA
EC-Croatia	01-03-02	17-12-02	FTA
EC-Jordan	01-05-02	17-12-02	FTA
Chile-El Salvador	01-06-02	29-01-04	FTA
EFTA	01-06-02	03-12-02	EIA
Canada-Costa Rica	01-11-02	13-01-03	FTA
Japan-Singapore	30-11-02	08-11-02	FTA
GCC	01-01-03	19-11-07	CU
EFTA-Singapore	01-01-03	14-01-03	FTA
EC-Chile	01-02-03	03-02-04	FTA
CEFTA accession of Croatia	01-03-03	23-02-04	FTA Accession
EC-Lebanon	01-03-03	26-05-03	FTA
Panama - El Salvador	11-04-03	24-02-05	FTA
ASEAN-China	01-07-03	24-11-04	PS
Turkey-Bosnia and Herzegovina	01-07-03	29-08-03	FTA
Turkey-Croatia	01-07-03	02-09-03	FTA
Singapore-Australia	28-07-03	25-09-03	FTA
China-Macao, China	01-01-04	27-12-03	FTA
China-Hong Kong, China	01-01-04	27-12-03	FTA
United States-Singapore	01-01-04	17-12-03	FTA
United States-Chile	01-01-04	16-12-03	FTA
Korea-Chile	01-04-04	08-04-04	FTA
EC 25	01-05-04	26-04-04	CU Accession
EC 25	01-05-04	26-04-04	EIA Accession
EC-Egypt	01-06-04	03-09-04	FTA
SACU	15-07-04	25-06-07	CU
EFTA-Chile	01-12-04	03-12-04	FTA
EFTA-Chile	01-12-04	03-12-04	EIA
Thailand-Australia	01-01-05	27-12-04	FTA
United States - Australia	01-01-05	22-12-04	FTA
EC-Chile	01-03-05	28-10-05	EIA
Japan-Mexico	01-04-05	31-03-05	FTA
Turkey-Palestinian Authority	01-06-05	01-09-05	FTA
EFTA-Tunisia	01-06-05	03-06-05	FTA
Thailand-New Zealand	01-07-05	01-12-05	FTA
Turkey-Tunisia	01-07-05	01-09-05	FTA

Agreement	Date of entry into force	Date notified by Parties*	Type of agreement **
India-Singapore	01-08-05	03-05-07	FTA
Jordan-Singapore	22-08-05	07-07-06	EIA
Jordan-Singapore	22-08-05	07-07-06	FTA
EC-Algeria	01-09-05	24-07-06	FTA
MERCOSUR	07-12-05	05-12-06	EIA
SAFTA	01-01-06	21-04-08	FTA
Turkey-Morocco	01-01-06	10-02-06	FTA
United States-Morocco	01-01-06	30-12-05	FTA
Dominican Republic-Central America-United States (CAFTA-DR)	01-03-06	17-03-06	FTA
Korea-Singapore	02-03-06	21-02-06	FTA
Trans-Pacific SEP	28-05-06	18-05-07	FTA
Japan-Malaysia	13-07-06	12-07-06	FTA
Panama-Singapore	24-07-06	04-04-07	FTA
United States - Bahrain	01-08-06	08-09-06	FTA
EFTA-Korea	01-09-06	23-08-06	FTA
Chile-China	01-10-06	20-06-07	FTA
EC-Albania	01-12-06	07-03-07	FTA
EC 27	01-01-07	26-06-07	EIA Accession
Turkey-Syria	01-01-07	15-02-07	FTA
EFTA-Lebanon	01-01-07	22-12-06	FTA
EC 27	01-01-07	27-09-06	CU Accession
Egypt-Turkey	01-03-07	05-10-07	FTA
CEFTA Enlargement	01-05-07	26-07-07	FTA
Pakistan - China	01-07-07	18-01-08	FTA
EFTA-Egypt	01-08-07	17-07-07	FTA
Chile-Japan	03-09-07	24-08-07	FTA
Chile-Japan	03-09-07	24-08-07	EIA
Japan-Thailand	01-11-07	25-10-07	FTA
Pakistan - Malaysia	01-01-08	19-02-08	FTA
EC - Montenegro	01-01-08	16-01-08	FTA
Chile - Panama	07-03-08	17-04-08	FTA
Turkey - Albania	01-05-08	09-05-08	FTA
* Dates of WTO documents containing notification			
** CU=Customs Union; EIA=Economic Integration Agreement; FTA=Free Trade Agreement; PS=Partial Scope			

Source: WTO

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