The Role of Market Structure in the Determination of Deviations from UIP Condition

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This paper contributes to the existing literature on deviations from uncovered interest parity by identifying and estimating the importance of market structure in explaining those deviations. Market structure here refers to the degree of concentration of market power among domestic financial intermediaries. I develop a theoretical and empirical analysis that explains the effects of market structure on the difference in returns to similar assets in two countries and on the relative financial flows between the two countries. In my theoretical model, I demonstrate that countries with greater market power in domestic financial institutions will have the ability to discourage financial flows through their manipulation of domestic interest rates. This use of market power will lead to a substantially different correlation between financial flows and excess returns in countries with concentrated domestic financial markets. I then estimate the impact of market structure for quarterly panel data from emerging economies between 2000 q1 and 2005 q4. I find that there is significant evidence of the impact of financial market concentration on the relation between excess returns and the volume of the financial flows. In addition to the traditional explanations, I found that the deviation from UIP is in part attributable to financial market power. Since market power has become more concentrated in financial markets of many emerging economies, my analysis indicates that models of financial flows and exchange-rate adjusted nominal returns must incorporate adjustments for market structure to be effective.

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The uncovered interest parity (UIP) condition is a key assumption of many open economy macroeconomic models. According to the UIP condition, interest rate spreads between two countries should be equal to expected exchange rate changes. The currency with the higher interest rate is predicted to appreciate. Most empirical studies, however, have rejected this relationship between interest rate differentials and exchange rate movements. The behavior of domestic returns relative to foreign returns has shown extensive deviations from the prediction of the UIP condition. This empirical failure of the UIP condition is one of the long-time unresolved puzzles to economists working in international finance area.

The presumption supporting the UIP condition is that financial flows between two countries will bring interest rates and exchange rate changes into UIP alignment. As discussed below, deviations from UIP are often associated in the literature with risk premia. Also important will be the degree of integration of the two financial markets: the more integrated, the greater the financial flows and (controlling for risk premia) the smaller the deviations from UIP. The volume of financial flows and excess returns (as I will call deviations from UIP) are thus simultaneously determined—negatively correlated, once other factors are controlled for.

I develop a theoretical model in this paper of joint determination of financial flows and deviations from UIP that nests the traditional explanations and introduces a new one: the varying market power of financial institutions across countries. I demonstrate in this model of portfolio financial flows that countries with greater market power in domestic financial institutions will discourage financial flows through their manipulation of domestic interest rates. This use of market power will lead to a substantially different correlation between financial flows and excess returns in countries with concentrated domestic financial markets.

In later sections I test this model using quarterly panel data on transactions in interbank financial markets for twenty one developing countries in the period 2000 q1 to 2005 q4. There is significant evidence of the traditional reasons given for observed excess returns, specifically risk premia and the absence of speculative capital flows. Supporting the hypothesis of this paper, there is also significant evidence of the impact of financial market concentration on the relation between excess returns and the volume of the financial flows. The deviation from UIP is in part attributable to financial market power.

This is an important contribution to the general empirical literature on the UIP condition: It demonstrates that financial market structure is a factor that must be considered in modeling the puzzling deviations from UIP. It also sheds light on the puzzling findings of Bansal and Dahlquist (2000) that the forward discount premium behaves significantly differently for developed and developing countries. My research does not consider the forward markets, but it suggests that the difference between the two groups in their results may be due to the relative market power of financial institutions in the two groups of countries. Finally, it has implications for financial market regulation in developing countries. If the market power of the large banks remains, since monopoly power in the domestic financial markets changes process governing financial flows and excess returns, it will have an impact on exchange rate policy. If policymakers have implicit or explicit exchange rate targets, since the excess returns will not attract capital inflows in a predictable fashion, policy actions to change the value of their currency may not be as effective. The increase in the value of interest rates will not necessarily trigger capital inflow.

I. Previous Literature

There have been many studies of the empirical failure of the UIP condition. Lewis (1994) summarizes different explanations for this situation and shows that excess returns can be expressed as a summation of risk premium and markets’ forecast error. According to this, excess returns would completely disappear if investors are risk neutral and/or underlying assets are perfect substitutes and agents have rational expectations. To the extent that investors are risk averse, an excess return appears to compensate for the perceived risk of holding foreign assets. Frankel and Chinn (1993)’s findings support this outcome. They found evidence that variation in the risk premium constitutes a large part of the deviations from UIP. Black and Salemi (1988) test the null hypothesis of a constant risk premium against an alternative where the risk premium changes with regimes by using German and the US data for 1964-1983 periods. When they allow processes driving relative interest rates and relative prices to shift across regimes, they find evidence for risk aversion. Moreover, UIP’s reliance upon the assumption of mean zero expectation errors is a controversial issue. Due to the existence of irrational traders and difficulties in measuring expected returns, systematic forecast errors may arise. Froot and Frankel (1989) show that the standard tests for UIP yield radically different results when one uses survey-based measures of exchange rate depreciation. They find that most of the variation of the forward discount appears to be related to expected depreciation for their sample.

Barriers to perfect capital mobility are another candidate to explain deviations from UIP, since they limit the possibilities of investors to speculate. Frictions and transactions costs are barriers in this sense. For any given interest rate differential, transactions costs create an upper and lower limit within which financial transactions can not be profitable. Frenkel and Levich (1977) estimate the transaction cost band for UK and US differentials from covered interest parity[1]. They find that the length of this band takes values between 0.12 percent and 1.03 percent per annum. Capital controls represents another barrier. While some papers investigating UIP conditions like Frankel and Poonawala (2004) or Chinn and Meredith (2005) bring up the role of capital controls without presenting a detailed discussion on this topic, Wolff et al. (2007) makes a direct analysis of capital controls. For a panel of Western European countries, where most countries liberalized their capital accounts in the 80's and beginning of the 90's, they found limited evidence that capital controls did affect uncovered interest parity deviations.

While the UIP hypothesis is tested more for developed countries than developing countries, existing empirical tests show that there are differences in the dynamics that determine excess returns in these two country groups. It is also found that the forward exchange rate is a less biased indicator of the future expected spot rate in emerging market economies than developed economies. Bansal and Dahlquist (2000) analyze the role of macroeconomic differences between these two country groups in the determination of excess returns and find that the absence of bias holds better when a country experiences high inflation rate, inflation volatility and low per capita incomes.

[1] The covered interest parity condition states that the return from buying the bonds of one's domestic country should be the same as that of investing abroad, once currency risk has been covered with a forward contract. However, in the UIP condition exchange rate risk is not covered. For the UIP deviations to be equal to zero, in addition to the zero exchange rate premium, the covered interest parity condition needs to

Frankel and Poonawala (2004) argue that while risk premiums would probably be larger and more variable for developing countries, emerging market currencies are more prone to high inflation and other sources of medium-term trends. Since it might be easier to forecast the direction of movement of the spot rate for these countries, the forecast errors can be smaller for these countries.

It is widely accepted in the literature that concentrated market structure in the financial sector has wide-ranging and long lasting implications. Some authors cite the stability and efficiency-improving aspects of concentrated financial markets while others claim that concentration increases vulnerability. Petersen and Rajan (1995) argue that banks with monopolistic power have greater incentives to incur the costs associated with overcoming informational barriers, which then facilitates the flow of credit to worthy enterprises. As a counterpoint, Caminal and Matitutes (2002) show that concentration leads to less credit rationing and higher probability of failures. Taking the impact of market structure on bank profits and ease of monitoring into account, Alen and Gale (2004) show that less concentrated markets are more prone to financial crisis. A recent empirical work by Beck et al (2006) also finds that crises are less likely in more concentrated markets. Since the banking sector has been the main source of finance in many countries, the repercussions of banking sector concentration on the long term economic growth have been widely analyzed as well. Beck et al (2004) evaluate firms' access to credit and find that in countries with low levels of institutions and economic development, bank concentration increases obstacles to obtain finance. While this literature generally focuses on the implications of market concentration on financial stability, efficiency of allocations and long-run economic growth, the role of market structure on international financial markets has not been analyzed. In this paper, I discuss the impact of collusive structure in the banking sector on international financial flows and excess returns.

The market structure discussion that I have in this article creates a connection between my work and a concept from the IO literature: the contestable market hypothesis. According to contestability theory developed by Baumol et al. (1982) competitive pricing can be observed in a market even if there is only limited number of firms. In this theory, a market with low (or maybe no) barriers to entry and exit and no sunk costs will be open to hit and run competition. Therefore, monopolistic or oligopolistic firms may not behave as economic theories predict. Instead, when it is possible players might take action to deter entry into their market. Recent studies apply the contestability concept to financial markets and suggest that even in the face of increased concentration, incumbent banks may still behave competitively once there exists a potential free entrant. Although my theoretical model show differences from contestability theory, theoretical implications of my model shares some common properties with this hypothesis. When the structure of domestic financial markets supports collusive behavior, agents are going to agree on a lower interest rate than what they would choose in the absence of collusion. Therefore, interest rates can be equalized, as in the contestable integration idea, with only limited foreign entry in my model.

