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A Stepwise Strategy of Stock Market Globalization: Evidences from the Korean Case*

J.H. Cho,
Y.M. Kim
and
Y.S. Kim**

The purpose of this paper is two folds. The first is to construct a model that is capable of capturing a gradual globalization process for a previously segregated domestic stock market. The second is to provide evidences of important influences not encountered by indigenous investors who formerly held only domestic equities under an autarky situation, such as exchange rate risk, global diversification effect, and external effects.

First, our analysis shows that unlike failures experienced by many countries, Korean strategy of gradually liberalizing its domestic market through globalization of portfolios can provide successfully, albeit indirectly, an effective mechanism for controlling capital inflows. Second, Korean stock market has remained largely segregated from the rest of the world capital markets, no matter that its real sector of economy is much intergrated via various international linkages. Third, our study also finds that classical diversification effect is dominant over exchange rate effect, more than enough to counterbalance increasing exchange rate risk connected to globalizing portfolios. Fourth, there exist additional benefits not considered in the past, the nature of which can be explained for the most part in terms of external benefits associated with liberalizing a segregated domestic stock market.

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** Ji-Ho Cho, Professor, Hanyang University, Seoul, Korea. Yooman Kim, formerly with FIREMANS FUND, U.S.A. and FIMCO, Korea. Youngsook Kim, Professor Chongju University, Chongju, Choong-Book, Korea.

I. Introduction

As the Korean economy continued to grow steadily throughout the 1980s, foreign investors began demanding liberalization of its domestic capital markets externally. Consequently, since the beginning of 1990s foreign capital flowing into Korea has greatly increased, leaping more than ten times by 1994. While bank loans from abroad by domestic borrowers constituted the majority of capital inflow in the past, portfolio capital of foreign investors, however, which is specifically targeted for domestic securities, has completely replaced the previous pattern of capital inflows. The main reasons behind the capital influx have been, essentially, the undervalued domestic stocks and the high level of domestic interest rate. Aside from these two factors, the elongated recessionary period in many developed countries has also played a part in contributing to further attraction of capital inflows for alternative investment opportunities available in Korea.

But the massive magnitude and the speed at which the foreign capital flows in have raised grave concerns among policy makers and many scholars alike, regarding the possible disruptions on a massive scale that can affect the entire domestic economy; the inflationary bubbles in asset prices and the exogenous increase in the stock of domestic money supply, on the one hand, and real exchange rate appreciation and reduced exports, on the other. Thus, it became imperative that the government come up with specific strategies and policy measures that could deal with the problems of the capital inflows.

From the outset, however, the Korean government has decided to open up domestic capital markets externally only in a stepwise fasion. And at the same time, it has also decided to provide access to foreign capital markets for domestic investors, for the purpose of lowering domestic capital costs and thereby expediting long-term economic growth. For these reasons, the Korean government announced in 1981 so-called "four-stages plan" for externally liberalizing domestic stock market in a stage-by-stage manner over a ten-year period.

During the first stage, only indirect investments on domestic stocks by foreigners were allowed, in the form of international investment trusts and international funds; in the case of the former, the Korean International Trust (KIF) was launched and for the latter, the Korea Fund (KF). Then, in 1991 the government has finally decided to allow foreign investors to acquire Korean equity shares directly, although the maximum amount of a particular security they can purchase is limited

to 10% of its total outstanding shares. At the same time, various global funds including the Korea Euro Fund (KEF) and the Korea Asia Fund (KAF) were newly added, increasing the number of funds available, as well as the amount of each fund. The final stage for allowing foreign investors to fully participate in the Korean equity market, as well as bond market, is scheduled to begin in 1996.

Without doubt, the issue of liberalizing capital markets of any country is extremely important, especially for a small-sized open economy, such as Korea and many other LDCs. Yet, calculus of macroeconomic benefits and costs of capital account liberalization is hardly straightforward. And economic doctrine has been, at best, ambiguous about the benefits of capital account liberalization, with Keynes being the most famous among many outspoken critics of free capital flows. In any case, starting from 1996 they too must abide, like all the rest of the world, by the agreements of the Uruguay Round.

The Korean government authorities were predisposed to this kind of skepticism when they sought to find a mechanism, for smoothing out the transition process, partly through utilization of various global funds such as those mentioned above. These are a special type of close-ended global funds, which includes both Korean and foreign securities in a predetermined ratio set by the government. The funds' beneficiary certificates are sold in Korea as well as abroad, thus making available, however indirect, domestic equities to foreign investors while at the same time allowing holdings of foreign securities for indigenous investors.

By no means, use of the global funds is the only defence mechanism against a possible surge of capital influx that may precipitate an economic crisis of a major proportion. For there are also various other measures the government can take, ranging from the outright imposition of direct controls to various subtle ways of indirectly curbing the capital inflows. Some of the better known for the policy tool kit of the government authority, include the following: starting from setting a maximum limit on the capital inflow at a miniscule level and frigid forms of various direct controls on capital movements, to the traditional sterilization by market operation and the currency swap. Moreover, imposition of a variable reserve deposit requirement (VDR) has also been adopted, as in the case of Australia and Israel, and taxes on interest rate differential, such as the Interest Equalization Tax (IET) in the U.S. during the late 1960s under Regulation Q, and capital earnings taxes, and so forth.

In the following, however, we will confine our discussion instead to

the indirect mechanism of portfolio globalization, because as will be explored sbusequently, it can deliver us an embedded adjustment mechanism to slow down capital inflows. At the same time, it can also induce capital outflows as a counterbalancing act, so as to prevent the foreign capital inflows, beforehand, from exogenously increasing stock of domestic money supply and eventually playing havoc with various macroeconomic stabilization efforts. Primarily based on effectiveness of this mechanism for controlling capital inflows, we will develop our argument, suggesting that governments take the indirect way of externally liberalizing their domestic stock markets by maximizing use of global funds, rather than adopt the direct approach of allowing increased free participation of foreign investors in domestic stock market. Consequently, we will place emphasis on further expanded use of global funds, for the external liberalization purpose, via increasing size and number of funds available for investment, prior to permitting the limit on direct purchases of domestic securities by foreign investors to be increased.

