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Abstract

The objective of this paper is to review the transmission mechanisms uniting equity market development and economic growth in developing countries. We find that the theoretical impact of equity markets is ambiguous. At the domestic level, the allocation function of equity markets appears conditioned by the extent of informational efficiency. Turning to international linkages, theoretical models suggest that equity market integration lowers the cost of capital, increases financial vulnerability and has a mixed impact on capital flows. Taking this into account, two conclusions arise. First, equity market development policies should focus on reaching and maintaining adequate levels of institutional transparency. Second, the optimal degree of international integration depends on the society's preference between *international accessibility* and *domestic stability*.

JEL classification: G11;G12;G15

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0. Introduction

Countries embarking on financial reforms usually bear two objectives in mind: (a) to raise the level of saving and investment; and (b) to improve the allocation of investment resources consistent with certain economic and social objectives. Endogenous growth models have suggested that financial development leads to an increased savings mobilization and a better allocation of capital (Greenwood & Jovanovic, 1990; Bencivenga & Smith, 1991). In this view, financial liberalization is expected to raise the growth rate and improve living standards in developing countries (ADB, 1994). This mechanism has been confirmed by empirical studies which suggested a long-run relationship between financial liberalization, financial development and long-run growth (King & Levine, 1993; Levine & Zervos, 1998).

However, these focused mainly on financial intermediation and the banking sector[1]. By contrast, the theoretical and empirical literature on the implications of equity market development is scant. A number of economists have even suggested that the process has no impact on real activity (Stiglitz, 1989; Mayer, 1990). Sceptics argue that volatile equity markets constitute "costly irrelevances which (developing countries) can ill afford" (Singh, 1999; Singh & Weiss, 1998). Another view is that development contributes to maximizing the allocation efficiency of investment by providing a specific bundle of financial services (Atje & Jovanovic, 1993). Equity markets and banking sector development may exert an independent but positive impact on economic growth (Levine & Zervos, 1998). Recent empirical work has indeed suggested that equity market liberalizations are associated with higher real growth, in the range of one percent per annum (Bekaert, Harvey & Lundblad, 2001). Acknowledging the controversial nature of equity market development for economic growth in developing countries, the objective of this paper is to review the main theoretical causality mechanisms.

[1] Bank loans constitute the primary source of outside funding for the corporate sector around the world. For instance, in the U.S., banks provided about 62 percent of total outside finance for non-financial firms on average for the 1970-1998 periods, while stock issues accounted for only two percent (Hubbard, 2000)

The remainder of the paper is structured as follows. The first section investigates the welfare implication of domestic equity market development. Allocation efficiency appears to be the main transmission mechanism, and informational transparency is crucial. The second section focuses on the international integration of equity markets, and investigates its consequences based on an asset pricing definition. It appears that equity market integration lowers the cost of capital, increases financial vulnerability and has a mixed impact on capital flows. Finally, the third section brings together our conclusions.

1. Equity market development

1.1 Equity markets and allocative efficiency: the causality mechanism

Initial models of 'financial repression' suggested that increased interest rates led to higher financial savings and greater capital allocation (McKinnon, 1973). However, these models were criticized for overlooking the possibility that endogenous constraints in the credit market constitute obstacles to the allocative efficiency of investment (Stiglitz&Weiss, 1981). Economists therefore considered equity market development to be a potential a solution to inefficiencies associated with weak credit markets in the presence of information asymmetries. For illustration, Cho's (1986) seminal model supposes that banks and equity investors have the same level of information on firms. The information asymmetries hypothesis implies that individual borrowers can be sorted according to their expected productivities, but that their degrees of riskiness are unknown. Since banks cannot identify the individual risk characteristics of firms, they aggregate borrowers into groups, and base their decisions according to the expected variance in the distribution of riskiness for each group of borrowers. The banking sector expected return is thus a function of a fixed interest rate r^* and the default risk. The model supposes that a group of firms j are innovative and highly productive while group of firms i have established customer relations with banks. Therefore,

the bank's subjective expected variance in the distribution of riskiness of group j should be larger than the other group *i.* As a consequence, the banks' expected return from lending to group i can be higher than that to group j (i.e., $E\Pi i^* \rangle E\Pi j^*$ *),* although the expected productivity of the latter is higher than that of the former (i.e., $Ri \langle Rj$ *).* This results in a suboptimal allocation of savings.

Turning to equity markets, investors do not take default risk into account as their expected returns $E\Pi j^*$ are equivalent to the project's expected return, i.e. $E\Pi j^* = Rj$. Potential shareholders pick up their investment decisions based on comparison of expected productivities, which are known. This allows riskier groups (such as group *j*) to obtain financing. The model concludes that equity market development contributes to full capital allocation efficiency, especially in the presence of information assymetries in the credit market (Cho, 1986). Recent contributions have proposed intuitive refinements of this argument. For instance, institutional economists have highlighted that banking systems in developing countries are often characterized by a high ownership structure resulting in oligopolistic practices. In such systems, the selection of investment projects based on expected operating results can be disturbed by strategical political interactions between agents, which results in suboptimal investment decisions, and in a weak corporate sector. The poor allocative performance of the bank-based financial structure then magnifies the relative advantages of equity markets (Henry & Springborg, 2004). Other studies have underlined the liquidity–enhancing function of equity markets. The creation of a domestic stock market in developing countries may provide households with an additional instrument which may better meet their risk preferences and liquidity needs (Dailami&Atkin, 1990). Domestic stock investment may thus constitute an alternative to consumption, the purchase of land and real estate, or the seeking of more profitable investment abroad, ultimately resulting in a higher mobilization of savings (Oshiloya & Ogbu, 2003). Some have also underlined the role of a

large and active secondary market in mitigating the problem of the availability of long-term funds. Investors and corporations tend to have conflicting concerns over the optimal degree of liquidity of financial transactions. Investors favour high liquidity whereas corporations need to be assured of long term credits to match their long term assets. To reconcile these conflicting concerns, transactions in the secondary markets are necessary as they enable new issues in the primary markets to be successful. Equity market development therefore allows easing the tension between savers' preference for liquidity and entrepreneurs' need for long-term finance (Ndikumana, 2001).

