

What explains the growth of Global Equity Markets?

The winner of the second annual Barclays Global Investors Canada Research Award asks why equity markets in some countries grow faster than others.

BY KAI LI

Over the past thirty years, stock markets around the world have experienced phenomenal expansion. The aggregated market capitalization of all national equity markets has grown from less than US\$1 trillion in 1974 to over US\$16 trillion by the end of 1997. Exhibit I presents evidence of the increase in market capitalization experienced by both developed and emerging markets.

The process of growth in global equity markets is still imperfectly understood. One view points to improved macroeconomic and financial fundamentals as the source of the growth. Others who are more skeptical of efficiently functioning capital markets, suggest that investors in their “exuberance” may have been buying up stocks, disregarding the historical relationship between market fundamentals and equity valuation.

In this paper, I adopt a modelling framework leading to the identification of sources of equity market growth. Specifically, I start with a valuation model where the dependent variable is the market capitalization of a country’s equity market relative to GDP. The model is a

generalization of stochastic production frontier models which assume that comparable economic agents operate according to a common technology or production frontier (“frontier” here meaning the maximum technically feasible output given inputs).¹ In this paper, I view countries as producers of their equity market capitalization (an output) given macroeconomic and financial characteristics (valuation inputs). Accordingly, countries can be thought of as operating either on or within the valuation frontier, and deviation from the frontier reflects market inefficiency (i.e., market discount or underpricing as in my particular application).

Over time, due to government policy changes such as capital markets liberalization in emerging economies, improved legal systems and better institutions, a country’s equity market can become more highly valued and “catch up” to the valuation frontier. That is, the distance from a country’s equity market capitalization to its maximum possible value—the frontier assuming no market discount—could become smaller over time. Or investors could simply become more upbeat about the

EXHIBIT 1

THE INCREASE IN MARKET CAPITALIZATION FOR DIFFERENT MARKETS

DEVELOPED MARKETS	1974 (\$M)	1997 (\$M)	%	EMERGING MARKETS	1975 (\$M)	1997 (\$M)	%
Canada	8,037	358,122	18	Argentina	83	35,142	32
Japan	108,234	2,929,475	15	Mexico	677	108,941	26
United Kingdom	48,889	1,484,860	16	Thailand	220	10,921	19
United States	467,068	5,932,982	12	Zimbabwe	215	1,123	8

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growth prospect of the world economy and adopt a more generous valuation formula linking fundamentals with market capitalization, thus causing the frontier itself to move outwards over time. I call this outward movement in the valuation frontier, not related to economic fundamentals or government policies in any systematic fashion, such as the change in valuation technology. In addition, a country can also move the valuation frontier outwards by improving its fundamentals. Hence, in this paper, the growth of equity markets can be thought of in terms of three different components: reduction in market inefficiency (i.e., decreases in underpricing), changes in valuation technology, and improvements in market fundamentals.

This paper is related to a growing body of research in finance that empirically examines the relationship between legal systems and capital markets. For example, La Porta et al. (1997) find that the legal environment matters for the size and extent of a country's equity market. Demirguc-Kunt and Maksimovic (1998) show that differences in legal and financial systems affect firms' use of external financing. Lombardo and Pagano (2000) find that there is a positive cross-country correlation between the quality of legal systems and the expected return on equity. Finally, Bekaert et al. (2001) conclude that financial liberalization spurs economic growth.

The work in this paper is most closely related to La Porta et al. (1997) but differs through the use of time-series as well as cross-sectional information. Indeed, the growth of global equity markets suggests a temporal dimension that is not captured by the cross-country regression typically employed in the literature. Hence, the findings in this paper could not be obtained using other models, and have no counterpart in the existing literature.

The Model

The valuation model used in this paper is based on the following specification for country i at time t

$$Y_{it} = f_{it}(X_{it}, \beta_{it}) \varepsilon_{it} \tau_{it} \quad (1)$$

where Y is the size of a country's equity market, measured as the ratio of market capitalization to GDP, and X is country-specific macroeconomic and financial characteristics, i.e., valuation factors. β is the model parameter. f is the valuation function which captures the maximum possible market value, i.e., valuation frontier, that can be obtained from given levels of market fundamentals assuming no market inefficiency (i.e., no underpricing). I will interpret shifts over time in f as reflecting

changes in valuation technology. ε is the error term. τ is the level of valuation efficiency, and it is bounded between zero and one. $\tau < 1$ indicates that the market value of an equity market is only τ per cent of the maximum it could be, that is, the equity market is underpriced by $(1 - \tau)$ per cent, and $\tau = 1$ implies that there is no underpricing.

