Valuing Emerging Market Equities - The Empirical Evidence

Niso Abuaf

Though practitioners and academics rely on similar conceptual frameworks when valuing international equities in general and emerging market equities in particular, they emphasize different aspects of the framework. In contrast to academics, practitioners adjust discount rates as opposed to cash flows, and use the US as opposed to the global equity market risk premium. After summarizing the arguments on the academic and practitioner sides, this paper lets the data do the judging and presents evidence that US dollar returns on emerging market equities (American Depository Receipts, ADRs) primarily are a function of returns on the broad US equity market (e.g., the S&P 500) and on the corresponding country's credit default swap (CDS) spreads. Because CDSs are standardized contracts that are far more liquid than dollar-denominated emerging market bonds, we use them in our empirical work. Analyzing emerging market equities from a different perspective, we also find evidence that international valuation multiples are statistically dependent on CDS spreads and macroeconomic growth rates. As macroeconomic conditions in an economy become more volatile, US dollar returns on a specified foreign equity start becoming more statistically dependent on the specified country's CDS spreads. Moreover, the US and European-sparked financial crisis of 2007-2010 have caused practitioners to de-emphasize the "market is correct" viewpoint in favor of "the markets may periodically under or over-react" viewpoint. In this light, the paper presents evidence on the warning signals of international under or overvaluation. The logical extension of this view is that asymmetric currency expectations need to be modeled in cash flows.

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■When the worldwide privatization boom began in the late 1980s, sellers, buyers, and financial intermediaries realized that they needed a framework within which to price assets in disparate regions of the world. Unfortunately, standard international corporate finance theory could offer little assistance, primarily because it argued that when valuing, for example, telephone assets in Mexico, one should account for Mexican risk by adjusting the expected cash flows and then discounting these cash flows by applying a weighted average cost of capital (WACC). This approach was similar to valuing telephone assets residing in the US, but not applicable to international valuations as analysts had no rational way of adjusting cash flows to reflect country risk, such as Mexico's.

As an alternative method, Abuaf and Chu (1991, 1994) and Abuaf, Chu, Czapla, Lawley, and Thadani, (1997), recommend and test a pragmatic strategy of adjusting the cost of equity, leading to a related adjustment to the WACC. Intuitively, in a virtually integrated global capital market, the risk associated with the Mexican telephone-asset example consists of two building blocks:

- A US telephone-asset risk.
- The risk associated with an investment in Mexico.

The above statements are simplifications that practitioners have used and continue to use. In theory, the correct approach would be to model the risk of the telecommunications industry worldwide, which in all likelihood would be modeled as returns on the global capital markets, adjusted by a global telecom beta (see Sections I and III for a detailed discussion of this point).

A US telephone-asset risk would be estimated by analyzing returns on US telecommunications companies, while the risk of an investment in Mexico would be estimated by analyzing returns on Mexican Bradys or Yankees. Almost two decades after these initial privatization waves, Bradys

have disappeared from the marketplace, while Yankees have lost their prominence and the credit default swap (CDS) market has supplanted them.

To elaborate, though CDSs have existed since the early 1990s, the market has skyrocketed since 2003. For example, in 2007, the CDS market had a notional value of $45 trillion, contrasted with the markets for corporate and municipal bonds and structured investment vehicles that totaled less than $25 trillion. Recent estimates suggest that the CDS market exceeds $60 trillion. And, the CDS market is more liquid and empirically more tractable than the Yankee bond market. Hence, our empirical tests now rely on the CDS market, and not on Bradys and Yankees.

The US and European-sparked crises of 2007-2010 have taught us that we cannot ignore the question of asset over or under-valuation, particularly in an international context in which exchange rates have demonstrated a propensity to significantly over, or under-shoot long-term equilibrium values. See, Dornbusch (1976) for a seminal treatment of exchange rate over or under-shooting. See also, Acharya and Richardson (2009), Akerlof (2009), El-Arian (2008), Kindleberger and Aliber (2005), Reinhart and Rogoff (2009), and Shiller (2000) for various perspectives on the financial crisis of 2007-2010, and on views on market over or under-reaction to economic news.