Since Grubel's work (1968) on the subject of benefits originating from international diversification, there appeared numerous papers on the subject of international stock markets as well as the international portfolio disversification. Some of the better known authors are Lessard (1974), Levy & Sarnat (1970), Solnik (1974), and others. Also, a number of papers dealing with the segmentation vs. integration issue of individual stockmarkets have appeared: Errunza and Losq (1985) developed a formal model in the context of a mildly segmented world capital market, employing an extended data base including LDC markets for their study; Subsequently, Jorion and Schwartz (1986) examined the issue of segregation vs. integration, regarding the Canadian equity market in relation to a partially global North American market; Eun and Shim (1986) also investigated the question of whether innovations in the U.S. are transmitted to other markets, and also whether the U.S. market movements can be explained by any single foreign market.

Although there exist few papers that dealt with the very subject of externally liberalizing the Korean stock market, a number of papers began to appear more recently, however, which discussed securities markets of other countries: In particular, Gultekin, Gultekin, and Penati (1986), focused on the Japan's case and analyzed the empirical relationship between the Japanese and the U.S. capital markets; Shigehara (1991) also provided an empirical analysis regarding the way in which Japanese monetary policy is affected by the external liberalization of its domestic capital markets; Argy (1987) also carried

out a similar study in the case of Australia and compared it to the Japanese experience; In the case of Germany, Porter (1972) analyzed the relationship between international capital flows and domestic capital markets, and explored the possibility of utilizing international capital flows in order to enhance effectiveness of its own domestic monetary policy; Cornelius (1991) examined the cases of developing countries, concentrating on how international capital flows might influence a monetary policy via affecting domestic stock price level; Similarly, Claassen (1991) dealt with the cases of Singapore and Malaysia and investigated how the capital market opening constrained their stabilization policies; In particular, Jwa (1992) produced a study on the capital mobility in Korea since the early 1980s and compared it to those of Japanese and Taiwanese experiences; Finally, Wolf (1994) recounted some of the conditions to explain the failure in New Zealand's liberalization experience.

What is revealed repeatedly from all these studies is that they all experienced, perhaps with a possible exception of Australia, various forms of difficulties in their domestic economy, due to international flows of capital. These difficulties, following the external liberalization of their domestic financial makets, invariably included exogenous increases to stock of money supply, instability of exchange market, decreases in exports, and reduced growth rates in their domestic production. While the extent of severity of the disturbances differed from country to country, the primary cause common to all these problems, however, appears to be that they proceeded with their external liberalization of financial markets with neither completing domestic liberalization internally beforehand nor liberalizing their real sector of economy first. It is obvious that this is like placing the horse-carriage in front of a horse, rather than behind. But the most outstanding feature in all of the liberalization-induced problems is that essentially, they all did not have a method, whether old or new, of effectively dealing with the international capital flows at the microeconomic level, other than resorting to employing the traditional policy tools at the macroeconomic level.

In this paper, our main objective lies, instead, in constructing a model that is capable of capturing a stepwise liberalization process for a previously segregated domestic stock market. The second is to provide evidences of important influences not encountered by indigenous investors who formerly held only domestic equities under an autarky situation, such as exchange rate risk, global diversification effect, and external effects.

For main tools of our analysis, we will employ the International Capital Asset Pricing Model (ICAPM) for global diversification purpose. In order to provide a mechanism for controlling inflows of foreign capital, however, we will further extend the ICAPM by explicitly introducing a policy parameter representing relative proportion of foreign securities in the globalized portfolios. For this purpose, we will approach from a slightly different angle, following closely that of Kim & Kim (1991). Thus, we will attempt to construct an alternative model of stock market liberalization, in which a mechanism for controlling international capital flows is incorporated through globalization of autarky portfolios. From this model, we will extract testable hypotheses regarding exchange rate effect, as well as traditional global diversification effect. And then we proceed to estimate empirically these effects by tracing out the respective risk-reduction schedules.

This paper is organized as follows. In Section II, we construct a model of global diversification, which can allow an initially segregated autarky portfolio to become globalized in a stepwise fashion. Section III attempts to estimate benefits of partially globalizing autarky portfolios and also proceed to estimate exchange rate risk. Lastly, in section IV, we provide arguments that there exist additional benefits, the nature of which are explained in terms of external benefits. We then explore ways in which the mechanism of the gradual globalization can provide an addition to policy tool kit of the government authorities.

II. Alternative Model of Liberalization

For the intermediate stages, prior to fully liberalizing a segregated domestic stock market, our immediate objective is to find a mechanism that can facilitate the liberalization to proceed gradually. In other words, we must find a way in which we can prevent the external shock, due to capital inflows, from causing abrupt disturbances throughout the entire domestic economy. Specifically, we have to come up with ways and means whereby capital outflows are somehow induced to counterbalance capital inflows on a continuing basis.

Thus, we must embed both controllability and counterbalancing ability within a model of external liberalization. For this purpose, we assume that the government has the authority to set the initial size of the global funds established, as well as the relative proportion of domestic and foreign securities to be contained in such funds. Through these two constraints on the structure of the global funds, the government can indirectly exercise power to control supply of domestic

securities available to foreign investors. If one were to make the assumption that the government predetermines also the relative ownership of the fund's beneficiary certificates, this would result in endowing the government with effective power to control foreign demand for domestic securities as well.