Another line of reasoning, stemming from corporate finance theory, suggests that the development of securities market helps to strengthen corporate capital structure and governance. In countries where there are no viable equity markets, firms tend to rely heavily on internal finance and bank borrowings to finance fixed assets and working capital, which raises the debt/equity ratio. The resulting imbalanced capital structure increases interest rate risk by creating maturity mismatches on balance sheets. This weakens the corporate sector in periods of economic downturn, where banks tend to squeeze credit and limit overdraft lines. By contrast, efficient stock markets increase the viability of investment projects by allowing all firms to compare the cost of various sources of finance and to pick up the appropriate debt to equity mix (Oshiloya&Ogbu, 2003). Additionnally, equity markets may improve corporate governance by mitigating the issue of 'moral hazard'. The latter is a standard corporate finance concept stating that the interests of managers and owners may not necessarily coincide if their incomes depend on different factors. In this context, inefficient managerial decisions may arise, negatively affecting the firm's value. One advantage of the stock market is that it allows tying the manager's income to stock prices, thereby reducing the incentive for imprudent actions and increasing the firm's long term value. Equity markets can also improve

managerial efficiency by promoting competition through effective takeover or threat of takeover (Jensen and Meckling 1976).

Overall, this analysis suggests that equity markets are useful as they enhance the economy's allocative efficiency. However, the analysis becomes more complex when one incorporates information costs and the informational requirements it imposes on the individual equity investor ((Oshiloya&Ogbu, 2003). Just like credit markets, equity markets can be subject to informational constraints which may undermine their allocation function.

1.2 The impact of market efficiency

1.2.1 Definition

At the theoretical level, 'market efficiency' states that the pricing of securities reflect all available information that is relevant to their valuation (Fama, 1970). However, within this unifying framework, 'weak form' efficiency has to be distinguished from other more restrictive definitions of efficiency, such as 'strong' and 'semi-strong' efficiencies. 'Weak-form' efficiency states that asset prices reflect all past available information relevant to their valuation, so that the analysis of past prices cannot help predicting future patterns. 'Semi-strong form' efficiency states that prices incorporate all public information as published in specialized press, financial statements and analysts's reports. Finally, 'strong form' efficiency states that all public and private historical information is entirely reflected within asset prices, implying that even insiders are unable to achieve abnormal rates of returns by predicting future values. Nonetheless, rejection of the weak form of efficiency automatically implies rejection of the 'semi strong' and 'strong' forms. The weak form definition of market efficiency thus constitutes the main operational tool for theoretical and empirical studies (Mobarek & Keasey, 2000). It implies that prices incorporate all known or anticipated events, and thus constitute an unbiased estimation of an asset's intrinsic value. The main consequence

of weak-form efficiency is that investors cannot predict future trends by extrapolating past events. At an empirical level, this implies that the market follows a 'random walk' as only an unknown event may modify prices instantaneously. The latter property being straightforward to formalize, market efficiency is often defined based on time series econometrics. More precisely, efficient prices may be characterized by the following process (Barhoumi, 2005):

$$P_t = P_{t-1} + \varepsilon_t \tag{1}$$

Where Pt is the asset price at time t, Pt-1 is the asset price at time t-1 and εt is a randomly distributed variable with 0 mean and variance $t\sigma^2$. Assuming the absence of serial autocorrelation, we have:

$$\begin{aligned} E\left[P_{t+1}/(...,P_{t-1},P_t)\right] &= E\left[P_t + \varepsilon_{t+1}/(...,P_{t-1},P_t)\right] \\ E\left[P_{t+1}/(...,P_{t-1},P_t)\right] &= E\left[P_t/(...,P_{t-1},P_t)\right] + E\left[\varepsilon_{t+1}/(...,P_{t-1},P_t)\right] \\ E\left[P_{t+1}/(...,P_{t-1},P_t)\right] &= E\left[P_t/(...,P_{t-1},P_t)\right] \end{aligned} \tag{2}$$

According to (2), current prices constitute an appropriate expectation for the price in t+1. Besides, the variance of expected prices is given by:

$$\begin{aligned} V\left[P_{t+1}/(...,P_{t-1},P_t)\right] &= V\left[P_{_T} + \varepsilon_{t+1}/(...,P_{t-1},P_t)\right] \\ V\left[P_{t+1}/(...,P_{t-1},P_t)\right] &= 0 + V(\varepsilon_{t+1}) \\ V\left[P_{t+1}/(...,P_{t-1},P_t)\right] &= V(\varepsilon_t) \end{aligned} \tag{3}$$

As shown in (3), the variance of the expected price is equal to the variance of the random variable ε_t. As a result, only the variance of the error term can explain the time-varying pattern of asset prices, whose changes do not help predicting future values. Hence, the

evolution of market prices cannot be forecasted based on the analysis of past equity trends. Prices follow a random-walk, and the efficiency condition is respected.

1.2.2 Implications

(a) Intuitive implications

Under market efficiency, the ability of markets participants to identify the most productive investment opportunities based on actual price signals ensures that resources are efficiently utilized (Bekaert, Harvey & Lundblad, 2001). By contrast, informational inefficiencies disturb the market-based system of incentives, and ultimately the investment allocation process. *First*, a firm may not be able to raise the outside funds necessary to undertake a worthy investment project if manager cannot fully and credibly reveal information to outside investors and lenders (Myers and Majluf 1984). *Second*, assymetries of information between managers and outsiders may lead to diverging perceptions of asset pricing. Given the alternative of financial leverage, managers may issue new equity only if they assume that prices are overvalued. As a consequence, risk-averse investors may be reluctant to invest in new equity issues (Stiglitz, 1989; Mayer 1990; Hubbard 2000). Entrepreneurs may also hesitate to implement public offerings as a result of high transaction costs or the uncertainty of getting a fair price, which reduces the incentive to enter new ventures (Bekaert and Harvey, 1997). *Third*, inefficient markets are often characterized by the absence of widely accepted accounting standards and the lack of a regular, adequate and reliable disclosure of information. This magnifies the informational advantage of insiders who are able to manipulate stock prices in order to make extra profits. For instance, better informed investors may gain inside information about firm productivity. This advantage may be used to retain the high-productivity firms and selling the low-productivity ones to partially-informed savers, resulting in a misallocation of domestic savings (Razin, Sadka and Yuen (1999)). *Fourth*, market efficiency constrains the impact of

stock market development on corporate governance. Tying the managers' income to biased market prices would result in set of wrong managerial incentives, and ultimately introduce disturbances in the corporate governance mechanism (Pollin, 2002). *Fifth*, market cycles tend to be particularly pronounced in inefficient markets. A lack of reliable information favours noise and herding behaviours among investors, increasing the probability of sudden opinion reversals (Singh, 1997). The negative consequences of market volatility are well-known. The cost of capital to corporations may increase when due to market fluctuations which discourage risk-averse investors (Caporale, Howells&Soliman, 2004). Major booms and busts in the secondary market may also undermine the confidence of investors and affect the ability of companies to raise new funds in the primary market. A major crash in the equity market may also undermine the financial system as a whole and generate financial crises with very large economic and social costs (Agénor, 2003). Taken altogether, these intuitions constitute considerable backing for the idea that informational inefficiencies condition the equity market's allocative performance.