Taking the logarithm of Equation (1), I obtain $y_{it} = x_{it}' \beta_{it} + v_{it} - u_{it}$ (2) where $y = \ln(Y)$, $x = \ln(X)$, $v = \ln(\varepsilon)$ following a normal distribution, and $u = -\ln(\tau)$ following an exponential distribution whose mean depends on some country-specific institutional characteristics, i.e., efficiency factors.

In sum, the modelling framework in Equation (2) assumes that the difference between the actual market capitalization and that implied by the valuation function is composed of the random error and the valuation efficiency term. And the variables used to explain market size are classified into "valuation factors"—macroeconomic and financial fundamentals which define the valuation frontier and are expected to affect the market capitalization of a country's equity market directly, and "efficiency factors"—measures of the legal, regulatory, and institutional framework which affect the deviation of the actual market capitalization from the maximum possible valuation assuming no market inefficiency. In principle, the legal system and institutional framework may have both a direct and an indirect effect on valuation. The direct effect occurs because better legal systems and institutions strengthen property rights and government reliability. This, in turn, broadens the appeal and confidence in equity investment and leads to highly valued equities (i.e., less deviation from the maximum possible equity valuation) and larger values of market capitalization relative to GDP. The indirect effect occurs because better legal systems and institutions also spur economic growth and improve market fundamentals, leading to a higher valuation frontier.

Decomposing the Growth of Equity Markets

Given the valuation frontiers, market fundamentals, and levels of valuation efficiency of country i in periods t and $t+1$, the expected increase in country i 's market capitalization (measured in logarithms) is

$$(x_{t+1,i}' \beta_{t+1} - x_{it}' \beta_t) + (u_{it} - u_{t+1,i}) \quad (3)$$

where the first term is due to both the change in valuation technology (as captured by the change in β) and

the change in fundamentals (as captured by the change in x), and the second term reflects the change in the level of valuation efficiency. Note that the first term in Equation (3) can be further written as $\frac{1}{2}(x_{t+1,i} + x_{it})'(\beta_{t+1} - \beta_t) + \frac{1}{2}(\beta_{t+1} + \beta_t)'(x_{t+1,i} - x_{it})$ (4) where the first component reflects the change in valuation technology measured as an average of two pure technological changes when fundamentals are at $x_{t+1,i}$ and x_{it} , respectively, and the second component captures the change in fundamentals measured as an average of two pure changes in market fundamentals: one with respect to the valuation frontier in period t , and the other with respect to the valuation frontier in period $t+1$.

The Valuation Factors—Macroeconomic and Financial Fundamentals²

I draw on finance theory and prior research to select market fundamentals that define the valuation frontier.

The valuation factors are:

- Growth rate of real GDP
- Real per capita GDP
- Level of financial intermediary development as the ratio of credits issued by financial intermediaries to the private sector to GDP
- Government consumption as the ratio of government consumption expenditure to GDP
- Trade openness as the ratio of the sum of exports and imports to GDP
- Stock market volatility computed using the method in Schwert (1989)
- Stock market correlation with the world portfolio computed using the method in Bekaert et al. (2001)

The Efficiency Factors—Legal, Regulatory, and Institutional

There are many other country characteristics, particularly related to the legal, regulatory, and institutional framework, which may not be regarded as fundamentals in defining the valuation frontier. However, they are nonetheless relevant for the proper functioning of equity markets, hence their size. For example, government policies on capital inflows and outflows can prevent market valuation from reaching the “best-practice” frontier. The logic of the model specified in Equation (2) implies that such characteristics should be incorporated in the distribution of valuation efficiency. The factors influencing market pricing behaviour are:

- Economic Freedom of the World index from the

Fraser Institute

- Legal origin from La Porta et al. (1998)
- Law and order index from the Political Risk Services, International Country Risk Guide
- Insider trading law variables from Bhattacharya and Daouk (2002)
- Country credit ratings from the Institutional Investor
- Shareholder rights from La Porta et al. (1998)
- Quality of accounting standards from the Center for International Financial Analysis and Research (1995)
- Capital market liberalization dates from Bekaert et al. (2001)
- Privatization dates from Perotti and van Oijen (2001)
- Business cycle indicator using the Organization for Economic Cooperation and Development (OECD) GDP growth rate

The Data

The equity market capitalization of developed countries comes from Datastream, and the equity market capitalization of developing countries comes from S&P/IFC Emerging Market Data Base. The developed country group includes 14 OECD countries: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, the Netherlands, Switzerland, the United Kingdom, and the United States, and two Asian economies: Hong Kong and Singapore. The sample period is 1974-1997. The developing country group includes the following 16 countries: Argentina, Brazil, Chile, Colombia, Greece, India, Jordan, South Korea, Malaysia, Mexico, Nigeria, Pakistan, Philippines, Thailand, Venezuela, and Zimbabwe. The sample period is 1984-1997. The stock return data are obtained from Datastream. Data on macroeconomic fundamentals are mainly obtained from the World Bank’s World Development Indicators and the OECD Main Economic Indicators.