First, we will define "autarky portfolios" to mean those portfolios which have been assembled before externally liberalizing a segregated stock market, hence initially containing no foreign securities. Likewise, "international portfolios" are defined to mean those that contain only foreign securities, hence none of domestic securities. These autarky portfolios are then said to become "partially globalized" as the policy parameter representing the relative proportion of foreign securities is gradually incremented, in a stepwise fashion. It is through this process of portfolio globalization that we wish to represent the stepwise strategy for the external liberalization.

For the purpose of extending the traditional market model to construct a globalized portfolio model, we can safely assume that for all practical purposes, Korean stock market is initially segmented from the rest of the world capital markets. In that case, a domestic equity's return would be directly related to movements of the Korea's own stock price index only, i.e., entirely independent of factors arising from the rest of the world.[1] Thus, autarky portfolios are influenced primarily by the Korean national factor. And if autarky portfolios are affected by any world factors at all, their returns are then assumed to be affected by a common world factor, but only indirectly via their national index. Consequently, autarky portfolios are influenced by its own national index which is in turn affected by a single world factor.

For the basic structure of our model, we shall employ the following set of equations for security i of a representative Korean autarky portfolio k:

$$(1.a) \qquad r_{ki} = a_{ki} + b_{ki}R_{km} + e_{ki}$$

[1] Alternatively, one could argue that even a physically segmented stock market, such as the Korean stock market, might be integrated to some degree with the world capital market via indirect forces of various international linkeages. While it would be a difficult task to measure the exact extent of a market's segmentation or integration, most empirical studies have suggested strongly that extent of integration, in general, varies across countries and lies somewhere between these two extremes. In the case of the Korean stock market, however, it can be considered as being largely segmented, for all practical purposes. For a detailed discussion in the case of the Korean securities market, see Kim & Kim (1991).

(1.b) $R_{km} = a^*_k + b^*_k(R^*_m + x_k) + e^*_k$

where

r_{ki} = equity i's rate of return in units of Korean won
b_{ki} = equity i's national systematic risk
b^*_k = international systematic risk of Korean securities
R_{km} = national market index rate
R^*_m = world market index rate
x_k = exchange rate adjustment factor in units of Korean won.
e_k = residual term.

Equation (1.a) is usually referred to as the single index market model in the financial economics literature, stating that a security's return is related to its national market rate of return. And Equation (1.b) specifies that the national market rate is in turn affected by a world index rate. This specification is justified on the ground that there exists some relationship between a national market and the world capital markets through various international linkages. This relationship is further reinforced, in particular, by the fact that also, earnings of many domestic firms are influenced by international trade and direct investment activities.

Without any loss of generality, we can suppose that each country's autarky portfolios are intially composed of n domestic equities with equal weights, and that international portfolios are assembled with representative foreign equities from m countries with equal weights as well.[2] We will denote r_k to represent the rate of return on the representative autarky portfolio of kth country, i.e., Korea in this case. On the other hand, we will denote r^*_k to represent the foreign rate of return on the representative international portfolio that excludes kth country. However, the foreign rate is adjusted for exchange rates in terms of Korean won, i.e., $r^*_k = \Sigma_j(r^*_j + x_{jk})/m$, where r^*_j is jth foreign country's rate of return in terms of its home currency unit, and x_{jk} is jth country's exchange rate vis-à-vis Korean won. Denoting variables without subscripts to represent respective average values, we can express r_k and r^*_k in terms of the world market rate, respectively, as follows:

2 As a result of this procedure, one can avoid the possibility of overstanding importance of any single country in the world economy, such as influences of U.S. or Japan, for instance.

$$(2.a) \quad r_k = a_k + b_k a^*_k + b_k b^*_k (R^*_m + x_k) + b_k e^*_k + e_k$$

$$(2.b) \quad r^*_k = a + ba^* + bb^* (R^*_m + x_k) + be^* + e$$

To proceed with externally liberalizing a domestic stock market, through an indirect route, is to globalize autarky portfolios by including both domestic and foreign equities, while giving both indigenous and foreign investors unrestricted access to thse globalized portfolios. Then, one of the obvious ways to generate a gradual process of liberalization of stock market is simply to increment discretely the relative proportion of domestic securities contained therein, in a step-by-step manner. On the other hand, if we were to increase instead the relative proportion of foreign securities, this would have the effect of intensifying portfolio globalization on the part of indigenous investors. Alternatively, given the relative porportion of respective securities, we could also increase the relative ownership of the global funds' shares by foreign investors, in order to increase, however indirect, foreign purchases of domestic securities. For modelling purpose here, however, we shall adopt the former approach. i.e., adjusting the relative proportion of domestic with no restrictions on the relative ownership.

Consequently, we will denote θ to represent the relative proportion of initial capital invested in domestic securities and θ^* to represent that of foreign securities contained in the kth country's globalized portfolio.[3] We can then express rate of return on the globalized portfolio in terms of r_k and r^*_k, with θ and θ^* as respective weights. In other words, $R^*_k = \theta r_k + \theta^* r^*_k$, with $\theta + \theta^* = 1$, where R^*_k denotes rate of return on thus-globalized portfolio in units of country k's currency.

But since r^*_k is a simply weighted average of m foreign countries' returns, we can assume fairly safely that it is independent of r_k, so that their covariance is practically zero. In other words, we can write

[3] Thus, increasing relative proportion of foreign securities in the global portfolio means, in effect, that investors simply increase holding of beneficiary certificates of the international index fund, in comparison to that of the autarky portfolio. Consequently, it implies that when the initial amount of capital is fixed, increasing the relative portion of foreign securities means that investors simply increase in equiproportion purchases of those foreign shares already included in the typical international portfolio with a fixed number of securities, while they decrease holdings of domestic shares likewise. In case when additional capital is involved, relative proportion of foreign securities can be increased by either including more of the same old foreign securities or selecting new foreign securities that do not alter the existing return-variance characteristics of the international portfolio.