(b) Formal implications

Theoreticians have begun to underline the crucial role of informational dynamics in determining the impact of stock market development on economic growth. A significant contribution was made in Capasso (2004). The author presented a dynamic general equilibrium model in which the firm level debt to equity ratio directly depends on the degree of informational asymmetry, which constitutes an obstacle to switching from debt financing to a less costly equity financing.

Consider an economy in which capital is produced from risky investment projects whose expected returns vary according the characteristics of firms. There is a fraction $n_1 \in (0,1)$ of skilled capital producers whose expected return is high, a fraction $n_2 \in (0,1)$ of semi-skilled

capital producers whose expected return is low, and a fraction $n_3 = n_1 - n_2$ of unskilled capital producers whose expected return is zero. These capital producers have access to a safe capital project which yields a certain rate of return. Within each group, firms are heterogeneous according to their efficiency in running a project. The efficiencies of firms within the risky and safe project are indexed by α and β, which are uniformly distributed on $(0,1)$. The initial outlay are $a(\alpha)$ and $a(\beta)$, respectively. Informational asymmetries stems from the fact that while efficiency levels α and β are public knowledge, the type of firm is private information. Besides, type-1 firms produce k_1 units of capital with probability p and 0 units of capital with probability $(1-p)$, type-2 firms produce k_2 units of capital with probability p and 0 units of capital with probability $(1-p)$ such as $k_2 < k_1$; and type-3 firms produce 0 units of capital. For a loan size of w and a linear production technology q, a type-3 firm yields $[w - b(\beta)]q$ units of capital from running the safe project. Letting r representing the equilibrium price of capital, the model assumes that:

$$rpk_1 > pa(\alpha) > pk_2 \tag{1}$$

Consequently, households will never lend to type-2 and type-3 firms since they can always earn $pa(\alpha)$ amounts of income by storage. It follows that these firms must masquerade as type-1 firms in order to receive loans to finance risky projects. Type-3 firms may or may not be motivated to do so depending on whether the returns from the risky projects are greater or less than the returns from the safe project. Letting β^* the fraction of type-3 firms who choose to run the safe projects and $(1-\beta^*)$ be the fraction of type-3 who masquerade as type-1 firms, the probability that a firm applying for a loan is actually a type-1 firm is equal to:

$$Z_t = \frac{n_1}{[n_1 + n_2 + (1 - n_1 - n_2)(1 - \beta^*)]} \tag{2}$$

Z_t represents the degree of information transparency in the equity market. An increase in $(1 - \beta^*)$, the proportion of type-3 firms who masquerade as type-1 firms, results in lower values of Z_t, and thus in higher information asymetries. The expected market value of a risky project can then be defined as:

$$EMV = zpk_1 + (1 - z)npk_2 \tag{3}$$

In equation (3), $n = \frac{n_2}{n_2 + n_3}$ represents the proportion of non-type 1 firms that are type 2. In the capital market, firms have the choice between two types of contract: a debt contract, in which repayment d is a lump sum from the proceeds of the project, and a equity contract in which repayment s is proportional to the net profits from the projects. Under both arrangements, the lender's constraint is that the expected income from participation must be at least equal to $pa(\alpha)$, the amount obtained from storage. Taking this into account, the shareholder's expected outcome when financing a risky project is equivalent to $rs(EMV)$. Using the lender's participation constraint, it follows that equity payments are equivalent to:

$$S = \frac{pa(\alpha)}{r(EMV)} \tag{4}$$

Assuming Φ to represent output production, the firm's expected net income from an equity contract can be given as $VE = r(1 - S)pk_1 + \Phi$. Substituting into (4) yields:

$$VE = \left[r(EMV) - \frac{pa(\alpha)}{r(EMV)} \right] * pk_1 + \phi \tag{5}$$

Turning to debt contracts, the bank's expected outcome is $r[zpD + (1-z)npk_2]$. Using the lender's participation constraint, this is equivalent to:

$$D = \frac{[pa(\alpha) - r(1-z)npk_2]}{rzp} \tag{6}$$

With probability p, the firm is successful, repays the loan and retain control over output production Φ. With probability $(1-p)$, the firm fails, goes bankrupt and produces a subsistence amount of home production ϕ. The firm's expected net income can thus be defined as $VD = rp(k_1 - D) + p\Phi + (1-p)\phi$. By substitution, we have:

$$VD = \frac{[r(EMV) - pa(\alpha)]}{z_t} + p\Phi + (1-p)\phi \tag{7}$$

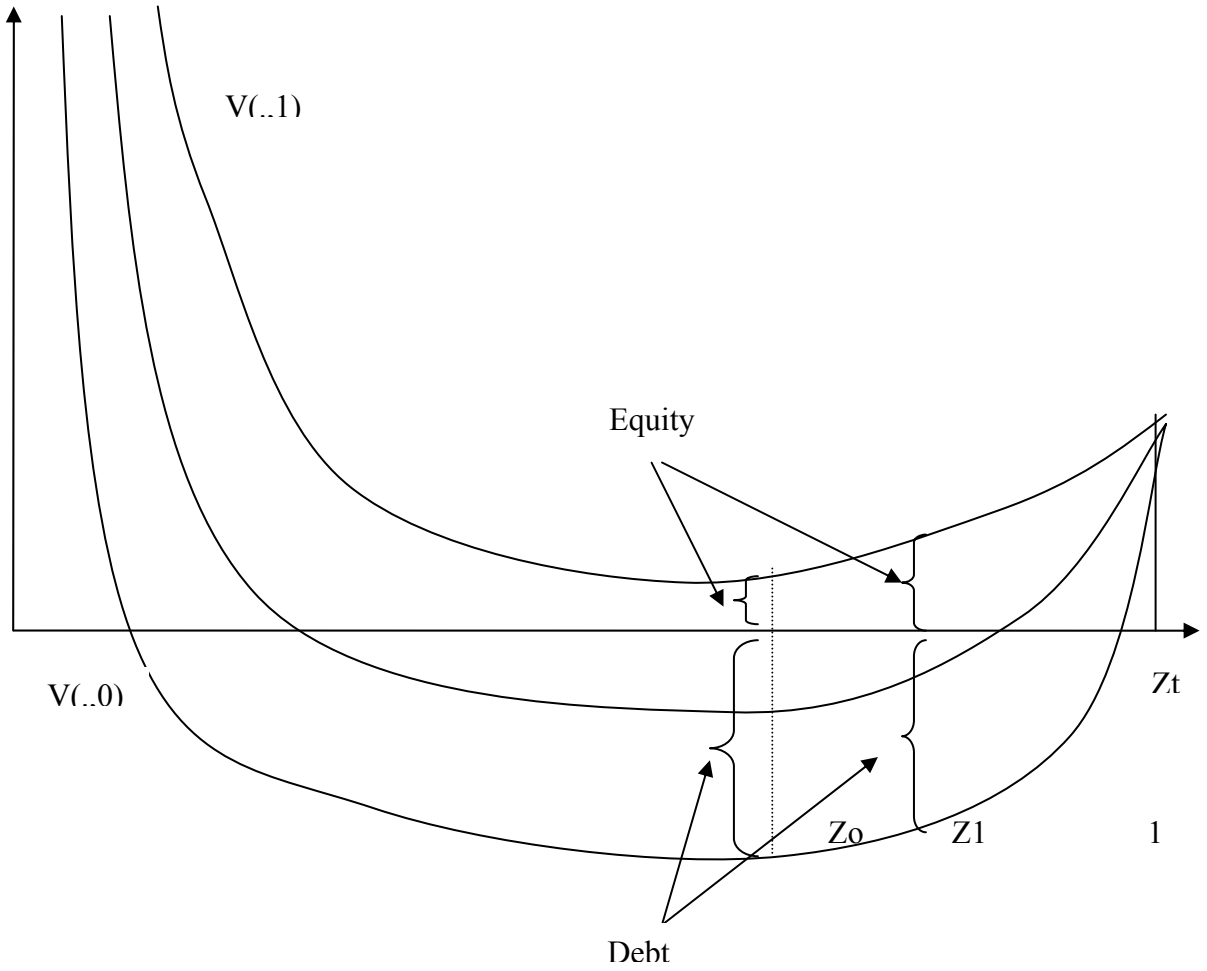
The optimal choice of contract for a type-1 firm can then be characterized by the function $V^* = VE - VD$; that is, from (5) and (7):

$$(1-p)(1-\Phi) - \frac{[r(EMV - pa(\alpha))](1-z)npk_2}{z(EMV)} = 0 \tag{8}$$

An equity contract is chosen if $VE - VD > 0$, while a debt contract is chosen if $VE - VD < 0$. For each level of efficiency $\alpha \in (0,1)$, it can be shown that V^* is a concave function in $z \in (0,1)$, with $\lim_{z \to 0} V^* = +\infty$ and $\lim_{z \to 1} V^* = (1-p)(\Phi - \phi) > 0$.

As shown in Figure 1, the highest of the curves is the locus corresponding to $\alpha = 1$, and the lowest is the locus corresponding to $\alpha = 0$. Inspection of the figure shows that the proportions of firms which prefer one contract to the other change with the level of information transparency. The fact that the proportion of firms preferring equity to debt is more important for high levels of information asymetries is due to the construction of the asymetry variable Z_t. More interestingly, the figure shows that the number of equity contracts increases with informational transparency, as we move from Z_0 to Z_1. This model thus highlights that informational dynamics play a central role in determining the contribution of equity markets to the financing of investment project. This also suggests that equity markets can be useful, but constitute be poor guides to investors in the presence of information asymmetries.

Figure 1: Informational asymetries and firms' financial choices



Source: Capasso, 2004

2. Equity market integration

The issue of the integration of equity markets into global finance and its relationship with economic development arised during the last two decades of significant flows of capital to emerging markets. However, the impact of financial globalization has often been analyzed within a macoeconomic framework, which has considered the financial sector as a whole. In what follows, we show that equity market integration has specific welfare implications which can be derived from an asset pricing perspective.

2.1 Definition

Within the generic definition, the integration of financial markets (credit, bond, money and equity markets) means that all potential market participants with the same characteristics (i) face a single set of rules when they decide to deal with financial instruments, (ii) have equal access to these financial instruments, and (iii) are treated equally when they are active in the market (Baele et.al (2004)). Turning to equity markets, integration means that cross-market arbitrage opportunities disappear (Gjersem, 2003). In such a situation, portfolios having the same payoffs tend to be priced equally regardless of their geographic origin (Frankel, 1994). This implies not only the absence of barriers to capital flows, but also that investors undertake capital transactions to eliminate arbitrage opportunities that arise (Fratzscher, 2002). The extent of cross-market integration is thus a positive function of the degree of comovement between investment returns. The process culminates into the law of one price (Kearney and Lucey, 2004). At a theoretical level, asset pricing models are useful for conceptualizing the integration of capital markets (Stulz, 1999). These models can be classified into three categories: segmented markets, integrated markets and mildly-segmented markets (Bekaert and Harvey, 1995).

2.1.1 Full market segmentation

Full market segmentation can be theoretically analyzed using the Capital Asset Pricing Model (CAPM) as developed by Sharpe (1964) and Lintner (1965). In this framework, the relevant risk that investors face is the asset's contribution to variance of a diversified portfolio within the domestic country, i.e the variance of the country portfolio. For any individual stock in the segmented stock market we have:

$$\begin{cases} E(R_i) = r_f + \beta_{im}\left[E(R_m) - r_f\right] \\ \left[E(R_m) - r_f\right] = \gamma(W)\sigma^2 m \\ E(R_i) = r_f + \gamma COV(R_i, R_m) \end{cases} \quad (1)$$

Where $E(R_i)$ is the required rate of return on firm i's stock, r_f is the risk-free rate in the domestic market, β_{im} is the beta coefficient of firm i with the domestic market portfolio, and $E(R_m)$ is the expected return on the domestic market. The aggregate risk premium can be decomposed as the product of the coefficient of relative risk-aversion $\gamma(W)$ by the variance of the domestic market portfolio $\sigma^2 m$. $COV(R_i, R_m)$ is the covariance between the individual stock and the domestic portfolio.