In a virtually integrated global capital market, the risk associated with investing in a Mexican telephone-asset consists of two building blocks: A global telephone-asset risk, and the risk associated with investing in Mexico. Most analysts capture the risk of an asset class as the beta of that asset class versus a Global Capital Market Return Index. Analysts use the S&P 500 as a proxy for global capital market returns because such an index is exceedingly difficult to construct. And currently, analysts capture the risk of an Emerging Market by its CDS spread as this market is far more liquid than the traditional sovereign-bond market.

In this paper, I empirically re-test the methodology outlined above and conclude that our results justify the use of the methodology.

Section I of the paper highlights principles of international valuation, while Section II covers the warning signs of currency over or under-valuation as tracked by measuring deviations from purchasing power parity (PPP) and by developments in carry trades. Section III is the theoretical part of the paper, modeling concepts related to calculating the international cost of capital and political risk premiums, as used by most practitioners. The paper's main contribution is in Section IV, in which I present the empirical evidence. Finally, Section V concludes the paper.

I. Principles of International Valuation

Typically, and consistent with valuing domestic equities, analysts triangulate by relying on four techniques when valuing international equities:

- Discounted Cash Flow Analysis (DCF).
- Public-Multiples Based Valuation.
  - Price-to-Earnings Ratios (P/E).
  - Firm-Value-to-EBITDA Ratios (FV/EBITDA).
- Acquisition (Transaction) Based Valuation.
- Real-Option Theory.

For a detailed discussion of the above approaches, see Abuaf (2010), Arzac (2005), Cottle, Murray, and Block (1988), Damodaran (2006, 2009), Fernandez (2003, 2009), Koller, Goedhart, and Wessels (2009), Titman and Martin (2008), Welch (2008), and Widen (2008). In this paper, however, I will only explore issues related to:

- Valuing international equity cash flows.
- International P/E differences.

When valuing international equities, analysts face an additional set of questions:

- Is the currency in consideration over or under-valued?
  - Are there deviations from Purchasing Power Parity (PPP)?
  - Is the carry trade generating abnormal profits?
- How does idiosyncratic country risk enter the picture?
  - What do we do about differing country growth rates?
  - How does political risk enter the picture?
    - Does diversification reduce the political risk premium?

The literature's approach to these questions is not monolithic. In particular, the following authors write:

- Lessard (1996):
  - "In valuing offshore projects, how managers adjust for risk (whether by raising the discount rate or reducing expected cash flows) should depend primarily on

- (1) whether the risks are 'one-sided' or 'symmetric,' and
- (2) whether the risks are 'systematic' or instead are 'diversifiable' by world capital markets.

- The free cash flows, discount rates, and the resulting present values of projects in various countries will differ because of five classes of factors:
  - Market and competitive factors that may be either positive or negative compared to the home-country base case;
  - Currency factors that may be positive (in the case of expected real appreciation) but will be generally negative relative to those of an otherwise similar home country project;
  - Tax factors that may be either positive or negative compared to home country projects;
  - Differences in market covariance risk that generally will be positive or neutral; and
  - Downside country –risk factors and unfamiliarity that will be neutral or negative."

This paper's position is that the first three factors should be incorporated in the cash flows, consistent with the academic view. In fact, Section II of the paper devotes considerable attention to currency factors. The last two factors, however, would be more easily handled in the discount rate, as explained below.

- Godfrey and Espinoza (1996):
  - "We argue that there are three major types of risk that affect most developing-country investments:
    - (1) political or sovereign risk;
    - (2) commercial or business risk; and
    - (3) currency risk.
    - Sovereign risk can be assessed by observing the yield spreads on sovereign bonds denominated in a common reserve currency such as the US dollar.
    - Business risk can be measured by comparing the volatility of local equity markets to the volatility of the US market.
    - Currency risk can be accounted for by performing the analysis in US dollars – that is, by converting local currency cash flows into US dollars at an appropriate exchange rate, and then discounting those dollar flows at the appropriate, risk-adjusted US dollar discount rate."

Similar to Godfrey and Espinoza (1996) who are practitioners, we:

- Assess sovereign risk by tracking CDS spreads.
- Assume that local business risk can either be modeled in the cash flows, or its net effect could be incorporated into the coefficient of the CDS spread.
- Devote considerable attention to currency risk, as described in Section III.