Due to the fundamental differences in the legal, economic, and valuation environment between developed and developing countries, I estimate the model in Equation (2) separately for these two groups of countries.

Valuation Efficiency Across Countries

Exhibits 2 and 3 present the average levels of valuation efficiency in each country during the sample period for developed and developing countries, respectively. Among developed countries, Australia, Canada, the United States, Hong Kong, and Singapore clearly have

the most highly valued equity markets. Among developing countries, Malaysia stands out to have the most highly valued equity market, valued on average at 95 per cent of what the valuation frontier says is the maximum possible, i.e., the Malaysian stock market is only under-priced by 5 per cent relative to the frontier.

Within each country group, it is apparent that there is a fairly large dispersion in the average levels of valuation efficiency. Among developed countries, as shown in Exhibit 2, the average level of valuation efficiency varies from 31 per cent in Austria to over 98 per cent in Hong Kong. Among developing countries, Exhibit 3 shows that the average level of valuation efficiency varies from 52 per cent in Thailand to over 94 per cent in Malaysia.

The Sources of Equity Market Growth

One main goal of this paper is to investigate why and how equity markets in some countries grow faster than others. To answer this question, Exhibits 4 and 5 present results on the growth decomposition for developed and developing countries, respectively.

It appears that favourable changes in valuation technology play quite an important role in the growth of global equity markets relative to GDP. That is, a large part of the growth in equity markets is achieved by obtaining higher valuation from given levels of market fundamentals rather than from improved fundamentals or from the elimination of market inefficiency. Improvements in valuation efficiency vary across countries, particularly in emerging markets, but they rarely play a significant role in explaining the growth of equity markets.

For developed countries, as shown in Exhibit 4, many experience adverse shocks to their market fundamentals

over the sample period, including an average decrease of 3 per cent in market fundamentals for the United Kingdom. For developing countries, as shown in Exhibit 5, there are fewer countries that experience negative shocks to their market fundamentals over the sample period, but there are some rather drastic changes in valuation efficiency. In particular, the average increase in the level of valuation efficiency for Colombia is 12 per cent, while the average decrease in the level of valuation efficiency for South Korea is 8 per cent.

The finding that favourable changes in valuation technology contribute a large part of the growth in global equity markets has obvious implications for both policy and international investing. Governments should exercise caution when contemplating any economic policy or strategy that fosters the development of their national stock market. The valuation of their stock market may be high when market sentiment shifts in their favour, possibly due to what the Fed Chairman Mr. Greenspan called “investors’ irrational exuberance,” but it can also shift against them for reasons beyond their control, making it difficult to attract foreign investment and maintain stability in the local stock market. One way for countries to insure against the capriciousness of the stock market is to diversify sources of financing through foreign direct investment, public and private placement of debt, and syndicated bank loans.

From the viewpoint of professional portfolio investors such as pension fund managers, when judging the soundness of a country’s equity market they should focus more on the determinants of equity market capitalization, such as a country’s economic fundamentals and its institution-