2.1.2 Mild market segmentation

The mild segmentation model was introduced by Errunza and Losq (1985). Mild segmentation occurs when government introduce one restriction to financial liberalization: while domestic investors are allowed to invest in the world market portfolio, foreign investors can only hold a subset of domestic equities. This situation can be represented using a hybrid CAPM in which assets are divided into freely tradable and restricted. Freely tradable assets are priced according to the world factor, which remains the relevant source of systematic risk

for foreign investors. In other words, the pricing of investible securities under mild segmentation will continue to be given by: $E(R_i) = r_f + \beta_{im}\left[E(R_m) - r_f\right]$. By contrast, the pricing of non-investible securities includes a 'super risk premium', which compensates domestic investors for bearing the risk associated with holding all of the non investible stocks. For any individual restricted stock we have:

$$E(R_i) = r_f + \gamma(W)COV(R_i, R_w) + \gamma u(W)COV(R_i, R_n | R_I) \quad (2)$$

In equation (2), R_n and R_I are the returns on the portfolio investible and non-investible securities, respectively. The variable $COV(R_i, R_n | R_I)$ is the covariance of firm i's return with the return on the portfolio of non-investible stocks, taking the return on the investible securities as given. γ and γu are the coefficient of risk aversion for restricted international investors and unrestricted domestic investors, respectively.

2.1.3 Market integration

The international version of the CAPM was proposed by Solnik (1974), in which risk is measured by asset contribution to the world portfolio. Under financial integration, the domestic equity market becomes part of the global equity market. As a consequence, domestic assets are rewarded in function of their covariance with the world portfolio, as the risk premium on any asset is proportional to its world beta. For any local firm, we thus have:

$$\begin{cases} E(R_{i*}) = r_{f*} + \beta_{iw}\left[E(R_w) - r_{f*}\right] \\ \left[E(R_w) - r_f\right] = \gamma(W)\sigma^2 w \\ E(R_{i*}) = r_{f*} + \gamma COV(R_{i*}, R_w) \end{cases} \quad (3)$$

Where β_{iw} denotes firm i's beta with the world market, $E(R_w)$ denotes the required rate of return on the world equity market portfolio, $\sigma^2 w$ denotes the variance of the return of the world portfolio and r_{f*} the world risk-free rate. In other words, expected local returns $E(R_i)$ in a fully integrated market depend solely on non-diversifiable international factors. The extent of integration of capital markets into global finance has various economic and financial effects, which can be derived from an asset pricing model. These include a decrease in the cost of capital for local firms, a decrease in portfolio diversification opportunities, and an increase in financial vulnerability.

2.2 Implications

2.2.1 Market integration and the cost of capital

The CAPM implies that the expected return required by the market on a risky security is equal to the risk free rate plus a risk premium equal to the beta coefficient of the security times the world market's's risk premium. In other words, the investment's present value for the shareholders is equivalent to the expected cash flows discounted by their required rate of return, as determined by the CAPM. Therefore, a decrease in the market's risk premium makes all projects which have a positive covariance with the market portfolio look more advantageous for investors. From the firm's point of view, this is equivalent to a decrease in the cost of capital.

The relationship was formally analyzed by Stulz (1999). The model makes the assumption of a homogenous degree of risk aversion for investors. Consequently, the price per unit of risk is a constant T, which can be defined as the ratio of risk premium on variance of the return:

$$T = \frac{[E(R) - r]}{\sigma^2} \tag{1}$$

Asset pricing theory states that the expected return required by the market on a risky security is equal to the risk free rate, plus a risk premium equal to the beta coefficient of the security times the reference market's risk premium. Assuming $E(R_m)$ to be the domestic market equilibrium rate of return and rm to be the domestic risk-free rate, we have:

$$\begin{cases} E(R_i) = r_f + \beta_{im}\left[E(R_m) - r_f\right] \\ E(R_{i*}) = r_{f*} + \beta_{iw}\left[E(R_w) - r_f\right] \end{cases} \quad (2)$$

β_{iw}, the beta of the small country portfolio with respect to the world's portfolio; is equivalent to $\frac{\rho\sigma_s\sigma_w}{\sigma_w^2}$, where σ_w^2 is the variance of the return in the global portfolio and ρ is the correlation coefficient between the return of the small country portfolio and the world portfolio. In addition, risk premiums can be rewritten as the product of the variance times the constant risk aversion T. Segmention and integration risk premiums can be rewritten as:

$$\begin{cases} RP_s = \sigma_s^2 T \\ RP_i = \rho\sigma s\sigma w T \end{cases} \quad (3)$$

By substitution, the necessary and sufficient condition for financial integration to diminish the risk premium (ie, $RP_i < RP_s$) in the small market is that:

$$\left[\frac{\sigma_s}{\sigma_w}\right] > \rho \quad (4)$$

According to (4), globalization decreases the risk premium – and thus the cost of capital - in the small country provided that return volatility of the small country portfolio relative to

return volatility of the world portfolio is higher than the correlation coefficient between the small country market and the world markets. In other words, the small country risk premium decreases if an investor that has all his wealth invested in the small country can construct a lower variance portfolio by selling some of his assets in the small country and make a positive investment in the world market portfolio. By contrast, integration may increase the risk premium and the cost of capital if the covariance with the world market is too high. In this case, the small country market is risky relative to the world market and therefore requires a higher risk premium. The same phenomenon occurs if the volatility of the world market is much higher than the small market's volatility. Therefore, a country that liberalizes its capital market can experience a decrease in the cost of capital provided that the correlation of its market portfolio with the world portfolio is not too large or if its volatility is larger than the volatility of the world market portfolio (Stulz, 1999). The impact of financial integration of capital markets on the cost of capital is thus strongly related to diversification opportunities arising from the integration process. Besides, this impact varies according to firm characteristics (Chari and Henry, 2004). This can be shown by subtracting equation (2) from equation (1):

$$\Delta E(R_i) = E(R_i) - E(R_{i*}) = (r_f - r_{f*}) + \gamma DIFCOV \tag{5}$$

Where $DIFCOV = [Cov(R_i, R_m) - Cov(R_i, R_w)]$. Equation (5) highlights the two channels through which integration may affect the firm-level required rate of return. The first effect occurs through a change in the risk-free rate and is common to all firms. The second effect is firm-specific and depends on the covariance of firm i's stock return with the domestic market minus the covariance of firm i's stock return with the global market. Intuitively, two situations may arise. If firm i has a low beta with respect to the world market and a high beta

with respect to the small country market, financial integration can lead to a substantial fall in the risk premium and in the cost of capital. By contrast, if firm i has a low beta with the small market portfolio and a high beta with the world market portfolio, and is small enough that it does not affect the distribution of the returns in the small market portfolio, financial globalization can increase the risk premium. However, such firms constitute exceptions in a domestic market. Overall, the model shows that financial integration has the potential to diminish the firm-level cost of capital, and thereby allow increasing the domestic rate of investment in capital-scarce economies.