In this paper I analyze excess returns and financial flows for a group of developing countries. In the theoretical section, I present an extension of Martin and Rey (2004)'s model to analyze the determinants of excess returns and financial flows. Monopoly power in the domestic financial market is shown to change the process governing financial flows and excess returns. Traditionally, the increase in the volume of financial flows is expected to be related to smaller interest rate differentials. However, my analysis shows that in markets with monopoly power, this mechanism does not work in this fashion. The reason for this is that domestic financial institutions will discourage financial flows by exercising their market power.

In the empirical section, I test the implications of the market structure on excess returns (deviations from UIP) of a group of emerging countries from developed countries in the period 2000 q1 to 2005 q4. The emerging market countries in my sample are Turkey, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Mexico, Poland, Romania, Chile, Malaysia, South Africa, Russia, Ukraine, Argentina, Slovenia, Israel, Brazil and Uruguay; the developed countries consist of Austria, Belgium, Netherland, France, Germany, Japan, Spain, Sweden, Switzerland, and the USA.. By using Hansen (1999)'s methodology, I apply threshold regression to my panel data set. In line with the predictions of my theoretical model, I show that market structure is important in determining excess returns. While speculative flows are found to be significant in more competitive markets as expected, I find that they do not have explanatory power in collusive markets. Although the structure of my theoretical model does show differences from the contestability hypothesis, my empirical analysis suggests that in the face of increased concentration, incumbent banks may push their interest rates closer to the foreign country level by themselves, in other words without having foreign capital flows, when there are no restrictions on foreign lenders entry. Therefore, my work suggests a potential way of testing contestable financial integration.

This paper demonstrates that the market structure has not only domestic, but also international implications. In an era when we have witnessed a multitude of bank mergers and increased concentration ratios both in developed and emerging countries, this article offers significant findings for policymakers, since it proves that in countries with concentrated financial markets, the relationship between excess returns and financial flows are different from what traditional models suggest. In these countries, interest rate differentials do not attract as much financial inflows. Therefore, the impact of market concentration needs to be taken into account in setting exchange rate targets and instruments.

The remainder of the paper is organized as follows: Section 2 presents descriptive statistics of excess returns, financial flows and concentration ratios for selected countries. Section 3 presents a theoretical model explaining the role of market structure in the determination of international financial flows and return differential. This is followed in Section 4 by the empirical results. Section 5 discusses policy implications of the current work and concludes.

II. Financial Concentration in Developed and Emerging Countries

Empirical tests show that there are differences in the dynamics that determine excess returns between developed and emerging countries. While Bansal and Dahlquist (2000) and Frankel and Poonawala (2004) analyze the role of macroeconomic factors in explaining this, differences in market structures has not been examined in this literature yet. However, financial markets in developed countries generally have a different structure than those in emerging countries. In the next two sections, I will analyze the implications of this difference on the determination of rates of returns and financial flows theoretically and empirically. In this section, summary statistics will be presented to illustrate the structural differences among selected developed and emerging countries.

Table 1: Descriptive Statistics for Selected Countries

	Concentration Ratios[1]		Excess Returns[2]		Financial Flows[3]	
Developed Countries	**2000**	**2005**	**2000**	**2005**	**2000**	**2005**
The United States	0.28	0.31				
Italy	0.38	0.74	0.33	2.25		
The United Kingdom	0.41	0.66	5.22	0.08		
Canada	0.53	0.59	3.39	7.17		
Japan	0.48	0.41	5.14	2.04		
Emerging Countries						
Estonia	0.98	0.99	2.37	1.94	22.5 [4]	40.25 [4]
Czech Republic	0.61	0.99	2.41	7.51	1.4	2.8
Croatia	0.65	0.98	1.30	2.16	0.2	0.2
Romania	0.93	1.00	69.98	1.31	0.3	1.0
Turkey	0.84	0.78	98.52	17.20	5.8	6.4
Hungary	0.61	0.91	6.89	9.26	1.5	2.3

[1] Concentration ratios represents the assets of three largest banks as a share of assets of all commercial banks. Source: A New Database on Financial Development and Structure (updated in 2007)[2].
[2] Absolute values of the calculated deviations from UIP. The US is taken as the base country. Source: IFS[3].
[3] Financial flows from the United States to given emerging country, billion US Dollars. Source: BIS.
[4] Millions of US Dollars.

Table 1 above represents the evolution of some of the key variables for selected countries. As the first two columns represent, concentration ratios in the developed group are remarkably lower than the values in the emerging economies. IPES (2005) point out that cross-border mergers and foreign acquisitions, regulatory reforms, and privatization processes are the main reasons for high concentration ratios in these countries. In addition to this, we recently observe a trend toward more concentrated banking sector in emerging countries as well mostly as a result of the need to reduce their excess capacity. As the table shows, all countries except Turkey experienced an increase in the concentration ratios through time. The third and fourth columns represent deviations from UIP. The US is taken as the base country here, and the interest rates used in these calculations are

[2] Beck et al. (2000) introduced a database of indicators of financial development and structure across countries and over time. This database is then updated in 2007. Both working paper version and the database itself are available on the following web-site: http://econ.worldbank.org/staff/tbeck
[3] The US Federal Funds Rate and realized exchange rate depreciations are subtracted from corresponding country's money market rate to calculate the UIP deviations.

money market rates. As the table reveals, deviations in Turkey and Romania are higher than what is observed in other countries. These are periods in which these two countries have higher inflation realizations than rest of the countries in the sample. Finally, the last two columns show the volume of interbank flows from the US to emerging countries. This data base is assembled by BIS to provide information about the country risk exposures of major national banking groups to emerging countries. The flows between developed countries are not available to public. Therefore, this data is provided only for emerging countries.

III. Theoretical Explanations for Excess Returns

In this section, the role of market power on the determination of rates of returns and financial flows will be analyzed. I will first start with an autarkic case. In this situation, asset prices are going to be different in each country. In terms of the parameters of the model, they will depend on domestic variables such as size and initial endowments of autarkic countries. And then predictions of traditional integration will be analyzed. When barriers to trade are totally abolished and when both countries participating in international fund transfer are competitive, I have the outcome that is defined in the "traditional integration" literature: financial flows will push returns to an equal level when they are both riskless. Since in real life countries are not identical in terms of the risk they carry and financial flows among riskless and risky countries are not uncommon, the third case will cover a situation in which one of the countries analyzed is riskier than the other. In this situation, the introduction of risk will change quantity of financial flows between the countries analyzed and rates of returns are going to differ due to the risk premium. Finally, the last case will include the market structure effect. While one of the countries is still competitive, the other country is now assumed to have a collusive financial market structure. Collusion in the financial market will play a major role in the determination of rates of return. It will be shown that when the trade barriers are abolished if market structure allows collusive agreements between domestic agents, asset prices in collusive market will converge to the other country's level with relatively limited financial flows.

An extension of the Martin and Rey (2004), MR hereafter, theoretical model will now be introduced. This is a two-period, two-country model analyzing the determination of financial flows and rates of return. The countries I am analyzing here, A and B, are assumed to have different populations, n_A and n_B. In the first period, risk-averse agents use their endowments, y_{1A} and y_{1B}, to consume, invest in risky projects or buy stocks. There are L different, equally likely states. Each agent produces only one project and each project pays a dividend equal to d in only one of those states of nature[4]. The total world population is assumed to be equal to the number of states, $n_A + n_B = L$, with each project paying off in one state. Since the set of projects are assumed to be common knowledge and all the projects have the same expected return, there is no reason to replicate a project that is already developed by another agent.

The financial flows between A and B in this model are agents' purchases of foreign equity shares. Due to my $n_A + n_B = L$ assumption, I have complete markets in some situations in this model. Under the complete market assumption, gross return on the riskless situation is equal to $\frac{d}{p_i} = 1 + r_i$ where p_i is equal to the equilibrium price of the shares under complete coverage situation. I will discuss the determination of this riskless rate of return below.

III. A. Model

Agents have a "love for diversity" type of utility function given below. Love for diversity comes from risk aversion.

$$EU_h = c_{1h} + \beta\left(\frac{c_{2h}^{1-1/\sigma}}{1-1/\sigma}\right) \tag{1}$$

where h=A, B which represents a typical agent from country A or B.

Agents have following budget constraint:

$$c_{1h} + \sum p_i s_i + \sum p_j s_j = y_{1h} + p_k \alpha_k \tag{2}$$

where y_{1h} is the initial endowment, s_i is the agent's demand for a share of domestic project, s_j is the agent's demand for a share of foreign project j. The agent sells a share α_k of the project that he has developed.

[4] Since it is not of critical importance in our structure, differing from Martin and Rey (2004), we do not introduce project starting costs or an endogenous number of assets.