$V(R^*_k) = \theta^2 V(r_k) + \theta^{*2} V(r^*_k)$. Consequently, given that the ordinary least squares conditions of standard serial and linear independence hold, we can express total risk associated with the globalized portfolios as in the following:

$$(3) \quad V(R^*_k) = [(\theta b_k b^*_k)^2 + (\theta^* b b^*)^2] V(R^*_m + x_k) + [\theta^2 \{V(e_k) + b_k{}^2 V(e^*_k)\} + \theta^{*2} \{V(e) + b^2 V(e^*)\}]$$

As shown in Equation (3), total variance is composed of two bracketed terms. The first term is the part that represents systematic risk associated with the globalized portfolio, which is adjusted for exchange rate changes. The first factor of this term corresponds to domestic systematic risk of a country, while its second factor corresponds to those of foreign countries. The second term is the part that represents unsystematic risk of the globalized portfolio. It is clear that its first portion represents the portion of unsystematic risk that is connected to domestic equities only, i.e., domestic unsystematic risk. And its second factor shows the portion of unsystematic risk associated with foreign equities only, i.e., foreign unsystematic risk.

Of various implications one can distill from Equation (3), we are mainly concerned with the following three aspects for the present discussion.

First, it is clear, according to the first term of Equation (3), that total systematic risk of the globalized portfolio is smaller, ceteris paribus, when individual markets are less influenced by the world capital market. That would be the case if international systematic risks b^*_j are small, given domestic risk levels b_j. It should be noticed that in portfolio diversification, this is precisely the key utilized in explaining how reduction of risk through global diversification could be achieved: that is, we must form global portfolios by selecting securities from countries that are relatively less correlated with movements of the world capital market.

Second, what differentiates this globalized model from traditional autarky models, however, is that unsystematic risk should now be reduced not merely by incrementing number of securities, but also by simultaneously increasing number of countries whose equities are to be included in the portfolio selection.[4] This becomes immediately

[4] Although at a first moment of thought, it may seem neither possible nor desirable from a practical point of view, there are indeed numerous global portfolios of mutual

apparent from simply inspecting the second term. Consequently, on account of this, total risk of a global portfolio would be smaller than that of an autarky portfolio. This reflects the fact that as a result of global diversification, a reduction of domestic systematic risk has become possible now, while it was not previously by domestic diversification alone.

It is an eminently well-taken point that the primary source of traditional microeconomic benefits associated with international diversification lies in the fact that cyclical variations of security prices are not perfectly synchronized across international boundaries. As is well known, this is because a great deal of national systematic risk inherent within an individual domestic market are not necessarily systematic on a global level, due to differences in their own political, economic, and social conditions of individual countries. As a result, total risk of a globalized portfolio typically decreases to a minimum in an asymptotic fashion, as either the number of securities or countries increases. This is the traditional argument, of course, that provides the theoretical basis for kindred claims about substantial benefits to be attained by global diversification: these benefits are typically explicated in terms of observed reduction in variability of returns or increment of return performance at given levels of risk. The second bracket term of Equation (3), however, spells out explicitly how this benefit can come about, which gives the "diversification effect of globalization." Moreover, by decreasing a portion of domestic systematic risks through globalization, it shows how total risk of portfolio investment can be further reduced, as compared to that of an autarky situation. Thus, it would be perfectly natural to call this type of risk reduction effect the "diversification effect of globalization."

But our argument here, as a testable hypothesis, is to assert that given the number of domestic and foreign securities, the total risk decreases to a minimum also, as the policy parameter θ^* increases to an optimal level. Consequently, incrementing the value of θ^* has the effect of pulling down vertically, at it were, the so-called Risk-Reduction Schedule of Solnik with the variances of portfolio returns plotted on the vertical axis and the number of securities on the horizontal axis, respectively. Likewise, this has the effect of pulling up

fund type, which encompass extremely large number of secuities, covering various industry types and many countries. In any case, if either the number of securities or the number of countries from which securities are selected could be increased without limit, it would be trivially true that both elements of this term could vanish to some level in the neighborhood of zero, in theory at least.

the so-called Efficient Frontier of Markowitz having the expected return plotted on the vertical axis and the variances on the horizontal axis.[5]

Third, the above Equation (3) states explicitly that in the calculus of total risk associated with global portfolios, exchange rate risk also must be accounted for. This is because portfolio globalization simultaneously results in increasing the total risk, due to presence of the exchange rate risk, no matter that the global diversification effect succeeds in reducing the total risk by diversifying away a portion of previously undiversifiable domestic systematic risk. In other words, while there exists an unambiguous efficiency gain, in terms of risk reduction, we must also contend with an efficiency loss, which arises from risk increments due to exchange rate fluctuations when investments involve foreign assets.

Consequently, aside from the real factors of foreign economies affecting global investment returns, via changes of respective foreign security prices, we must additionally deal with the nominal factor of exchange rate fluctuations, which exerts direct influences on returns of globalized portfolios. This is because under exchange rate fluctuations, investors can experience either a capital loss as well as a capital gain on the exchange transaction. In order to ascertain properly the final value of investment in the investor's currency unit, then, exchange rate risk has to be accounted for when portfolio investments involve holding of assets denominated in foreign currency. In this case, it would be entirely natural to call this type of effect on return performance the "exchange rate effect" of portfolio globalization, which arises strictly from exchange rate changes affecting variance of nominal returns on foreign investments.