For illustration, Patro and Wald (2005) investigated a panel of 18 emerging markets and made three important observations. First, they found an average decrease in returns of 2.88% per month during the 36 month period starting three and a half year after the liberalization date, suggesting a decrease in the cost of capital. Second, they constructed asset pricing models and observed an average increase in global beta of 0.199 after liberalisation. As predicted by models of international asset pricing, this indicates that increased global risk sharing is the source of the perceived decline in the cost of capital. Third, they measured the extent to which risk sharing drives the revaluation of stock prices that actually occurs following liberalisation. To do so, they investigated the impact of firm-level characteristics and found that the decrease in the cost of capital is more pronounced for firms with a higher local market beta, which tend to display lower long term returns. The latter result echoes Chari and Henry (2004), who used a similar dataset in international asset pricing modeling framework, and found that firm-specific risk sharing characteristics as measured by the differential between local and global covariances account for two fifth of the revaluation of investible stocks. Empirical studies hence highlight a decrease in the cost of capital in the period following financial liberalization, which seems to be related to firm level characteristics. The differential between

local market and global betas thus appear to be driving the main theoretical advantage of equity market integration.

2.1.2 Market integration and financial vulnerability

The concept of financial contagion refers to a possible unexpected transmission of volatility across markets. There are several co-existing definitions for contagion, all highlighting the destabilization risk brought along by financial liberalization. *Fundamental contagion* refers to the transmission of shocks resulting from real interdependencies between economies. *Pure-contagion* is the transmission of local shocks to another country or market, resulting in an increase in correlation during periods of financial crisis in excess of fundamental linkages (Forbes and Rigobon, 2002). Nonetheless, whatever the chosen definition, financial contagion refers to shocks in a market resulting from the international transmission of price movement (Kodres and Pritsker, 2001). The linkage between market integration and this generic definition of contagion has been underlined by Bekaert, Harvey and Ng (2003). Their approach proceeded by extending the traditional CAPM from a one-factor to a two-factor setting. In doing so, they divided the world market into the U.S. and a particular region, and allow for local factors to be priced. Consider a financially integrated country i. Under the CAPM, expected excess returns in US dollars have the following form:

$$R_{it} = \gamma_i Z_{i,t-1} + \beta_{iUS,t-1} * \mu_{US,t-1} + \beta_{iREG,t-1} * \mu_{REG,t-1} + \varepsilon_{i,t} \qquad (1)$$

In (1), $\mu_{US,t-1}$ and $\mu_{REG,t-1}$ represent the conditional expected excess returns on the US and regional portfolios, based on informations available in $(t-1)$. The vector $Z_{i,t-1}$ contains a constant and the local dividend yield, which help estimate the expected return of market *i*.

The sensitivity of equity market i to the foreign news factors is measured by the parameters $\beta_{iUS,t-1}$ and $\beta_{iREG,t-1}$. These risk parameters are time-varying and modeled as follows:

$$\begin{cases} \beta_{iUS,t-1} = p_{1,i} * X_{iUS,t-1} + q_i X_{iW,t-1} * W_{US,t-1} \\ \beta_{iREG,t-1} = p_{2,i} * X_{iREG,t-1} + q_i X_{iW,t-1} * W_{US,t-1} \end{cases} \quad (2)$$

Where $W_{US,t-1}$ represents the US market capitalisation relative to the world market capitalisation at time $t-1$. $X_{iUS,t-1}$, $X_{iREG,t-1}$ and $X_{iW,t-1}$ are information variables that capture the covariance risk of market i with the US and the region, respectively[3]. $\varepsilon_{i,t}$ represents the unexpected portion of local market returns. It is driven not only by shocks from the local market, but also by two foreign shocks originating in the U.S. and the region, that is,

$$\varepsilon_{i,t} = \beta_{iUS,t-1} * e_{US,t-1} + \beta_{iREG,t-1} * e_{REG,t-1} + e_{i,t} \quad (3)$$

Where $e_{i,t}$ represents the idiosyncratic shock on any market i (including the US and world portfolio). It follows a normal distribution such as $e_{i,t} \sim N(0, \sigma 2_{it})$. The U.S. and regional markets models are special cases of (1)-(2). For the U.S. market (with $i = us$), $p_{1,US} = p_{2,US} = q_{US} = 0$. For the regional market, (with $i = reg$), $p_{2,REG} = q_{REG} = 0$. US and regional dollar excess returns can thus be expressed as:

$$\begin{aligned} R_{US,t} &= \gamma_{US} Z_{US,t-1} + \varepsilon_{US,t} \\ R_{REG,t} &= \gamma_{REG} Z_{REG,t-1} + \beta_{reg,US,t-1} * \mu_{US,t-1} + \varepsilon_{REG,t} \end{aligned} \quad (4)$$

[3] In the empirical model, these include the proportions of bilateral trade (Xus+Mus)/E(X+M), (Xreg+Mreg)/E(X+M) and (X+M)/GDP, respectively.

And the unexpected US and regional returns are :

$$\begin{aligned} \varepsilon_{US,t} &= e_{US,t} \\ \varepsilon_{reg,t} &= \beta_{reg,US,t-1} * e_{US,t-1} + e_{reg,t} \end{aligned} \tag{5}$$

Letting i and j be two individual countries and assuming that the idiosyncratic shocks to the US, regional and individual market are uncorrelated; this implies the following variance and covariance expressions:

$$\begin{cases} h(i,t) = E(\varepsilon_{i,t}, \varepsilon_{i,t}) = \beta^2_{i,US,t-1} * \sigma^2_{US,t} + (\beta^2_{REG,t-1i}) * \sigma^2_{REG,t} + \sigma^2_{i,t} \\ h(i,us,t) = E(\varepsilon_{i,t}, \varepsilon_{US,t}) = \beta^2_{i,US,t-1} \\ h(i,reg,t) = E(\varepsilon_{i,t}, \varepsilon_{REG,t}) = \beta_{i,US,t-1} * \beta_{REG,US,t-1} * \sigma^2_{US,t} + \beta^2_{i,REG,t-1} * \sigma^2_{REG,t} \\ h(i,j,t) = \beta^2_{i,US,t-1} * e_{US,t-1} + \beta^2_{i,REG,t-1} * e_{REG,t-1} + e_{i,t} \end{cases} \tag{6}$$