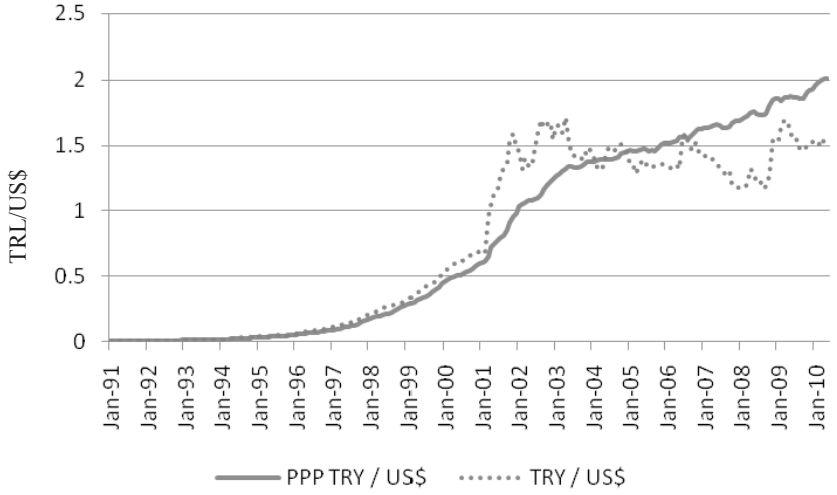
- Pereiro (2002):
  - "Empirical evidence shows idiosyncratic risk to have a powerful and unavoidable influence on the value of real assets that do not publicly quote.
  - Empirical evidence shows that, even among financial investors, the existence of efficiency is highly debatable in emerging markets.
  - The application of the plain Capital Asset Pricing Model (CAPM) to emerging markets is a controversial endeavor. Still, chances are it will continue to be used for many years to come, for three reasons:
    - The first is that abundant data already exist for easily applying the model; thus, efficiency-conscious analysts may opt for using the model simply for cost-benefit reasons.
    - The second, more important, reason is that the model's popularity has made it a standard benchmark.
    - The third reason is that some of the flaws of the model can be partially alleviated through specific adjustments."

In agreement with Pereiro (2002), this paper's approach is that of a US-based extended CAPM.

- Garcia-Sanchez, Preve, and Sarria-Allende (2010):
  - "The discounted cash flow technique is based on the idea of discounting unconditional expected cash flows at a discount rate that reflects risk that is symmetric (or two-way) and cannot be hedged by holding a globally diversified portfolio – that is, global market or economy-wide risk. The problem, however, is that to estimate expected cash flows that are truly unconditional, we need to consider all possible scenarios, including potential countrywide crises and the associated costs of corporate financial distress.
  - To account for the fact that we are estimating expected cash flows that ignore the cost of default typically associated with crises, most analysts estimate

Figure 1. Turkish Lira per US Dollar (TRL/US$) vs. PPP Implied, Jan 1991 - May 2010

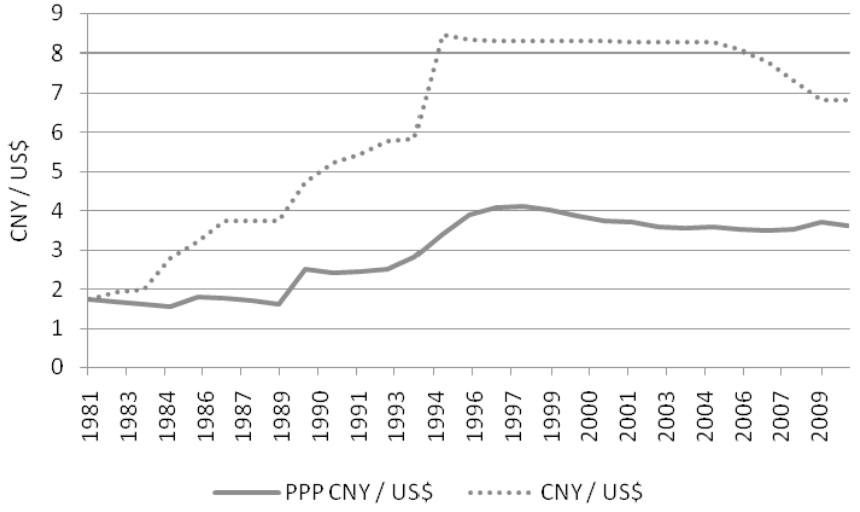
When most macroeconomic shocks are monetary, as has been the case for Turkey, PPP holds in the long run.