Because of the presence of the exchange rate effect, we would expect that the total risk of global portfolio ceases to decrease at some point of θ^* and starts to increase thereafter, as the global diversification eventually becomes dominated by the exchange rate effect. Consequently, instead of the total risk decreasing asymptotically to a minimum, as if sliding down a slope, the risk-reduction schedule is more likely to have a U-shaped figure with the optimal point of θ^* at its bottom. In any case, we can no longer expect that total variance strictly decreases because of the presence of exchange rate fluctuations.

Of course, it is another matter, requiring a theoretical discussion of a quite different nature, to determine whether or not the exchange rate

[5] For a demonstration of this, see Kim & Kim (1991).

risk as well could be completely diversified away, especially when exchange rates are flexible.[6] It might be more realistic, instead, to treat the matter ultimately as an empirical question. And another hypothesis we wish to investigate is that the exchange rate risk is a strictly increasing function with respect to the proportion of foreign securities, rather than a decreasing function.[7]

III. Empirical Estimates

A. Data

To construct our data base, fifty Korean equities were selected, based on size of capital assets and monthly average volumes traded. This provided a sampling base from which Korean autarky portfolios were assembled. Monthly rates of return were obtained by first calculating monthly changes of simple average price levels for each of the domestic equities and then adjusted for dividends.[8] Time period chosen for this study is from January 1980 to December 1987.

In the case of foreign securities, however, thirty foreign stock markets were chosen, based on their market size according to market capitalization values, as of December 1987. In order to represent rate of return of a foreign country's typical security, we assumed that the foreign rate can be represented best by rate of change of that country's market index.[9] Thus, this procedure is tantamount to requiring that a typical foreign security to represent the country have its beta value of unity with respect to its national market index rate throughout the entire period.[10]

[6] For a further discussion on this topic, see Eun and Resnick (1988).

[7] It should be noticed that although exchange rates of individual foreign countries are washed out of the right-hand-side expression of Equation (3), except those affecting the world market in the composite fashion, i.e., x_k, they are nonetheless buried in the left-hand-side of the expression R^*_m. That is, $R^*_k = \theta r_k + \theta^* r^*_k$ with $r^*_k = \Sigma_j (r^*_j + x_{jk})/m$, where x_{jk} is jth country's exchange rate vis-à-vis Korean won.

[8] However, we did not account for the gratis stock payments without consideration, that were distributed in the form of dividends or capital increases, especially during the latter part of this period. Consequently, we are subsuming that these are reflected implicitly in the calculated figures.

[9] The capitalized market values were obtained from the data reported by the Federation Internatinoale des Bourses de Valeurs. On the other hand, an individual country's market index rates were calculated based on the respective natinoal market indexes reported in the International Financial Statistics.

[10] By following this procedure, we are fully accounting for intra-country diversification

For the purpose of empirical simulation, we assume in the following that all portfolios are composed of twenty securities, each of which is different from one another, and that a given amount of initial capital is allocated to each kind of the twenty securities in equiproportion. Thus, to construct an autarky portfolio, twenty domestic securities were randomly selected. And following this procedure, we formed ten autarky portfolios from which their simple average variance was calculated.

Next, the purpose of forming global portfolios, we considered the case in which proportion of foreign equities included was incremented discretely, in the amount of 10% at a time. Consequently, this procedure ensures the extent of globalization of portfolios to increase gradually, initially starting from autarky portfolios. Thus, we assembled global portfolios by deleting successively two domestic securities at a time from the autarky portfolios and replacing them with the same number of foreign securities, corresponding to respective proportions of foreign securities. In this way, ten global portfolios were assembled for each level of foreign securities' relative proportion.

First, for use in estimating the traditional global diversification effect, we calculated ten variances from thus-assembled portfolios for the given proportion of foreign securities, by adjusting for exchange rate changes of all foreign returns in Korean currency unit. This procedure was repeated ten times for each type of portfolios and simply averaged the ten variances corresponding to the given type.

Second, in order to estimate the exchange rate effect on globalized portfolios, we repeated the above procedure once more, but this time, without the exchange rate adjustments, i.e., in terms of respective country's home currency unit. For ensuring comparability of the two types of calculations, however, calculated average variances were converted to relative figures.[11] Consequently, the difference resulting from deducting the second type of calculations from the first gives the exchange rate effect for a given level of θ^*. The residue then is the net amount of exchange rate risk, faced by indigeneous investors, which incidentally includes variances of individual exchange rates as well as covariances between them.

effect, albeit implicitly, such as industrywise diversification effect within a foreign country.

[11] Consequently, this procedure results in providing a control for different rates of changes in variances inherent to different types of calculations, and hence makes comparison of risk changes meaningful.

Table 1 reports results of the calculations specified in the above procedure. The first row of Table 1, represented by V_p, shows various portfolio variances calculated with the exchange rate adjustments, i.e., variances based on return figures converted to investor's home currency unit, Korean won in this study. And those of the second row, indicated by V_p^*, report the corresponding variances without the exchange rate adjustments, i.e., based on returns measured in foreign currency units. The third row with the heading of $(V_p - V_p^*)$ shows the difference between the two approaches at each level of θ^*.

B. Globalization Effect

Examining the reported results of Table 1 from left to right, we observe that variances decline rather rapidly in either type of the approaches, as the proportion of foreign securities increases. This continues to be the case, at least until the proportion of foreign securities becomes considerably high. Of course, there is nothing new in this type of results, which simply reflects the classical result of global diversification. For example, total risk of an autarky portfolio containing no foreign securities can be reduced by more than 50% from simply holding a naive form of globalized portfolio, such as the Korean Matching Fund that includes both Korean and foreign securities in the same proportion. Moreover, if indigenous investors were to increase the extent of portfolio globalization to 80%, investment risk can be further reduced, at least until then. In that case, initial variance of returns associated with an autarky portfolio can be reduced, on average, by 62%.