The conditional covariance dynamics given in (6) have several important implications. First, a market's covariance with the U.S. (regional) market return is positively related to its country-specific beta with the U.S. (or region). Second, provided that the country specific beta parameter is positive, higher volatility in the U.S. market induces higher return covariance between the U.S. and market *i*. Third, the covariance with the regional market or any other national market *j* within the same region increases in times of high return volatility in the U.S. and/or the regional market. This natural implication of any factor model, coupled with asymmetric volatility, could lead to the appearance of "contagious bear markets." The significant costs associated to this phenomenon have been underlined by a well-known series of financial crises which had various causes but which spreaded worldwide equivalently. These included the Mexican peso crisis of December 1994, the Asian crisis of 1997, the Russian crisis of August 1998, the collapse of the Brazilian real in January 1999, the Turkish

lira crisis of February 2001, and the Argentine peso crisis of December 2001-January 2002. For instance, Bekaert, Harvey and Ng. (2003) highlighted that correlation increased significantly during the Asian crisis, so that even countries whose economic fundamentals (deficits, inflation, and unemployment rate) were not degraded were affected by contagious waves of bear markets. Theory and evidence hence suggest that increased financial vulnerability is an unavoidable cost of market integration.

2.1.3 Portfolio rebalancing and capital flows

Standard portfolio theory states that the inclusion of weakly correlated assets into a domestic portfolio reduces risk and maximize long run yields (Markowitz, 1952,1959). Concurrently, the additional benefits of international diversification have been highlighted by Grubel (1968) and Solnik (1974). In theory, these benefits are attributed to smaller correlation between international assets, as compared to assets belonging to the same market. According to Roll (1992) this differential can be explained by differences in cross-national industrial structures. Intuitively, the benefits of international diversification thus depend on the degree of market integration/segmentation. In an international context where many emerging countries dismantled restrictions and controls on capital flows and at the same time relaxed regulations on the operation of domestic financial markets and moved away from regimes of 'financial repression', the consequence has been the increased globalization of investments seeking higher rates of return and the opportunity to diversify portfolio risk.

Financial liberalization and deregulation policies have eased the implementation of diversification strategies by allowing international capital movements, leading to an increase in global portfolio investment flows. However, integration brings along an increase in international cross-market correlations, which hinders the benefits of international diversification. The relationship between integration, correlation and diversification is

formally illustrated in Arouri (2003). First consider the following International Asset Pricing Model (Solnik, 1974):

$$\begin{cases} E\left(R_i/\Omega_{t-1}\right)-r_f = \dfrac{COV\left(R_i,R_w/\Omega_{t-1}\right)}{VAR\left(R_w/\Omega_{t-1}\right)} * \left[E\left(R_w/\Omega_{t-1}\right)-r_f\right] \\ E\left(R_i/\Omega_{t-1}\right)-r_f = \delta_{t-1} COV\left(R_i,R_w/\Omega_{T-1}\right) \end{cases} \quad (1)$$

Where $\delta_{T-1} = \dfrac{\left[E\left(R_w/\Omega_{t-1}\right)-r_f\right]}{VAR\left(R_w/\Omega_{t-1}\right)}$ is the time-varying price of market covariance risk. Therefore, the risk premium is expressed as the product of the price of risk δ_{t-1} and the actual risk $COV\left(R_i,R_w/\Omega_{t-1}\right)$. Besides, according to the 'separation theorem', investors derive optimum portfolios by combining the market portfolio and the risk free rate (Black, 1972). Let I be the internationally diversified portfolio. We thus have:

$$R_I = \theta_{t-1} * R_{w,t} + \left(1-\theta_{t-1}\right)R_{ft} \quad (2)$$

According to (2), the returns of the international portfolio can be decomposed into the risk-free rate and the market portfolio. The exact decomposition of returns depends on θ_{t-1}, which represents the investor's preference for international investment. The latter is a positive function of the expected domestic risk, and a negative function of the expected global portfolio risk. It can be expressed as:

$$\theta_{t-1} = \frac{VAR\left(R_i/\Omega_{t-1}\right)}{VAR\left(R_w/\Omega_{t-1}\right)} \quad (3)$$

Excess returns of the international portfolio can thus be given by:

$$E\left(R_I/\Omega_{t-1}\right)-r_f=\delta_{t-1}COV\left(\theta_{t-1}*R_{w,t},R_w/\Omega_{t-1}\right)$$

$$E\left(R_I/\Omega_{t-1}\right)-r_f=\delta_{t-1}*\theta_{t-1}*VAR\left(R_{wt}/\Omega_{t-1}\right) \quad (4)$$

Letting i be the domestic portfolio, domestic excess returns can be expressed as follows:

$$E\left(R_i/\Omega_{t-1}\right)-r_f=\delta_{t-1}*COV\left(R_i,R_w/\Omega_{t-1}\right) \quad (5)$$

It follows that the expected gains from international diversification are equal to:

$$E\left(R_I-R_i/\Omega_{t-1}\right)=\delta_{t-1}*\left[\theta_{t-1}*VAR\left(R_{w,t}/\Omega_{t-1}\right)\right]-COV\left(R_i,R_w/\Omega_{T-1}\right) \quad (6)$$

Considering the conditional correlation coefficient between the domestic and the global portfolio $p_{iz,t-1}=\frac{COV\left(R_i,R_w/\Omega_{t-1}\right)}{\sqrt{VAR\left(R_{i,t}/\Omega_{t-1}\right)*VAR\left(R_{wt}/\Omega_{t-1}\right)}}$; it can be shown that:

$$\theta_{T-1}*VAR\left(R_{w,t}/\Omega_{t-1}\right)-COV\left(R_i,R_w/\Omega_{T-1}\right)=\left(1-p_{i,w,t-1}\right)*VAR\left(R_{i,t}/\Omega_{t-1}\right) \quad (7)$$