EXHIBIT 2
VALUATION EFFICIENCY ACROSS
DEVELOPED COUNTRIES

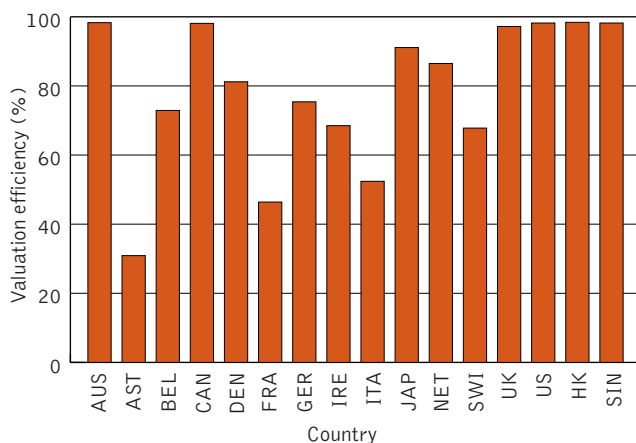


EXHIBIT 3
VALUATION EFFICIENCY ACROSS
DEVELOPING COUNTRIES

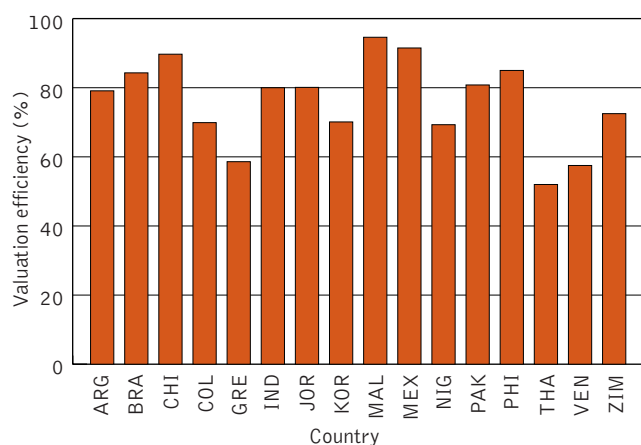


EXHIBIT 4

THE SOURCES OF GROWTH OF EQUITY MARKETS RELATIVE TO GDP FOR DEVELOPED COUNTRIES

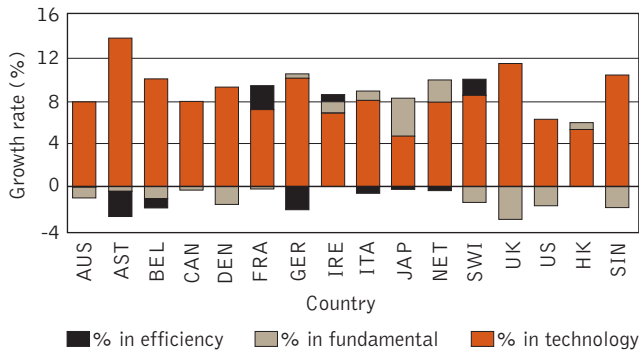
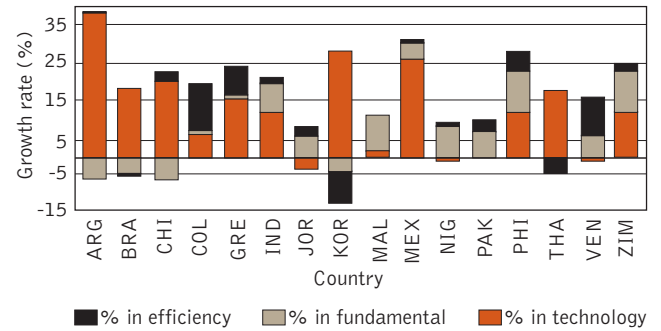


EXHIBIT 5

THE SOURCES OF GROWTH OF EQUITY MARKETS RELATIVE TO GDP FOR DEVELOPING COUNTRIES



al framework, rather than the market size itself which is prone to speculative attacks driven by the inexplicable market sentiment, according to the findings of this paper.

Unfortunately there is never a true model. Thus the results in this paper are subject to the usual caveats. In particular, economic fundamentals that I fail to include in the valuation factor set might change the results on the growth decomposition obtained in the paper. Alternatively, the model specification might not be exactly consistent with the reality. Nonetheless, this paper represents a first attempt to understand the fundamental determinants of global equity market development using a more structured model than is currently available in the literature. The results are suggestive if not exact.

Conclusions

The objective of this paper is to examine, in the broadest sense, why and how equity markets of some countries grow faster than others. To address this issue, I attribute the growth of global equity markets to three factors: improvements in macroeconomic and financial fundamentals, changes in valuation technology, and reduction in market inefficiency. Using data on 32 countries, I show that Australia, Canada, the United States, Hong Kong, and Singapore have the most highly valued equity markets in the developed world, and Malaysia has the mostly highly valued equity market in the developing world.

One interesting finding of the paper is that changes in valuation technology, not apparently related to a country's economic fundamentals or its institutional framework, appear to have played an important role in the phenomenal expansion of global equity markets over the past three decades. That is, most of the growth in equity markets is achieved by obtaining higher valuation from given levels of market fundamentals rather than from

improved fundamentals or from elimination of market inefficiency. Many developed countries and some developing countries experience adverse shocks to their market fundamentals during the sample period.

Improvements in valuation efficiency vary, particularly in emerging market countries, but they rarely play a significant role in explaining the growth of equity markets. ■

Acknowledgments

Financial support from the Social Sciences and Humanities Research Council of Canada and the UBC-HSS grant is gratefully acknowledged. I also wish to thank Paul Halpern for helpful comments, and Marcus Xu and Longkai Zhao for research assistance. I am responsible for all the remaining errors.

Endnotes

1. See, for example, Koop and Li (2001).
2. For more detailed definitions and discussions on my choice of valuation and efficiency factors, please refer to Li (2002).

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