These results were expected, and there are also a number of other studies that produced similar estimates. What should be pointed out

Table 1

GLOBALIZATION EFFECT VS. EXCHANGE RATE EFFECT

	Proportion of Foreign Securities (θ^*)										
	0%	10%	20%	30%	40%	50%	60%	80%	90%	100%	
V_p	.412	.342	.285	.251	.224	.199	.187	.163	.154	.160	.179
V_p^*	.412	.341	.281	.243	.214	.179	.158	.129	.121	.117	.126
$(V_p - V_p^*)$	.000	.001	.004	.008	.010	.020	.029	.034	.033	.043	.053

Note: The above figures are normalized average portfolio variances.

here, however, is the extent to which efficiency of portfolio investments can be increased in the case of Korean stock market, simply by globalizing autarky portfolios. While these results clearly show that Korean investors can benefit a great deal by globalizing their portfolios, they also suggest that Korean stock market has been remaining in segregation from the rest of the world capital markets.[12] This surprised us, especially in light of the fact that in the case of Korea, its real sector of economy is much integrated with the rest of the world through various international linkages, including extensive international trade activities. Moreover, Korean economy's dependency on international factors has been reinforced by the fact that its industrial structure too has become considerably integrated with those of the world via direct foreign investments. Nonetheless, our results established here clearly suggest that as far as the Korean stock market is concerned, it has remained largely segmented from the rest of the world.

C. Exchange Rate Effect

According to the values of $(V_p - V_p^*)$ reported in Table 1, it appears that there does exist exchange rate risk and that this may not be insignificant, especially at high levels of θ^*. Moreover, it is revealed that exchange rate risk accounts for an increasingly significant portion of total variance of returns, as θ^* increases. For example, in the case when the proportion of foreign securities is 50%, exchange rate risk accounts for only 10.1% of total variance. In the case when the proportion increases to 100%, however, it nearly triples, amounting to 29.6%.

This result suggests that the nominal factor due to purely exchange rate fluctuations plays also a significant role in directly affecting variance of return performance. This result, however, gives a contrasting conclusion in comparison to that of Grubel & Fadner (1975), which found no evidences of exchange rate risk.[13] While the inconclusive result of their study might have been caused mainly by lack of sufficient variations in exchange rate changes, our result in this study, however, enables us to detect unambiguous existence of exchange rate risk.

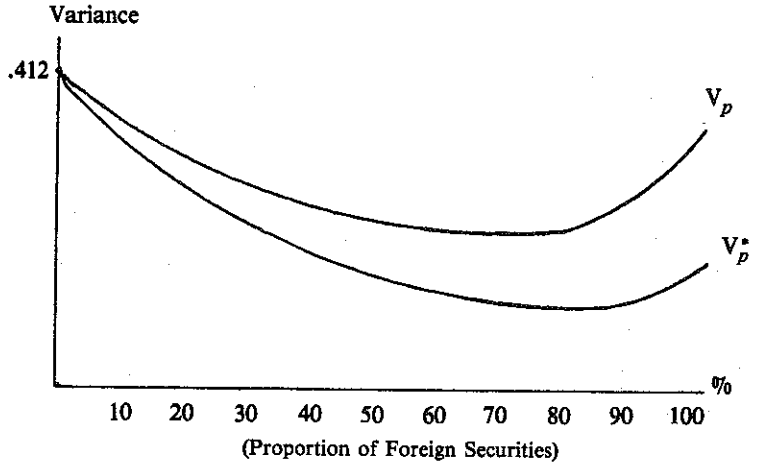
Results reported in the above Table 1 are shown in Figure 1. In this

12 For a detailed discussion on this, see Kim & Kim (1991).

13 Insignificance of their results, however, were caused, by the simple fact that observations of exchange rate changes in their data base were very small in comparison to those of changes in equity values. See Grubel and Fadner (1975).

Figure 1

Exchange Rate Effect on Risk



figure, X-axis plots proportion of foreign securities, and Y-axis plots calculated variances of returns. The upper curve shows the risk- reduction schedule, corresponding to portfolios that have all figures adjusted in terms of Korean won. Likewise, the lower curve shows the risk-reduction schedule of portfolios without the adjustments for the exchange rate changes. Consequently, the area between the two curves indicates the exchange rate risks associated with holding foreign securities at various levels of θ^*.

According to Figure 1, V_p schedule shows a declining trend, until θ^* reaches 80%, but beyond that level, total risk starts to increase instead. Thus, the optimal proportion of foreign securities is shown to be in the neighborhood of 80%. Consequently, this result substantiates existence of the classical diversification effect, insofar as θ^* remains below the 80% level. As the proportion of foreign securities exceeds that level, however, the increasing exchange rate effect becomes dominant over the diversification effect, increasing total risk of global portfolios thereafter. In other words, the benefits measured in terms of risk reduction, due to global diversification, outweigh the costs originating from increases of total risk connected to the exchange rate factor insofar as the proportion of foreign securities remains above 80% level. But beyond that level, these benefits become dominated, instead, by the costs associated with increasing exchange rate risk, turning upward the direction of the risk-reduction schedule.

Consequently, what this result suggests to us is that despite the presence of exchange rate risk, investors should still diversify their asset portfolios by including foreign securities, the optimal proportion being approximately 80%. And in no way should the presence of exchange rate risk hinder investors from acquiring globalized portfolios. Nonetheless, precisely because of the exchange rate effect eventually dominating the diversification effect, this result also indicates that indigenous investors should always include some domestic securities in their globalized portfolios, the optimal proportion of which is approximately 20%, according to results of this study.