Note: Data are yearly.
Source: Bloomberg.

Figure 2. Chinese Yuan per US Dollar (CNY/US$) vs. PPP Implied Rate, 1981 - 2009

When most macroeconomic shocks are real, as has been the case for China, PPP does not hold even in the long run.



Note: Data are yearly.
Source: Bloomberg.

discount rates that combine global data – typically computed using the global CAPM – with a given measure of country risk. The most popular proxy for country risk is the spread between emerging markets and US sovereign bond returns, which provides a unique measure that is typically added to the discount rate and used in the valuation of all potential targets within a particular country. The fundamentals behind this estimate, however, are far from what analysts really need to account for the expected impact of emerging market risks on a particular business."

As described in Section III, this paper's approach is pragmatic; instead of arguing the theoretical pros and cons of various approaches, we let the data be the judge.

II. Warning Signs: PPP and the Carry Trade

As stated in Smithers (2009), the markets are moderately,

rather than perfectly efficient. From an international valuation perspective, this observation means that my analysis needs to incorporate aspects of market over or under-valuation, and market sentiment. If the analyst decides that there is considerable sentiment regarding currency over or under-valuation such sentiment needs to be reflected in cash flows, possibly in the form of scenario analysis.

In an international setting, two warning signs of market over or under-valuation are:

- Deviations from Purchasing Power Parity (PPP).
- Abnormal returns from carry trades. Note that a carry trade is typically defined as borrowing in low-interest rate currencies, and lending in high-interest rate currencies.

The US and European-sparked crises of 2007-2010 have taught us that we cannot ignore the question of asset over or under-valuation, particularly in an international context in which exchange rates have demonstrated a propensity to significantly over, or under-shoot long term equilibrium values. In an international setting, two warning signs of market over or under-valuation are: Deviations from Purchasing Power Parity (PPP), and abnormal returns from carry trades. Deviations from PPP and the carry trade are correlated, meaning that over-valuations of the real exchange rate are correlated with positive carry for the currency, and conversely.

A. Deviations from PPP

When macroeconomic shocks are predominantly of a monetary nature (especially when the money supply of one country significantly increases versus the other), inflation and exchange rates move in synchrony to equalize international prices, a condition that is known as PPP. On the other hand, if macroeconomic shocks are predominantly of a real nature, PPP may not hold (see Figure 1). See Lauria and Abuaf (1993) for using PPP as a predictor of exchange rate movements.

Because international investments are subject to inflation and exchange rate risk, the analyst's views of whether PPP holds or does not hold are critical in assessing the long-term value approach to such investments. As Figures 1-2 illustrate, PPP may not hold all of the time, especially in the short term, and adjustments can be made to account for possible expected deviations from it.

Hyperinflationary currencies usually depreciate in accordance with PPP, assuring the stability of cash flows when viewed from a US dollar (US$) perspective. For example, Figure 1 plots the spot and the PPP implied rates for the Turkish Lira/US$ exchange rate. We obtain similar results (not reported here due to space constraints) for the following historically hyperinflationary currencies:

- Mexican Peso/US$.
- Brazilian Real/US$.
- Indonesian Rupee/US$.

As Figure 1 demonstrates, PPP has approximately held, within a tolerance band of about 10%, for the above countries that would have been considered hyperinflationary until the 1990s. See Abuaf and Jorion (1990) in which they demonstrate that PPP has held among the major industrialized countries in the post-Bretton-Woods era of 1973-1984. PPP also holds for countries that are in close economic cooperation and near monetary union, as in the French franc versus the Deutschemark (see Abuaf and Chu, 1994).

On the other hand, PPP may not hold for high-growth countries such as China and Japan, as illustrated in Figure 2 (due to space constraints we just report China's results and note that Japan's results are similar).