An agent's consumption in the second period depends on his share purchases made in the first period.

$c_{2h} = ds_i$ if he purchased a share in realized state i,

$c_{2A} = ds_j$ if he purchased a share in realized state j,

$c_{2A} = d\left(1-\alpha_k\right)$ if the state associated with his own project is observed[5].

At time 1, agents determine their first period consumption, demand for domestic and foreign shares and the proportion of each project to be kept.

III. B. Autarkic Equilibrium

In this case, barriers in both Country A and B are assumed to prohibit international financial flows. Under this scenario, since agents are allowed to buy only domestic shares, risk coverage will be incomplete. Therefore, agents might have zero consumption in the second period.

A typical agent's utility function and budget constraint are given below

$$EU_A = c_{1A} + \frac{D}{\Delta}\left(\sum_{i=1}^{n_A-1}\left(s_i\right)^{1-\frac{1}{\sigma}} + \left(1-\alpha_k\right)^{1-\frac{1}{\sigma}}\right) \tag{3}$$

$$c_{1A} = y_{1A} + p_k\alpha_k - \sum_{i=1}^{n_A-1} p_i s_i \tag{4}$$

where $D = \dfrac{\beta d^{\Delta}}{L}$ and $\Delta = 1 - \dfrac{1}{\sigma}$

These definitions indicate that each agent produces only one project and buys at most $\left(n_A - 1\right)$ domestic assets. The first order conditions with respect to s_i and α_k can be manipulated to yield the equilibrium price level.

$$s_i = p_i^{-\sigma} D^{\sigma} \tag{5}$$

$$\left(1-\alpha_k\right) = p_k^{-\sigma} D^{\sigma} \tag{6}$$

$$1 - p_A^{-\sigma} D^{\sigma} = p_A^{-\sigma} D^{\sigma}\left(n_A - 1\right) \tag{7}$$

The equilibrium price level in Country A from equation (7) is

$$p_A = D n_A^{1/\sigma} \tag{8}$$

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[5] In this section, i represents domestic fellows, j represent projects developed by agents from the other country and finally k is used to indicate agents' own asset.

Total equilibrium welfare and the equilibrium consumption in the first period are

$$EU_A^{Aut} = y_{1A} + \frac{D}{\Delta} n_A^{1/\sigma} \tag{9}$$

$$c_{1A} = y_{1A}$$

Similarly, the equilibrium price level and autarkic welfare in Country B are

$$p_B = D n_B^{1/\sigma} \tag{10}$$

$$EU_B^{Aut} = y_{1B} + \frac{D}{\Delta} n_B^{1/\sigma} \tag{11}$$

When markets are closed, the equilibrium prices are going to be different in Country A and B. As it can be seen from (8) and (9), the country with the larger population will have higher equilibrium prices. That is to say, the difference in asset prices at this stage are determined by Country A's and B's sizes. It is due to barriers to capital flows, not to risk premia.

III.C. Complete Integration (No Barriers to Trade) Equilibrium

In this section the political authorities in Countries A and B agree to abolish barriers to financial flows. After this, an agent who buys both Country A's and B's shares can cover his risk completely[6].

In this new scenario, the utility functions and budget constraint include both domestic and foreign assets

$$EU_A = c_{1A} + \frac{D}{1-\frac{1}{\sigma}} \left(\sum_{i=1}^{n_A-1} (s_i)^{1-\frac{1}{\sigma}} + \sum_{j=1}^{n_B} (s_j)^{1-\frac{1}{\sigma}} + (1-\alpha_k)^{1-\frac{1}{\sigma}} \right) \tag{12}$$

$$c_{1A} = y_{1A} + p_k \alpha_k - \sum_{i=1}^{n_A-1} p_i s_i - \sum_{j=1}^{n_B} p_j s_j \tag{13}$$

In addition to (5) and (6), a new first-order condition determines the demand for foreign shares.

$$s_j = p_j^{-\sigma} D^{\sigma} \tag{14}$$

Due to foreign participation, there is a different equilibrium condition in this case

[6] In MR, financial integration is defined as an increase in the effective market size. However, when the two countries open their financial markets, the asset prices are not equalized due to the transaction costs and imperfect substitutability between the assets in their model. Since transaction costs are not the main point of this article, in this version they are assumed to be equal to zero.

$$1-p_A^{-\sigma}D^{\sigma}=\left(n_A-1\right)p_A^{-\sigma}D^{\sigma}+n_B p_A^{-\sigma}D^{\sigma} \quad (15)$$

The equilibrium price level, first period's consumption and welfare in Country A are

$$p_A=D\left(n_A+n_B\right)^{1/\sigma} \quad (16)$$

$$c_{1A}=y_{1A}$$

$$EU_A^{Int}=y_{1A}+\frac{D}{\Delta}\left(n_A+n_B\right)^{1/\sigma} \quad (17)$$

Similarly, the equilibrium price level, the first period's consumption and welfare in Country B are now

$$p_B=D\left(n_A+n_B\right)^{1/\sigma} \quad (18)$$

$$c_{1B}=y_{1B}$$

$$EU_B^{Int}=y_{1B}+\frac{D}{\Delta}\left(n_A+n_B\right)^{1/\sigma} \quad (19)$$

When financial restrictions are abolished, the equilibrium price levels in Country A and B are equated now as can be seen from (16) and (18)[7]. Differing from Case 1, we have financial flows between A and B now. Each agent from Country A's demand for Country B is equal to s_j and agent will buy n_B of them. Therefore, an *agent's* total spending on B's assets is equal to $n_B p_B s_j$. *Total flows* from Country A to B, FF_A^B and flows from Country B to A, FF_B^A ,are given below

$$FF_A^B=p_A s_j n_A n_B=\left(n_A+n_B\right)^{-\Delta}n_A n_B \quad (20)$$

$$FF_B^A=p_A s_j n_A n_B=\left(n_A+n_B\right)^{-\Delta}n_A n_B \quad (21)$$

III.D. Equilibrium with Risk Premium

Country A and B have different sizes and different initial endowments, but otherwise have been taken to be identical. In this section, I analyze a case in which there is a one-sided information asymmetry problem. I assume that states in Country B are not verifiable. Some of the borrowers from Country B cheat and assert that the state from which they offer shares was not realized even if it in fact was. Moreover, the legal system can enforce only ω per cent of total contracts. Therefore, when an agent from Country A

[7] Moreover, comparison of equation (7) and (10) reveals that the integrated equilibrium is a better outcome than the autarky for both Country A and B.

buys a share of a Country B project, the probability of coming across a seller who cheats is $1-\omega$. This in turn means that the expected dividend of country B's projects to Country A residents is $\frac{d}{L}\omega$. On the other hand, I assume that agents from Country B can still monitor the states in Country B: Domestic agents cannot fool each other. While agents from Country A cannot monitor Country B, Country A is still transparent to Country B purchases. The expected dividend of country B's projects to Country B residents is still equal to $\frac{d}{L}$. Agents from Country A will not buy any of the shares of Country B when $\omega = 0$, which is the autarky case described in section III.B. When $\omega = 1$, the model is going to be identical to the integration case defined in Section III.C.

When this information asymmetry in Country B is introduced, the utility function of an agent from Country A will be somewhat different, while the budget constraint will be the same as (13)

$$EU_A = c_{1A} + \frac{D}{\Delta}\left(\sum_{i=1}^{n_A-1}\left(s_i\right)^{1-\frac{1}{\sigma}} + \omega\sum_{j=1}^{n_B}\left(s_j\right)^{1-\frac{1}{\sigma}} + \left(1-\alpha_k\right)^{1-\frac{1}{\sigma}}\right) \quad (22)$$

This time the Country A demand for foreign shares depends on the level of risk

$$s_j = p_j^{-\sigma} D^{\sigma}\omega^{\sigma} \quad (23)$$

Since the risk introduced has impact only on Country B's reliability, nothing will change in A. Therefore the equilibrium condition and equilibrium price level in Country A is still the same as equation (16). However, the introduction of this one-sided risk will have some welfare effects in A.

$$c_{1A} = y_{1A} + n_B D\left(n_A + n_A\right)^{-\Delta} - n_B\omega^{\sigma} D\left(n_A\omega^{\sigma} + n_A\right)^{-\Delta} \quad (24)$$

$$EU_A^{Int-Uncer} = y_{1A} + D\left(n_A + n_B\right)^{-\Delta}\left(\frac{n_A}{\Delta} + n_B\right) + n_B\omega^{\sigma} D\left(n_A\omega^{\sigma} + n_B\right)^{-\Delta}\left(\frac{1}{\Delta} - 1\right) \quad (25)$$