IV. External Effects and Policy Considerations

A complete opening up of Korean securities market to foreign investments has been put off several times in the past. The main reason behind the delay has been the fear that a massive influx of foreign capital will end up virtually swamping domestic capital markets and cause severe disturbances throughout the entire economy. In particular, indigenous managers have worried over the possibility that foreigners will take away control over management at the firm level. At the government level, in the meanwhile, policy makers have been concerned about the possiblity of uncontrollable capital inflows fatally affecting stability of domestic capital markets, and eventually leading to loss of independent monetary policy. As a result, there have existed, on every occasion, political temptations for Korea to take extremely conservative actions and move too cautiously in externally liberalizing its stock market to foreign investments.

But will there be really falling of the Heavens on a nation following the external liberalization of its domestic stock market? While we do not assert that liberalization of an LDC's stock market is entirely without costs, these worries appear to be largely one-sided. Several things become immediately apparent, under a closer inspection, which otherwise might go unnoticed.

In the first place, there is no guarantee that additional inflows of foreign capital will actually ensue in massive amounts, after liberalizing a domestic stock market. And even when capital inflow does take place, the gradual strategy discussed in association with the stepwise globalization may work as an effective mechanism to control the capital inflow, even for macroeconomic stabilization purposes. Secondly, by focussing the scope of our arguments thus far primarily to the traditional discussion on portfolio globalization, we may have

missed a crucial aspect of benefits engendered by the external liberalization.

This is partly because in addition to the type of the strictly traditional effects connected to global diversification, there also exist other types of benefits arising from its secondary effects. While the nature of these benefits are essentially external to the global investment activities in their character, these may be potentially far more important, encompassing both micro type at the firm level as well as macro type affecting the entire economy. Nevertheless, these benefits, for the most part, have not been explicitly recognized in the traditional discussions dealing with the external liberalization of a stock market.[14]

First, at the level of firms, it is clear that the question of management control or loss cannot arise in the case of beneficiary certificates of various globalized funds. This is the case even when ordinary shares are involved. Even in those instances when foreign investors do wish to acquire domestic equity shares directly, rather than through the indirect way by purchasing the beneficiary certificates, they could be limited to preferred shares only, which have nothing to do with actual management of corporate affairs. It is unambiguously clear in either of these cases then that dometic firms whose equities are included in any of such funds can reap, instead, all the benefits of additional source of fund forthcoming from foreign investors, without any loss of management control.

Second, globalization of portfolioes, while providing an effective mechanism for indirectly controlling international capital flows, gives also an excellent opportunity for indigenous fund managers to acquire hands-on experience with a minimum cost. This is simply because prior to fully opening a domestic stock market, the globalized funds can clearly be utilized as a sort of learning device in the interim. Consequently, management experiences thus acquired will certainly help equip local firms with the necessary know-how for doing financial business in an international setting. And it will eventually help domestic firms better prepare for international competition in the domestic ground, as well as in the world maket place. For these

14 This gross without saying that this approach is being taken, of course, at the expense of ignoring various other costs. Aside from various inefficiencies that will necessarily follow from that approach, however, our immediate concern is that limiting the number and the amount of Korean Global Funds by government regulations has ended up with unnecessarily causing enormous costs to the economy, as well as creating an oligopolistic market for that particular type of financial products.

reasons, it is expected that the step-by-step approach of first establishing globalized funds, such as the Korean global funds for instance, will help local fund managers and policy makers ease into an international environment without too much costs.

Third, due to newly created foreign demand for the globalized portfolios containing domestic securities, sale of these funds will induce, more likely than not, generally higher price level for domestic equities, as compared to an autarky situation. As a result, it will make external sourcing and financing for domestic firms far easier than otherwise possible, thereby lowering capital costs in the short run, while contributing to economic growth as well in the long run. Furthermore, globalized portfolios make available at the same time foreign securities to indigenous investors, which incidentally create additional demand for domestic securities, at least for those contained in the globalized funds.

Fourth, globalization of domestic portfolios can also contribute to enhancing stability of a dometsic stock market, through the various constraints the government can adjust; the size of the global funds, the relative proportion of domestic securities, and the relative ownership of the shares, in addition to a maximum of capital inflow permitted per period. As argued earlier, adjustments of these constraints result in providing a mechanism for controlling excess demand or supply for domestic securities. In times of a depressed domestic market, for instance, either the size of the Korean global funds or the proportion of domestic securities can easily be increased to liven up the market, assuming of course that the foreign excess demand persists. Should the foreign demand for domestic securities weakens, however, the exactly opposite actions can be taken; by decreasing instead either the size or the proportion of domestic securities. In any case, to the degree that this adjustment mechanism can be made operational rather effectively with relative ease and speed, stability of domestic stock market can be maintained far more readily than otherwise possible.

In addition to the afore-mentioned type of benefits at the micro level, the portfolio globalization can also generate macroeconomic benefits, albeit indirectly. First, some of these benefits arise, in part, from the fact that such portfolios can be utilized systematically to contribute to efficient management of foreign exchange holdings as well as to enhance efficacy of exchange rate policy. On the one hand, since outflow of foreign exchange is induced from purchasing foreign securities contained in the globalized funds, capital inflow can be counterbalanced by thus-created capital outflow. As a result, upward

pressure on domestic exchange rate, accompanying the capital inflow, can be mitigated by such demand for foreign exchanges. On the other hand, since part of a given amount of capital inflow is necessarily forced to expend on acquiring foreign securities contained in the global funds, capital inflow's impact on exchange rate can be effectively emasculated by that extent. Moreover, should there arise a great amount of demand for these global funds coming from indigenous investors instead, it would not be entirely impossible to have a situation that capital outflow might even dominate the capital inflow.