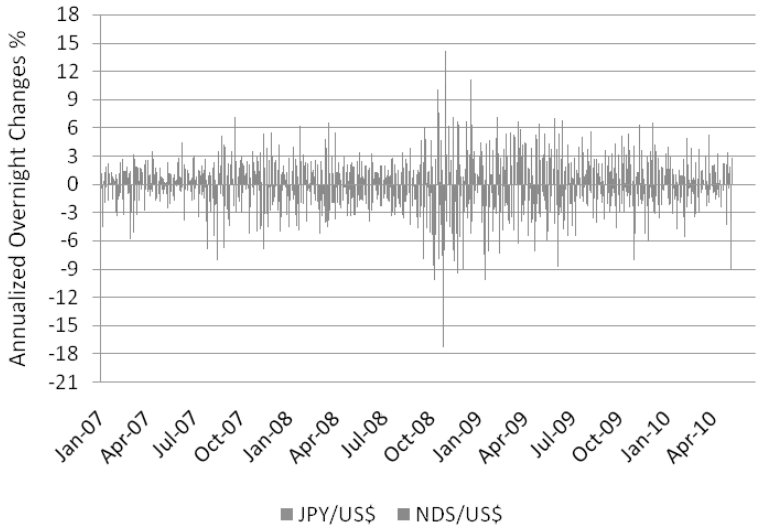
Every April, The Economist applies the PPP theory by comparing the relative prices of a McDonald's Big Mac around the world. For example, according to this index, in mid-March 2010, the Norwegian Krone was about 90% overvalued, while the Chinese Yuan was about 60% undervalued. As the Economist (2010) states: "The index is a lighthearted attempt to gauge how far currencies are from their fair value. It is based on the theory of PPP, which argues that in the long run exchange rates should move to equalize the price of an identical basket of goods between two countries. Our basket consists of a single item, a Big Mac hamburger, produced in nearly 120 countries. The fair-value benchmark is the exchange rate that leaves burgers costing the same in America as elsewhere."

Deviations from PPP are known as appreciations or depreciations of the real exchange rate. As Citigroup's Chief Economist William Buiter (2010) writes:

"We believe the appreciation of China's real exchange rate, and that of other successful emerging markets like India, Brazil, Peru, Indonesia and Turkey, is warranted for three reasons. First, the secular real convergence of these countries' productivity levels with those of the advanced industrial countries tends to be associated with a positive differential between the productivity growth rates in the traded and non-traded sectors that are larger in these emerging markets than in the advanced industrial countries (for example, the International Monetary Fund (IMF) forecasts that in 2011 the US will grow at 2.4%, while emerging and developing economies and China will grow at respectively

Figure 3. Annualized Overnight Changes: ND$ and JPY, 1 Jan 2007 - 10 April 2010

Daily changes in exchange rates, as has been the case for the ND$ and JPY, can easily overtake interest rate differentials, negating the benefits of carry trades.



Notes: ND$ is New Zealand Dollar and JPY is Japanese Yen.
Data are daily.
% changes are in differences of logs and are annualized by 256 trading days per year.

Source: Bloomberg.

6.5%, and 9.9%). This so called 'Balassa-Samuelson' effect means that the equilibrium effective real exchange rate of successful, fast-growing emerging markets will tend to appreciate, with a matching depreciation in the equilibrium effective real exchange rate of the advanced industrial countries. The numbers involved tend to be modest, but in countries with Chinese-level real gross domestic product (GDP) growth rates – around 7% higher than those of its trading partners – it could be as much as 3% per annum (see Frankel 2006a, 2006b). This assumes that the country in question starts from its fundamental Balassa-Samuelson equilibrium position. If, as seems likely, China's current real exchange rate is significantly weaker than its Balassa-Samuelson equilibrium level, a higher Balassa-Samuelson real exchange rate appreciation would be warranted."

B. The Carry Trade

Though academics have written about the carry trade for almost a century, and called it the Fisher Open, or the Interest Rate Parity Theorem, this trade entered the vernacular during the 2007-2010 crises. When speculators borrow in low-interest rate currencies and lend in high-interest rate currencies, they earn the carry. The obvious risk is that the currency in which they are long in depreciates, sometimes in large magnitudes (known in the industry as maxi or mega-devaluations). These types of shocks happened in numerous emerging market crises in the 20th century. Interestingly, the first major crisis of the 21st century saw overnight mega devaluations of developed-market currencies such as the New Zealand Dollar (ND$, or Kiwi) and the Japanese Yen (JPY).