Since Country A's demand for B's assets depends on the risk involved, the equilibrium condition and therefore the market clearing price level in Country B is

$$1 - p_B^{-\sigma} D^{\sigma} = \left(n_B - 1\right) p_B^{-\sigma} D^{\sigma} + n_A p_B^{-\sigma} D^{\sigma}\omega^{\sigma}$$

$$p_B = D\left(n_A\omega^{\sigma} + n_B\right)^{1/\sigma} \quad (26)$$

The consumption in the first period and total welfare of Country B in equilibrium are given below:

$$c_{1B} = y_{1B} + D\left(n_A\omega^\sigma\right)\left(n_A\omega^\sigma + n_A\right)^{-\Delta} - n_A D\left(n_A + n_B\right)^{-\Delta} \quad (27)$$

$$EU_B^{Int-Uncer} = y_{1B} + D\left(n_A\omega^\sigma + n_B\right)^{-\Delta}\left(n_A\omega^\sigma + \frac{n_B}{\Delta}\right) + n_A D\left(n_A + n_B\right)^{-\Delta}\left(\frac{1}{\Delta} - 1\right) \quad (28)$$

Calculation of Risk Premium

Risk is completely covered in the integration case. By contrast, in this section I have discussed a case in which Country B's assets have an uncertain return. Due to this risk, Country B is now offering a higher return to Country A. This can be seen when we compare (26) to (18). The risk premium is given by the following equation

$$RP_t = \frac{\left(n_A + n_B\right)^{1/\sigma}}{\left(n_A\omega^\sigma + n_B\right)^{1/\sigma}} - 1 \quad (29)$$

$$\frac{\partial RP_t}{\partial\omega} = -\frac{n_A\omega^{\sigma-1}\left(n_A + n_B\right)^{1/\sigma}}{\left(n_A\omega^\sigma + n_B\right)^{1+1/\sigma}} < 0$$

Therefore, as the level of enforceability goes up, the risk premium goes down. As can be seen from equation (29), it is also possible in some cases that the risk premium may go to infinity. For instance, when the number of assets produced in country B, n_B, is very small, and when ω converges to zero, RP_t goes to infinity. In this situation, agents in Country A will not be willing to buy any of Country B's shares, while agents from Country B still buy A's shares. This situation will be called "one-sided autarky" in this article. In the one-sided autarky case, Country B still enjoys the benefits of the financial integration, whereas due to the high risk contained in B's assets, Country A buys only domestic assets.

Excess Returns in Risky Integration

In this section, I derive an equation that will be used in the empirical part of the paper. Country A residents' returns from buying two different assets are now different due to the asymmetric information problem in Country B. This time, the expected dividend of Country B's projects to Country A residents is $\frac{d}{L}\omega$, while that of A's projects is $\frac{d}{L}$. If the ratio of expected return to the price of asset is represented by $1+r_n$ where $n = A, B$, expected returns can be rewritten

$$1+r_A = \frac{d}{LD\left(n_A+n_B\right)^{\frac{1}{\sigma}}} \tag{30}$$

$$1+r_B = \frac{d\omega}{LD\left(n_A\omega^{\sigma}+n_B\right)^{\frac{1}{\sigma}}} \tag{31}$$

Based on the fact that $\log\left(1+r\right) \cong r$ and definition of D, (30) and (31) can be rewritten

$$r_A = \frac{1}{\sigma}\log\left(d\right) - \log\left(\beta\right) - \frac{1}{\sigma}\log\left(n_A+n_B\right) \tag{32}$$

$$r_B = \frac{1}{\sigma}\log\left(d\right) + \log\left(\omega\right) - \log\left(\beta\right) - \log\left[\left(n_A\omega^{\sigma}+n_B\right)^{1/\sigma} + \varepsilon\right] \tag{33}$$

Since transactions are in terms of real goods, this model does not include an exchange rate term. However in real life when financial assets are dominated in different currencies to compare them we need to convert one currency into another[8]. Therefore, return differentials will take the exchange rate impact into account in this case.

$$r_B - r_A - \Delta e = \log\left(\omega\right) - \frac{1}{\sigma}\log\left(n_A\omega^{\sigma}+n_B\right) + \frac{1}{\sigma}\log\left(n_A+n_B\right) \tag{34}$$

According to equation (34), observed excess returns for the risky country depends on a parameter related to risk and parameters representing country specific features.

Quantity of Flows in the Risky Case

Financial flows between A and B are different from the integration case discussed before due to the risk involved. Each agent from Country A's demand for Country B's assets is equal to s_j and agent will buy n_B of them. Therefore, an agent's total spending on B's assets is equal to $n_B p_B s_j$. *Total flows* from Country A to B, FF_A^B, is given below

$$FF_A^B = p_A s_j n_A n_B = n_A n_B D\left(n_A\omega^{\sigma}+n_B\right)^{-\Delta}\omega^{\sigma} \tag{35}$$

[8] In the future extension of this article, I am going to introduce money and an exchange rate into my model.

Notice that when $\omega = 1$, expressions in (20) and (35) are identical. For any other values of ω, flows from A to B will be smaller as expected. On the other hand, since Country A is still riskless, flow demand from Country B to A are the same as before.

III. E. The Role of Market Structure in Equilibrium

So far I have assumed that Countries A and B have competitive market structures. Moreover, they are assumed to be identical in every aspect except for market size and the degree of risk premium. In this section, another difference between A and B will be introduced. I will assume that Country B is not only risky, but it also has a collusive market structure. In other words, while Country A is still competitive, agents in Country B are now allowed to act together to change the equilibrium market outcome[9].

In this situation, agents in Country B have the capability of forming a cartel. The members of cartel are now assumed to collect the initial endowment together at time 1 and decide how many units of financial assets to be bought and sold. Holdings are then assumed to be shared equally. In this section, since the collusive agreement will give power to project producers in Country B, the price of the shares sold in Country B will reflect the impact of this monopoly power.

In a situation like this, the cartel can manipulate the market outcome to its best interest. If it is possible to provide the cartel members with higher welfare by imposing a different price level than competitive price level, the cartel will sell its asset to the citizens of Country A at this price level, which is indicated by p_R. Below, it will be shown that the imposition of this new price level will change the welfare level not only in Country A, but also in Country B.

The Cartel's Optimization Problem

Since the cartel is assumed to collect the initial endowment at the beginning of time 1, it will have $n_B y_B$ units of initial endowment. For each domestic agent, the cartel will have s_j units of demand for Country A's shares. The total demand for foreign shares is equal to $n_B s_j$ units. The share of the home projects that will be sold to the other

[9] Although I do take the market structure as given, this scenario can be modeled by introducing cost of establishing a cartel. While this cost will be assumed to be low enough to set up a cartel in Country B, it will be assumed to be high in Country A in this scenario.

country is now represented by α_k, with the remaining $1-\alpha_k$ to be shared equally among the agents of Country B. That is to say, each agent will be purchasing $\frac{1-\alpha_k}{n_B}$ shares of domestically produced projects. This will give us following utility function and budget constraint:

$$EU_B^C = c_{1B}^C + \frac{D}{1-\frac{1}{\sigma}}\left(n_B \sum_{i=1}^{n_A} \left(s_j\right)^{1-\frac{1}{\sigma}} + n_B \sum_{k=1}^{n_B} \left(\frac{1-\alpha_k}{n_B}\right)^{1-\frac{1}{\sigma}} \right) \quad (36)$$

$$c_{1B}^C = n_B y_{1B} + \sum_{k=1}^{n_B} \alpha_k p_k - n_B \sum_{j=1}^{n_A} p_j s_j$$

Determination of Reservation Price

The cartel's target is to impose a price level to Country A to increase its welfare. Therefore, the price level will be increased to a point where citizens of Country A are indifferent between the collusive case and autarky case. In other words, the cartel will push the price level as high as possible such that when the price level goes slightly above p_R, Country A's consumers will be better off not buying it. This requires that

$$EU_A^C\left(p_R, p_A\right) - EU_A^{Autarky}\left(p_A^{Aut}\right) = 0 \quad (37)$$

where $p_R = p_B + \varepsilon$. Here p_B is the equilibrium price level in the integrated market scenario.

The Impact of Imposition of the Cartel's Price

At this new price level, Country A's demand for Country B's assets are given below:

$$s_B^A = p_R^{-\sigma} D^\sigma$$

Now, remaining shares are going to be purchased by agents in Country B. Therefore market equilibrium in Country B requires that

$$n_B p_B^{B^{-\sigma}} D^\sigma + n_A p_R^{-\sigma} D^\sigma = 1 .$$

The equilibrium price level in Country B which is given below will be also dependent on A's reservation price level:

$$p_B^B = n_B^{1/\sigma} D\left(1 - n_A p_R^{-\sigma} D^\sigma\right)^{-1/\sigma}$$

This can be expressed as in terms of the equilibrium price in the integrated case:

$$p_B^B = p_B - \gamma$$

where $\gamma = D(n_A\omega^\sigma + n_B)^{1/\sigma} - n_B^{1/\sigma} D\left(1 - n_A p_R^{-\sigma} D^\sigma\right)^{-1/\sigma}$. For plausible parameter values $\gamma > 0$.