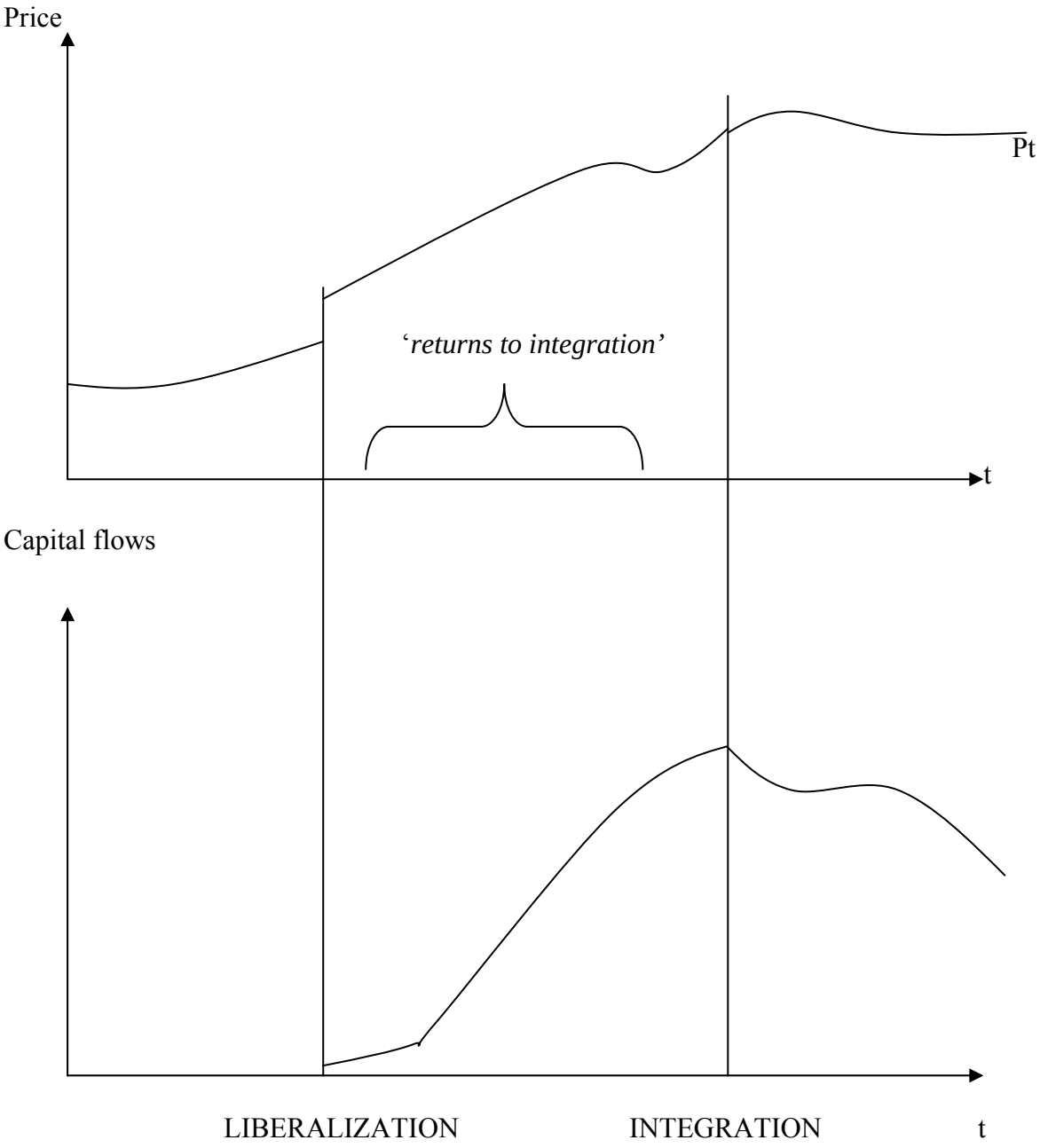
And by substitution:

$$E\left(R_I-R_i/\Omega_{T-1}\right)=\delta_{T-1}*\left(1-p_{i,w,t-1}\right)*VAR\left(R_{i,t}\Omega_{t-1}\right) \quad (8)$$

According to (8), the gains from international diversification are a negative function of the conditional correlation coefficient between the domestic portfolio and the global portfolio. The power of portfolio diversification is magnified in segmented markets, where returns tend to be predominantly determined by the systematic risk of each security in the context of the national portfolio (Bartram & Dunfey, 2001). By contrast, the gains from international diversification are equal to zero under perfect integration; ie when the domestic portfolio is perfectly positively correlated to the global portfolio (piw,t-1=1). Taking this into account, equity market liberalization may have a mixed impact on portfolio inflows. Market segmentation may first lead to a sharp increase in capital flows in the immediate aftermath of financial liberalization. As an illustration, Bekaert & Harvey (2000) investigated a sample of 16 emerging markets and observed that american holdings increased on average from 6.2% to 9.4% of market capitalization from five years before liberalization to five years after liberalization. Empirical studies have suggested that these capital flows are self-sustained on the short run due to the induced pressure on local prices which results in significant 'returns to integration' (Bohn&Tesar, 1996; Clark&Berko, 1997). However, the subsequent increase in international correlation leads to dynamic rebalancing of international portfolios, ultimately resulting in the adjustment of capital inflows (Bacchetta and Wincoop, 2000; Stulz 1999; Griffin, Nardari&Stulz, 2002). This phenomenon is illustrated in figure 2, which shows an increase in capital flows between in the time between liberalization and integration, and a diminution of the same flows in the following years (Barhoumi, 2005).

Overall, theoretical models suggest that financial integration diminishes the cost of capital, increases financial vulnerability and has a mixed impact on capital flows. From an economic perspective, equity market integration seems to depend on an arbitrage between *international accessibility* and *domestic stability*.

Figure 2. Market integration and portfolio flows



Source: Barhoumi, 2005

3. Conclusion

Two salient facts have emerged from this literature survey. First, the impact of equity market development on the allocation of investment seems to be determined by the extent of informational transparency (Bekaert & Harvey, 2001, Capasso, 2004). Second, the integration of local equity markets into global finance appears to have mixed consequences. Asset pricing models underline a diminution of the risk-premium following integration, resulting in a lower cost of capital for local businesses (Stulz, 1999). But on the other hand, increases in international covariances exert a positive impact on financial vulnerability. Financial integration may increase shock sensitivity and financial contagion (Bekaert, Harvey & Ng, 2003). Increases in international correlations also undermine the benefits of portfolio diversification for foreign investors, resulting in a mixed impact on capital flows (Arouri, 2001; Baroumi, 2005). The overall policy message is thus ambiguous. Theory shows that the effectiveness of policies seeking to enhance the allocative function of equity markets is conditioned by the extent of informational efficiency. We can hence suggest that equity market development policies should focus on reaching and maintaining adequate levels of institutional transparency, regardless of the level of international integration, which depends in last resort on the society's preference between *international accessibility* and *domestic stability*.

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