Second, in an entirely similar fashion, globalized funds can contribute to money market's stability as well. This can come about by offsetting the upward pressure on domestic money supply, which accompanies capital inflows with the emergence of foreign demands for domestic securities. Thus, somewhat like the way in which the traditional market operations of central banks are carried out, a counterbalancing act can be carried out by soaking up the capital inflow; the only difference is that of course, it is done through sale of the beneficiary certificates of the global funds in this case. Consequently, to the degree that capital inflow can be channeled to purchasing these global funds before it reaches domestic capital markets, globalized portfolios can provide effectively a safety mechanism for preventing the unchecked foreign capital from causing disturbances in the domestic money market.

Due to presence of this mechanism, domestic capital markets can become fairly well insulated, for the time being at least and certainly far more effectively than otherwise possible, from potential disturbances following the inflow of foreign capital. Even when a complete insulation is not possible, it can alleviate, at least, the undesirable effects of the capital leakage on pursuit of independent monetary policy. As a result, it would not be too unrealistic to entertain the possibility that the globalized funds could be utilized as a policy tool to buttress efforts of controlling the exogenous money supply increases, as well as exchange rate disturbances.

Third, there are times, mostly in the early stages of economic development, when one could argue that more benefits would follow instead from foreign direct investments in the form of plants and equipment. In the case of Korea, however, domestic wage rates have risen excessively in recent years that incentives created by labor cost advantages, as well as other inducements, are no longer available for attracting direct investments from abroad. It appears then that the time might have arrived for Korea to actively take advantage of

foreign capital inflow instead, by further opening its equity market to foreign investments. And this is irrespective of the fact that one of the main cores of the on-going financial revolution in the world is precisely globalization of capital markets.[15]

Lastly, while many of the traditional dangers associated with capital inflows cannot be overlooked, it may not be too presumptuous, based on all of the above considerations, to suggest that additional capital inflows might end up with actually engendering more desirable effects, assuming of course that they are controllable. For they can contribute to not only preparing domestic securities industry for global competititon, but also strengthening its entire economic system in the long run. Moreover, Korea's economy may have reached the point where past efforts of merely increasing quantitative efficiency, i.e., in terms of cruching out high growth rates, must be discarded in favor of a new endeavor to highten qualitative efficiency for global competition instead.

V. Concluding Remarks

This paper has attempted to present a model that is capable of capturing a gradual liberalization process for a formerly segregated domestic stock market. For its theoretical framework to explicate the effects of externally liberalizing a segregated stock market, we extended the traditional market model to an alternative model of a stepwise globalization. In order to provide a mechanism that can facilitate the liberalization process in an orderly fashion, however, we introduced the notion that adjustments of a policy parameter, with respect to the relative proportions of foreign and domestic securities, can work rather effectively, as a sort of controlling device for inflows of foreign capital.

Thus, we entertained in this paper essentially nothing beyond the explicit introduction of the policy parameter θ into a globally extended market model. While the primary virtue of our model may have been confined to simplicity of its approach, it nevertheless succeeded in capturing a stepwise liberalization process. Moreover, we were able to not only distill testable hypotheses based on the model thus-constructed, but also provide evidences of important influences not previously encountered by indigenous investors under an autarky situation.

In the first instance, empirical results showed that in the case of

15 See Suary & Topf (1974) for a through treatment on the topic.

Korean stock market, there exists indeed a substantial amount of benefit, in the form of risk reduction, following from the global diversification. In the face of these results, one could hardly deny that the Korean stock market has been remaining in segregation from the rest of the world capital markets. Apparently, it did not matter much, insofar as the Korean stock market is concerned, that Korea's real sector of the economy is extensively integrated with the rest of the world via vairous international linkages.

In the second instance, our study showed that there exists also the nominal factor, due to exchange rate fluctuations, which exerts direct influences on variance of nominal returns of foreign assets. Thus, while incrementing the proportion of foreign assets tends to reduce risk of global investments, it also results in simultaneously increasing the risk via exchange rate effect. Despite the increase of the exchange rate risk, however, the classical diversification effect, which is fundamentally due to real factors influencing the variance via stock price changes, is apparenty more than enough to offset the increasing exchange rate effect. That was seen to be the case, according to the empirical evidence of this study, at least until the proportion of foreign securities increases to the neighborhood of 80%.

Finally, we provided arguments that in the case of a formerly segregated stock market, there exist additional benefits associated with portfolio globalization, while the nature of these benefits can be explained largely in terms of external effects. Thus, in addition to the afore-mentioned benefits at the level of portfolio diversification, we argued that globalization of autarky portfolios could also generate, albeit indirectly, other microeconomic benefits at the level of firms, as well as macroeconomic benefits at the government level.

It is based on with this kind of results that we suggest the government authority to take the indirect way of externally liberalizing the domestic stock market by maximizing use of global funds, rather than adopt the direct approach of allowing free participation of foreign investors. Moreover, the type of arguments mentioned above provides a sufficient rationale for further expanding global funds, in size as well as number of funds available for investment, prior to permitting the limit on direct purchases of domestic securities by foreign investors to be increased.

The present paper has focused, for the most part, on the microeconomic aspects of gradually globalizing portfolios. Insofar as the putative micro view of the capital market liberalization is concerned, it is unambiguously clear that benefits could be engendered by the in-

direct way of opening a domestic stock market. But at the same time, we should also be mindful of the fact that there exist far more serious costs associated with capital inflows, which pose severe difficulties for conduct of macroeconomic stabilization policies in many developing countries. Although currently, these issues are very important without any doubt, they are an entirely different matter, not intended for discussion in the present paper.

It would be utterly unwise, nonetheless, to altogether ignore the macroeconomic problems caused by capital inflows, as has been done in this paper. Especially so, in light of the fact that the capital flow-induced problems have become not only very real, but also they are bound to become further exacerbated inthe following years to come, due to the whole financial structure of the world currently going through revolutionary changes. Clearly, there exists need for a lot more work in the area of capital market liberalization, especially at this juncture facing a host of exigent policy problems connected to the Uruguay Round Agreements.

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