Therefore, in the collusive scenario the shares of Country B's asset will be sold at a different price level in Country A than in Country B. The difference will be equal to $\gamma + \varepsilon$.

The imposition of the reservation price will also have influence on the price of asset produced by Country A's citizens due to the income and substitution effects. The form of utility function used here includes only substitution effects. In this version the substitution effect of this price change on Country A is assumed to be negligible. Since generally size of the financial markets of countries with collusive market structure is small relative to the size of financial markets with competitive structure, this assumption is of real life relevance as well.

Quantity of Flows in Collusion

Market power also plays an important role in the determination of financial flows between Country A and B. Each agent from Country A's demand for Country B is equal to S_j and agent will buy n_B of them. Therefore, an agent's total spending on B's assets is equal to $n_B p_B S_j$. *Total flows* from Country A to B, FF_A^B and flows from Country B to A, FF_B^A, are given below

$$FF_A^B = p_A s_j n_A n_B = n_A n_B D^\sigma \omega^\sigma \left(\left(n_A\omega^\sigma + n_B\right)^{1/\sigma} + \varepsilon\right)^{1-\sigma} \tag{38}$$

$$FF_B^A = p_A s_j n_A n_B = \left(n_A + n_B\right)^{-\Delta} n_A n_B \tag{39}$$

Welfare Implications of Collusion

Tables A1 and A2 in the Appendix 1 summarize welfare implications of the different scenarios analyzed so far. As is shown in the third row of the table, residents of Country B will have lower welfare when they have one-sided information asymmetry. Related to the risk premium they have to pay, they will generate a lower level of welfare.

My next task is to analyze welfare implications of collusion in Country B. As explained above, the imposition of the reservation price on Country A's citizens will also have impact on the price of asset produced and bought by the members of the cartel itself. The members of the cartels will now pay a lower price of their domestic assets now, which is equal to $p_B^B = p_B - \gamma$. As it will be shown below, this lower price will bring the welfare improvement[10].

Moreover, for plausible parameter values welfare in the fourth row is greater than that in the third row: welfare in Country A is smaller. This tells us that by colluding, Country B increases its welfare at the expense of Country A's welfare.

Excess Returns in Collusion

In this section, I derive an equation that will be used in the empirical part of this paper. Country A residents' returns from buying two different assets are going to be different due to the asymmetric information problem in Country B and collusive market structure.

$$1 + r_A = \frac{d}{LD\left(n_A + n_B\right)^{\frac{1}{\sigma}}} \tag{40}$$

$$1 + r_B = \frac{d\omega}{LD\left[\left(n_A\omega^{\sigma} + n_B\right)^{\frac{1}{\sigma}} + \varepsilon\right]} \tag{41}$$

By using the fact that $\log(1+r) \cong r$ and definition of D, (40) and (41) can be rewritten

$$r_A = \frac{1}{\sigma}\log(d) - \log(\beta) - \frac{1}{\sigma}\log(n_A + n_B) \tag{42}$$

$$r_B = \frac{1}{\sigma}\log(d) + \log(\omega) - \log(\beta) - \log\left[\left(n_A\omega^{\sigma} + n_B\right)^{1/\sigma} - \gamma\right] \tag{43}$$

By taking the exchange rate depreciation effect into account again, the excess returns offered by Country B's asset relative to Country A's asset is given by the following equation:

[10] An alternative way of modeling strategy here would be that the members of the cartel impose a higher price level to both domestic and foreign buyers. In a situation like this, cartel would collect a higher income from their trade. In the second stage, higher income can be shared by the members of the cartel. This would also result in welfare improvement.

$$r_B - r_A - \Delta e = \log(\omega) - \log\left[\left(n_A\omega^{\sigma} + n_B\right)^{\frac{1}{\sigma}} - \gamma\right] + \frac{1}{\sigma}\log\left(n_A + n_B\right) \quad (44)$$

According to equation (44), observed excess returns for the risky country depends on a parameter related to risk, a parameter related to the imposition of the cartel price and parameters representing country specific features.

Comparison of Different Scenarios

In this section, I am going to compare return differentials in the collusive integration to the differentials in risky integration case. As can be seen from the equations given below the return differentials are different under these different scenarios.

$$r_B - r_A - \Delta e = \log(\omega) - \frac{1}{\sigma}\log\left(n_A\omega^{\sigma} + n_B\right) + \frac{1}{\sigma}\log\left(n_A + n_B\right)$$

$$r_B - r_A - \Delta e = \log(\omega) - \log\left[\left(n_A\omega^{\sigma} + n_B\right)^{\frac{1}{\sigma}} - \gamma\right] + \frac{1}{\sigma}\log\left(n_A + n_B\right)$$

When we compare these two equations, we see a term in the collusive case that did not take place in the competitive scenario. The reason for this is that in the previous scenarios, capital inflows and outflows push the price level close to each other. In the riskless case, we observed the equality of returns. In risky case, this did not happen because of the risk premium. But, in this scenario we have a situation different from previous cases. In an environment like this, return differentials between two countries are not determined by capital inflow and outflow process, but by a term which represents the existence of collusive situation. This shows us that the establishment of cartel changes the dynamics that determine the return differentials.

IV. Testing the Market Structure Hypothesis

The theoretical findings suggest that level of risk and country size are among the determinants of the excess returns. I also found that market structure plays a central role in the determination of the excess returns. The countries with a collusive structure have two different effects from competitive markets. First, they can reduce the risk premium they pay. Second collusion results in fewer financial flows. As a result of their collusive behavior, the collusive country manages to charge higher share prices and therefore fewer capital inflows are realized.

My theoretical findings have important implications in the UIP discussion. As it is indicated above, the UIP condition suggests that speculative flows continue until excess returns disappear. However, in collusive markets financial flows are discouraged. Therefore, in collusive markets a channel which forces asset price equality does not work as the UIP condition suggests.

In the following section, the impact of market structure on excess returns is tested. For this purpose, two types of regression will be used. In the first stage, an explanatory equation for financial flows will be estimated. Once the amount of "normal" flows between two countries given the characteristics of the lender and borrower are found, the predicted excess flows are going to be used to proxy for speculative flows. I will then test if market power plays a role in financing flows.

IV.A. Estimation of Financial Flows

As in the trade literature, gravity equations are commonly used in order to explain cross-border capital movements. In these equations, flows are generally explained by typical gravity variables such as size, common language, distance etc. As in gravity regressions in the goods' trade literature, variables defining distance between countries typically have negative signs in these equations. Since, unlike goods, assets are weightless, significant negative impact of distance on financial transactions at first sight looks quite surprising. But, as Portes and Rey (2005) indicates, variables representing proximity are not used to proxy transportation costs, but to proxy for information costs or an information asymmetry between domestic and foreign investors. Variables representing cultural closeness, like common language or colonial history, are used to proxy for the efficiency of transactions in explaining financial flows[11].

Gravity equations have been very successful in explaining financial flows in terms of precision of estimates and explanatory power. In this section, to analyze interbank flows from a group of developed to emerging countries, a gravity equation is estimated. In addition to these typical gravity variables, by following the predictions of the theoretical model, a risk variable is also placed in the gravity estimation. Appendix 3 gives a detailed explanation of the variables used in these estimations.

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[11] See Portes and Rey (2005), Papaioannou (2004) and Lane and Feretti (2004), for examples of gravity equations estimating financial flows.

Table 2: Estimations of Financial Flows

	Pooled Estimates			Fixed-effects (within) regression			Between Regression		
	Coef.	Std. Err.	T	Coef.	Std. Err.	T	Coef.	Std. Err.	T
Dist	-0.653	0.025	-25.89	(dropped)			-0.655	0.117	-5.59
comlang	0.875	0.173	5.070	(dropped)			0.834	0.801	1.040
colony	2.520	0.141	17.93	(dropped)			2.553	0.652	3.910
gdp_d	1.178	0.021	56.83	0.51	0.043	11.73	1.195	0.100	11.90
gdp_s	0.681	0.020	33.59	0.49	0.139	3.53	0.695	0.095	7.340
cpivr	0.008	0.002	3.460	-0.007	0.001	-5.91	0.020	0.014	1.400
openness	0.044	0.019	2.260	0.051	0.016	3.18	0.096	0.103	0.930
_cons	-9.119	0.338	-27.01	-4.979	1.786	-2.79	-11.157	2.239	-4.980
Num. Obs.	5040			R-sq:	0.32		R-sq:		
F(31, 5008)	175.46			F(27,4802)	30.91		F(8,201)	26.99	
R-sq	0.5119								
Adj R-sq	0.5095								

In this table dist, comlang, colony, gdp_d, gdp_s and cpivr, openness respectively represent the distance between the borrower and the lender country, common language dummy, colonial relationship dummy, logarithm of the contemporaneous real GDP of the borrower and lender country and volatility of CPI series calculated from GARCH estimations[12]. Openness is a variable derived by Chinn and Ito (2007) to capture the influence of capital controls. Although the results are not reported here, by following Portes and Rey (2005), time dummies are also included in the estimations to capture the impact of aggregate shocks.

In the estimation of the gravity equation, the dependent variable is the interbank bilateral flow from one developed to one emerging country, finflows. Typical gravity variables, distance, colony, common language and size variables (gdp_d and gdp_s) are among the explanatory variables. These coefficients are found to have expected signs and to be significant.

Once the financial flows equation is estimated, in the second step the role of financial flows in the determination of the excess returns is tested. Gravity equations give us the amount of "normal" flows between two countries given the characteristics of

[12] For details of GARCH estimation, see Appendix 3.

lender and borrower countries. Therefore, error terms found from the gravity equations represents the "excess flows". In other words, negative realizations of the error terms represent that the realized flows are more than expected given the characteristics of the countries analyzed and vice versa. Therefore, the excess flows will be used to proxy for speculative flows.

IV.B. Testing for the Null Hypothesis

In equation (44) of the theoretical model, excess returns are explained by variables related to risk and country size. In this and the next section, empirical tests of the theoretical model's predictions are presented. The model presented here is a model where interest rates are not observed directly. But, asset prices incorporate information about the interest rates. Since the price equality will lead to interest rate equality as well, in this section I am going to apply this result to money-market rates. I will estimate deviations from UIP as $r_{it} - r_{jt} - \Delta e_{ij,t}$. In this expression, r_{it} and r_{jt} represents emerging market and developing country money market rates and $\Delta e_{ij,t}$ realized value of exchange rate depreciation.

The quarterly money market time series used in these estimations are the short horizon interest rates downloaded from International Financial Statistics (IFS) of the International Monetary Fund (IMF). My estimation covers the period from Q1 2000 through Q4 2005 for a group of emerging countries listed in the appendix.

Table 3: Determinants of UIP Deviations

	Coef.	Std. Err.	T
cpi_vr	0.452	0.021	21.030
Risk	-0.016	0.024	-0.680
ggdp_d	-0.015	0.010	-1.500
ggdp_s	-0.135	0.015	-9.270
excess flows (all)	-0.231	0.251	-0.920
F(28,4802)	34.53		
R-sq:	0.3502		

Table 3 displays the fixed effect estimations of the determinants of UIP deviations. For each emerging economy in the sample, the UIP deviations from corresponding base developed country are calculated and taken as the dependent variable in this estimation. Again, although the results are not reported here, time dummies are also included into estimations to capture the aggregate shocks. The first two variables in this table are variables representing risk. GDP variables in this equation represent size.

Table 3 shows that the increase in the volatility of inflation rates in the borrower country results in an increase in the deviations. When volatility of inflation rates and the risk variable are used together, the risk is not found to be significant. Among the remaining variables, only the growth rate of the lender country is found to be significant. The remaining variables, including the variable used to measure unexpected capital flows, are found to be insignificant.

As explained above, when the realized flows are more than expected given the characteristics of the countries, the country is interpreted as having speculative flows. An increase in the value of this variable represents speculative inflows and this decreases the value of the deviations[13]. While the sign of this variable is in line with my theory's expectations, this variable is not found to be significant in this section. As the predictions of my theoretical model are remembered, these are not unexpected results. In the theoretical model, it is shown that asset prices are determined as a result of collusive actions in some market structures and in this case asset prices move closer to the other country's level with only limited amount of flows. In other words, for the collusive markets financial flows are not expected to have explanatory power. On the other hand, for the markets which do not have collusive structure, the traditional models' presumption holds. That is to say, my theoretical model suggests that there are two different regimes in the determination of asset prices. In one regime, flows have explanatory power, in other they are not.

IV.C. Testing for the Alternative Hypothesis of Market Power

To analyze the predictions of my theoretical model for a panel data set, a threshold regression is estimated. The methodology used in this section is introduced by Hansen (1999). It is developed for the estimation of non-dynamic panels with individual specific effects. The threshold variable is not taken as given, but estimated like other model coefficients. In the first step, the threshold variable which minimizes the sum of

[13] Excess flows variable here is calculated from the fixed effect estimations of the gravity equation.

the error squares is searched over all possible values. In the second step, for this chosen value of the threshold variable the least squares estimations of the slope coefficients are calculated. This estimation procedure will allow us to differentiate different regimes in my estimations. As in the structure of the theoretical model, threshold models specify that individual observations can be divided into classes based on the value of an observed variable.

$$y_{it} = \mu_i + \beta_1^{'} x_{it} + e_{it}, \qquad q_{it} < \gamma \tag{45}$$

$$y_{it} = \mu_i + \beta_2^{'} x_{it} + e_{it}, \qquad q_{it} > \gamma \tag{46}$$

According to equations (45) and (46), the observations are divided into two regimes depending on whether q_{it} is smaller or larger than the value of the threshold γ. Each regime is defined by its regression slopes, β_1 and β_2 in this equation.

In Table 3 fixed effect estimations of deviations from UIP are presented. In this section, I am going to repeat a similar exercise by using Hansen's threshold regression methodology. Equation (47) below represents a compact version of equation (45) and (46). As my theory suggests, I estimate the excess returns by using variables representing risk, country size and speculative flows. My theory suggests that financial flows are governed by different processes in collusive and noncollusive markets. Therefore, the role of financial flows determining excess flows will be analyzed by the threshold framework.

$$s_{it} = \beta_1 b_{it} + \beta_2 b_{jt} + \beta_3 rp_{it} + \beta_4 a_{it} I\left(c_{it} < \gamma\right) + \beta_4^{'} a_{it} I\left(c_{it} > \gamma\right) + e_{it}, \tag{47}$$

As in equation (44), excess returns in equation (47) are expressed as a function of risk and size variables. In this equation, s_{it}, b_{it}, b_{jt}, a_{it}, and rp_{it} represent deviations from UIP, size variables of country i and j, a speculative flow variable and a variable related to the degree of risk respectively. The observations here are divided into two classes based on the value of a collusion variable, c_{it} by using an indicator function $I(.)$. The first indicator function takes the value of 1 when $c_{it} < \gamma$ and value of zero when $c_{it} > \gamma$. The second indicator function takes the value of 1 when $c_{it} > \gamma$ and value of zero when $c_{it} < \gamma$. As in equation (45) and (46), the coefficient of the a_{it} variable takes a different coefficient depending on its relationship with the threshold variable. In this estimation procedure, I am going to use the degree of market concentration in the banking sector to represent the degree of collusion in these markets and it will be used as a threshold variable[14].

Table 4: Threshold Estimation of the UIP Deviations[15]

	Coef.	Std Er*	t
cpi_vr	0.276	0.036	7.721
Risk	0.147	0.025	5.957
Conc	6.286	5.118	1.228
ggdp_d	-0.082	0.017	-4.801
ggdp_s	-0.084	0.016	-5.152
excess flows (regime 1)	-0.688	0.217	-3.175
excess flows (regime 2)	1.908	0.677	2.816
Estimated threshold value	0.81		
Confidence region of the threshold estimate	0.80	0.81	
Number of obs. in regime 1	870		
Number of obs. in regime 2	4170		
R-sq:	0.5658		

*These are heteroscedasticty corrected standard errors.

Table 4 above represents the estimation of equation (46) using Hansen (1999)'s fixed effect methodology. As in Table 3, the dependent variable is the UIP deviations of an emerging economy from the developed countries in my sample. The estimated threshold value, which is 0.81, defines regime 1 and regime 2 in this table. When an observed concentration ratio in a country is less than this value, this country is estimated to be in the first regime, and vice versa. The coefficients and their standard errors in Table 4 show that financial-flows variable has the expected sign and is significant only in the first regime (when financial markets are not collusive). The other variables included into the regression have similar magnitudes and signs with variables in Table 1.

In the next step, I tested the significance of the threshold effect. In terms of the parameters of equation (47), the hypothesis of no threshold effect can be represented by the following linear constraint.

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[14] Concentration ratios represent the assets of three largest banks as a share of assets of all commercial banks. I downloaded this variable from Financial Structure Dataset. It is available on the World Bank's web-site. http://econ.worldbank.org/staff/tbeck.

[15] In these estimations, I used a modified version of Hansen (1999)'s MATLAB code.

$H_0 : \beta_1 = \beta_1^{'}$

Under the null hypothesis of no threshold, the model is

$$s_{it} = \mu_i + \beta_1 a_{it} + \beta_2 b_{it} + \beta_3 rp_{it} + e_{it}, \tag{48}$$

Hansen (1999) suggest that the likelihood ratio test of H_0 is based on the following equation:

$$F_1 = \frac{\left(S_0 - S_1\left(\hat{\gamma}\right)\right)}{\sigma^2} \tag{49}$$

where S_0 and $S_1\left(\hat{\gamma}\right)$ represents the sum of squared errors under the null and alternative hypotheses.

Table 5: Test for Threshold Effect

Calculated test stat.	**51.66**
Critical value	**36.38**
Bootstrap est. of asy. p-value	**0.02**
Number of bootstrap rep.	**1000**

Since under the null hypothesis the threshold variable is not identified, classical tests will have non-standard distributions. Hansen (1999) describes a bootstrap procedure to determine whether the threshold effect is statistically significant. I followed his procedure and calculated the percentage of draws for which the simulated statistics exceeds the actual. This is the bootstrap estimate of the asymptotic p-value for the calculated statistics. Table 5 also represents the results of this test. It is found that the null of “no threshold effect” is rejected with 5 percent significant level. Table 5 also reports the value of calculated likelihood ratio statistics and critical value at 5 percent significance level.

These results indicate that for a group of emerging countries analyzed in this section, the threshold effect is significant. In countries that have banking sector concentration ratio higher than 0.81, the speculative flows are not effective in reducing the deviations from UIP, whereas in less concentrated countries they are found to be effective. This shows that excess returns offered by an open financial market does not always attracts financial flows. Therefore, in evaluating implications of financial integration, using low interest rate spreads as an indicator of integration can be deceptive. Because these countries may not be actually gathering traditionally assumed benefit of financial integration.

IV. D. Forward Premium Puzzle

These results shed lights on two issues that have been commonly analyzed by the literature: the unbiasedness hypothesis and forward premium puzzle. According to the unbiasedness hypothesis, interest rate differentials are unbiased predictors of future exchange rate movements. Therefore, risk premia and non-rational expectation errors are uncorrelated with interest rate differentials and changes in exchange rates should be positively related to interest differentials with a coefficient of unity. In the estimation of equation (50) below, β is expected to be equal to 1. However, empirical tests of this equation in the literature find a negative β for developed countries; positive but less than one β for emerging countries. In analyzing these issues, forward premium and interest rate differentials are used interchangeably by authors such as Bansal and Dahlquist (2000) since forward premium is approximately equal to the interest rate differentials. The fact that the forward premium incorrectly predicts the direction of the subsequent change in the spot rate, that is to say $\beta < 0$ in equation (50), is known as the forward premium puzzle.

$$\Delta s_{t+1} = \alpha + \beta\left(i_t - i_t^*\right) + u_t \tag{50}$$

The literature has so far examined the role of macroeconomic factors in explaining these differences. My theoretical model suggests an alternative: market power can be a potential explanation for the realization of smaller biases in emerging market economies compared to those in developed countries. As opposed to Frankel and Poonawala (2004)'s higher risk premium and lower forecast errors predictions for emerging countries, my analysis suggests the risk premium realizations do not have to be high in these countries even if they are risky. In emerging markets that have collusive market structures, risk premium realizations are expected to be lower due to the exploitation of the monopoly power.

I analyzed the forward premium puzzle for the emerging market countries in my sample. I follow Bansal and Dahlquist (2000) and use interest rate differentials to represent forward premium since forward rates are not available for most of the emerging markets in my sample.

Table 6: Estimation of Forward Premium Puzzle Equation

	Pooled Estimates			Fixed-effects (within) regression			Between Regression		
	Coef.	Std. Err.	T	Coef.	Std. Err.	T	Coef.	Std. Err.	T
int_d	0.875	0.023	38.370	0.958	0.030	31.970	0.7762	0.0514	15.10
_cons	-0.642	0.397	-1.620	-1.313	0.419	-3.140	0.1610	0.6772	0.24
Num. Obs.	5040			R-sq:	0.1747		R-sq:	0.5231	
F(1, 5038)	1472.19			F(1,4829)	1022.15		F(1,208)	228.12	
R-sq	0.2261								
Adj R-sq	0.226								

Table 6 presents the estimated coefficients of equation (50) above. The dependent variable in this equation is the expected exchange rate changes. The independent variable is the interest rate differentials between corresponding emerging market and developed country. These results show that the coefficient of interest rate differential is less than 1. Since my sample does not include the deviations of the developed countries, I do not analyze the forward premium puzzle for the developed countries. But, the results confirm Bansal's finding for the emerging markets. The forward premium puzzle does not apply to emerging markets. Especially, fixed effect estimation results show that the coefficient of interest rate differential is very close to 1.

Bansal (1997) suggests that violations of uncovered interest rate parity depend on the sign of the interest rate differential. He introduces a threshold type of equation similar to the one I used above. However, he takes threshold value as given-his threshold is taken to be zero. Equation (51) given below is built upon a similar assumption. Instead of taking zero as my threshold, I used the threshold value of the concentration ratio that is estimated above.

$$\Delta s_{t+1} = \alpha + \beta_1 \left(i_t - i_t^*\right) I\left(c_{it} < \gamma\right) + \beta_2 \left(i_t - i_t^*\right) I\left(c_{it} > \gamma\right) + u_t \qquad (51)$$

Table 7: Estimation of Forward Premium Puzzle Equation with Threshold Approach

	Pooled Estimates			Fixed-effects (within) regression			Between Regression		
	Coef.	Std. Err.	T	Coef.	Std. Err.	T	Coef.	Std. Err.	T
int_d1	0.502	0.046	10.950	0.579	0.055	10.520	0.425	0.123	10.520
int_d2	0.970	0.025	39.150	1.046	0.032	33.060	0.876	0.060	33.060
_cons	-0.683	0.394	-1.730	-1.296	0.416	-3.120	0.055	0.664	-3.120
Num. Obs.	5040			R-sq:	0.186		R-sq:	0.545	
F(1, 5038)	792.760			F(1,4829)	551.5		F(1,208)	228.120	
R-sq	0.226								
Adj R-sq	0.226								

Table 7 above presents the estimation results of equation (51). The dependent variable in this equation is still the expected exchange rate changes. The independent variable is the interest rate differentials in the first regime, int_d1, and interest rate differentials in the second regime, int_d2. The results indicate a striking difference between the estimated parameters. While the interest rate differentials for the non-concentrated countries are found to be in the proximity of 0.5, the results of the concentrated markets are found to be much closer to 1 than the parameter values presented in Table 6. Although more empirical work has to be done to claim that the forward premium puzzle disappears due to the market concentration, the simple analysis provided in this section shows that among emerging market countries with high concentration ratios β gets closer to the theory's expectation.

V. Conclusions and Extensions

While the UIP condition is used frequently by open economy macroeconomists, empirical data do not support the prediction of this condition. In this paper I investigate the deviations from UIP condition. The framework I develop here demonstrates that in addition to the traditional explanations, the market power of domestic financial institutions also has an impact on these deviations. My analysis shows that in markets where agents have monopoly power, borrowers can actually determine the amount that will be borrowed and this amount is typically lower than what we would observe if these markets were competitive. These agents can limit the foreign lenders' lending by offering them a smaller return than what they would have to pay in competitive markets. Therefore, in these markets observed excess returns will be smaller while financial flows are discouraged by agents' interest rate manipulation. My panel data estimation shows significant evidence of the impact of market concentration on excess returns and volume of financial flows. I found that in countries that have banking sector concentration ratios higher than 0.81, speculative capital flows are not necessary in reducing the deviations from UIP, whereas in other countries flows are necessary.

In this article I analyze a situation in which a collusive market with asymmetric information is financially integrated with a country that is competitive and does not have similar informational problems[16]. The market power is found to have important welfare implications in this situation. Colluders are found to have a chance to increase their welfare at the expense of the other country's welfare. This finding shows that liberalized financial markets would generate more overall welfare only when they both have competitive structures. Therefore, political authorities can contribute to welfare improvements by persuading more competitive market structures. Moreover, my analysis also shows that welfare realizations are higher when countries do not have asymmetric information problems. Therefore, political authorities' effort to increase transparency also pays off.

The empirical literature finds that forward premium incorrectly predicts the direction of the subsequent change in the spot rate for developed countries, while the direction is as expected for emerging countries. In this article, I also analyze the forward premium puzzle for the emerging market countries and I show that market concentration has implications of this issue as well. Although more work has to be done, this article shows that countries with concentrated markets are closer to have the expected coefficient value than other countries. However, future works have to analyze the influence of concentration for developed countries to make a valid comparison of this result with subsequent literature.

Standard theoretical arguments tell us countries with a relatively small capital stock benefit from financial integration as foreign capital flows in and speeds up the

[16] The case in which both countries have informational transparency will be analyzed in the next version of this article.

process of convergence. Indeed, this is one of the main motivations behind the push towards the international financial integration of emerging countries. In this article, while I do not model capital formation, my findings nevertheless suggest that capital flows may not be realized even if barriers are removed. The convergence in the interest rates might be the result of collusive behavior, not capital inflows. Therefore, policymakers' efforts to increase the degree of competition in financial markets must account for and counteract the response of domestic intermediaries and success will have long run growth implications.

Since market concentration has an impact on the relationship between excess returns and volume of financial flows, market power of domestic financial institutions will have repercussions on the performance of exchange rate policy. In concentrated financial markets, since the relationship between excess returns and financial flows is distorted, intervention should anticipate this response. Otherwise, policy makers' efforts to move the value of their currency towards a particular value will not be as effective as before.

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Appendix 1: Comparisons of the Different Scenarios

Tables presented in this section compare welfares, price levels, quantity of financial flows under the different scenarios analyzed in the model.

Welfare Comparisons:

Table A1: Welfare in Country A under Alternative Scenarios

Autarky	$EU_A^{Aut} = y_{1A} + \frac{D}{\Delta} n_A^{1/\sigma}$
Integration	$EU_A^{Int} = y_{1A} + \frac{D}{\Delta}\left(n_A + n_B\right)^{1/\sigma}$
Risky Integration	$EU_A^{Int-Uncer} = y_{1A} + D\left(n_A + n_B\right)^{-\Delta}\left(\frac{n_A}{\Delta} + n_B\right) + n_B\omega^\sigma D\left(n_A\omega^\sigma + n_B\right)^{-\Delta}\left(\frac{1}{\Delta} - 1\right)$
Risky Integration under Collusion	$EU_A^{Int-Uncer} = y_{1A} + D\left(n_A + n_B\right)^{-\Delta}\left(\frac{n_A}{\Delta} + n_B\right) + n_B\omega^\sigma D\left(n_A\omega^\sigma + n_B\delta\right)^{-\Delta}\left(\frac{1}{\Delta} - 1\right)$

Table A2: Welfare in Country B under Alternative Scenarios

Autarky	$EU_B^{Aut} = y_{1B} + \frac{D}{\Delta} n_B^{1/\sigma}$
Integration	$EU_B^{Int} = y_{1B} + \frac{D}{\Delta}\left(n_A + n_B\right)^{1/\sigma}$
Risky Integration	$EU_B^{Int-Uncer} = y_{1B} + D\left(n_A\omega^\sigma + n_B\right)^{-\Delta}\left(n_A\omega^\sigma + \frac{n_B}{\Delta}\right) + n_A D\left(n_A + n_B\right)^{-\Delta}\left(\frac{1}{\Delta} - 1\right)$
Risky Integration under Collusion	$EU_B^{Int-Col} = y_{1B} + D\left(n_A\omega^\sigma + n_B\delta\right)^{-\Delta}\left(n_A\omega^\sigma + \frac{n_B\delta^\Delta}{\Delta}\right) + n_A D\left(n_A + n_B\right)^{-\Delta}\left(\frac{1}{\Delta} - 1\right)$

Financial Flows

Table A3: Financial Flows from Country A to Country B

Autarky	-
Integration	$FF_A^B = p_A s_j n_A n_B = \left(n_A + n_B\right)^{-\Delta} n_A n_B$
Risky Integration	$FF_A^B = p_A s_j n_A n_B = n_A n_B D^\sigma \omega^\sigma \left(n_A \omega^\sigma + n_B\right)^{-\Delta}$
Risky Integ. under Collusion	$FF_A^B = p_A s_j n_A n_B = n_A n_B D^\sigma \omega^\sigma \left(\left(n_A \omega^\sigma + n_B\right)^{1/\sigma} + \varepsilon\right)^{1-\sigma}$

Table A4: Financial Flows from Country B to Country A

Autarky	-
Integration	$FF_B^A = p_A s_j n_A n_B = \left(n_A + n_B\right)^{-\Delta} n_A n_B$
Risky Integration	$FF_B^A = p_A s_j n_A n_B = \left(n_A + n_B\right)^{-\Delta} n_A n_B$
Risky Integ. under Collusion	$FF_B^A = p_A s_j n_A n_B = \left(n_A + n_B\right)^{-\Delta} n_A n_B$

Price Levels

Table A5: Equilibrium Asset Price Level in Country A

Autarky	$p_A = D n_A^{1/\sigma}$
Integration	$p_A = D\left(n_A + n_B\right)^{1/\sigma}$
Risky Integration	$p_A = D\left(n_A + n_B\right)^{1/\sigma}$
Risky Integ. under Collusion	$p_A = D\left(n_A + n_B\right)^{1/\sigma}$

Table A6: Equilibrium Asset Price Level in Country B

Autarky	$p_B = Dn_B^{1/\sigma}$
Integration	$P_B = D\left(n_A + n_B\right)^{1/\sigma}$
Risky Integration	$p_B = D\left(n_A\omega^{\sigma} + n_B\right)^{1/\sigma}$
Risky Integ. under Collusion	$p_B = D\left(n_A\omega^{\sigma} + n_B\right)^{\frac{1}{\sigma}} + \varepsilon$

Appendix 2:

An Extension: What Happens when $\omega = 0$?

As it is indicated in section III.D, in the extreme case, flows from Country A to Country B might approach to zero due to the risk. While flows from B to A are not interrupted, flows from A to B disappear in this situation. In this section, I am going to study welfare implications of this situation.

$$c_{1B} = y_{1B} - n_A D\left(n_A + n_A\right)^{-\Delta} \qquad \text{(2a)}$$

Equation (2a) now gives the level of first period consumption in Country B. Since in the first period, agents in B consumes less due to lack of income transferred from A to B, the first period consumption is lower in this scenario. On the other hand, due to the absence of Country A's residents in the domestic market, domestic assets in Country B are cheaper in Country B.

$$EU_B^{Int-Uncer} = y_{1B} + \frac{D}{\Delta}\left(n_B\right)^{1/\sigma} + n_A D\left(n_A + n_B\right)^{-\Delta}\left(\frac{1}{\Delta} - 1\right) \qquad \text{(2b)}$$

Appendix 3: Variables Used in Gravity Equation

Flows of funds in the international banking sector from a group of developed country to developing countries are estimated by using a gravity equation. Banking Statistics used in this estimation are downloaded from BIS. These variables were introduced as a semiannual reporting exercise in the late 1970s and early 1980s to provide information on the country risk exposures of major national banking groups to developing countries. They are started to be reported on a quarterly basis since 2000. To facilitate coherence among financial flows and other variables used in the estimation, I am going to use 2000-2005 period. The developed countries consist of Austria, Belgium, Netherland, France, Germany, Japan, Spain, Sweden, Switzerland, and the USA. The emerging market countries in my sample are Turkey, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Mexico, Poland, Romania, Chile, Malaysia, South Africa, Russia, Ukraine, Argentina, Slovenia, Israel, Brazil and Uruguay.

The definitions of the variables used in this estimation are summarized below:

dist: logarithm of the distance between the capital cities of borrower and lender country.

comlang: a dummy variable which takes the value of 1 when the borrower and the lender shares a common language.

colony: a dummy variable which takes the value of 1 when the borrower and the lender shares a colonial history.

ffinlow: logarithm of the real financial flows[17].

gdp_d: logarithm of the real GDP of the borrower country.

gdp_s: logarithm of the real GDP of the lender country.

cpi_vr: the volatility of CPI series. For each borrower country in the sample a GARCH(p,q) equation is estimated. In these estimations, p and q values are selected by using AIC criteria. For each country in the sample, 12x12 separate GARCH regressions are run. The lag length which provides minimum AIC value has been chosen. Table 3a below presents the lag lengths selected for each country. Once the GARCH equations are estimated, the estimated standard deviations are used to represent the volatility of the CPI series.

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[17]While the US's CPI data is used in calculating real financial flows, in real GDP calculations related country's CPI data is used.

Table 3a. p and q Values of GARCH (p,q) Estimates Selected by Using AIC Criteria

	p	q
Turkey	1	3
Bulgaria	3	1
Croatia	10	11
Czech Republic	9	12
Estonia	4	12
Hungary	5	7
Latvia	9	10
Lithuania	8	10
Poland	2	3
Romania	1	10
Mexico	4	6
Chile	1	1
Malaysia	1	6
South Africa	12	1
Russia	1	12
Ukraine	1	2
Argentina	1	1
Slovenia	1	10
Uruguay	1	1
Israel	3	5
Brazil	1	3

risk: Economic Intelligence Unit issues a quarterly report for each country covered. Each report rates the corresponding country in four generic categories, the political risk, the economic policy risk, the economic structure risk and the liquidity risk. These four risk categories are then aggregated to produce an overall country risk score[18]. This score ranges from 0 (least risky) to 100 (most risky). In the estimations, percentage change of the index values is used.

openness: To capture effects of capital controls an index developed by Chinn and Ito (2007) has been used. This index is based on the information from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. It takes on higher values the more open the country is to cross-border capital transactions.

[18] In these calculations, the weights of the political risk, the economic policy risk, the economic structure risk and liquidity risk are taken 22%, 28%, 27% and 23% respectively by EIU.

time dummies: Although the results are not reported here, by following Portes and Rey (2005), time dummies are also included in the estimations to capture the aggregate shocks.