In the period since 2000, Japanese Yen interest rates fluctuated around 1%, while US$ interest rates declined significantly with the onset of the crisis of 2007. Yet, New Zealand Dollar interest rates remained consistently higher than their Japanese and US counterparts. This observation suggests three carry trades:

- Long US$, short JPY.
- Long Kiwi, short JPY.
- Long Kiwi, short US$.

The above three carry trades would be subject to three exchange-rate risks:

- JPY appreciating versus the US$.
- JPY appreciating versus the Kiwi.
- The US$ appreciating versus the Kiwi.

Figure 3 illustrates two of these risks:

- JPY versus US$.
- Kiwi versus US$.

As Figure 3 demonstrates, on numerous occasions after the onset of the financial crisis, these daily exchange rates moved by 5%-15% (annualized). Because the interest rate differentials among the above currency pairs rarely exceeded 5%, the above exchange rate movements frequently offset gains from the carry trade, or pushed it into negative profit-loss territory.

Deviations from PPP and the carry trade are correlated, meaning that over-valuations of the real exchange rate are correlated with positive carry for the currency, and conversely. For example, the Economist (2010) points out that Brazilian interest rates are high, with the policy rate standing at 10.75%, and its Big Mac index suggesting that the Real is overvalued by 31%.

From an international valuation perspective, the above discussion implies that the analyst should beware of the following:

- Significant overvaluation of the real exchange rate (positive deviations from PPP), and,
- Significant prolonged positive carry for the currency being evaluated.
    - Suggest that a maxi or mega devaluation might be in the horizon, and,
- Significant undervaluation of the real exchange rate (e.g. Chinese Yuan), suggesting a maxi or mega appreciation.

III. International Cost of Equity, Country Risk, and Growth

A. International Cost of Equity

Though the CAPM has been much maligned in the literature, it is still the gold standard of Mergers and Acquisitions and valuations specialists. The model holds that investors require compensation for bearing only systematic risk, because they can fully eliminate non-systematic or firm-specific risk by diversification. The CAPM is the primary technique used by practitioners to estimate the cost of equity, k_e . This has been my experience as an investment banker at Chase Manhattan Bank, Salomon Brothers – Citigroup, Credit Suisse, and Samuel A. Ramirez and Co. in the years 1984 – 2011.

As Pereiro (2002) writes:

- "The model's popularity has made it a standard benchmark. Analysts do not live in plastic bubbles; they interact with others also using the CAPM to estimate cost of capital and the value of a company. Ignoring the model would put an analyst at a disadvantage, since his or her counterparts in valuation exercises and buy-sell negotiations – other investors, managers, venture capitalists, angel investors, and researchers – are most likely using the CAPM as well."

One reason that the CAPM still remains as the gold standard is that even if it were wrong, practitioners calibrate their differences with respect to the CAPM. This calibration means that most investment bankers and other practitioners employ either a one-factor CAPM, or an extended CAPM whose additional variables may include: A small-stock premium, a start-up discount, a value variable, a momentum or sentiment variable, a private versus public ownership flag, an illiquidity discount, and a political risk premium variable. The empirical work in this article focuses on the extension of the CAPM as it relates to the political risk premium, as measured by CDS spreads.

Another reason that the CAPM still remains as the gold standard is that even if it were wrong, practitioners calibrate their differences with respect to the CAPM. This calibration means that most investment bankers and other practitioners employ either a one-factor CAPM, or an extended CAPM whose additional variables may include:

- A small-stock premium.
- A start-up discount.
- A value variable (e.g. price to book).
- A momentum or sentiment variable.
- A private versus public ownership flag.
- An illiquidity discount.
- A political risk premium variable.

Indeed Pereiro (2002) writes:

- "The third reason is that (that the CAPM is still used) some of the flaws of the model can be partially alleviated through specific adjustments."

This practical approach is similar to extended CAPM models or frameworks that academics have introduced such as the arbitrage pricing theory (APT), the initial, or the

extended Fama-French models, among others (for a fuller discussion, see Berk and DeMarzo 2010). Stated differently, they are arguing that the introduction of a political risk premium variable is in the same spirit as the above extensions of the CAPM.

In this spirit, I postulate that the expected cost of equity, k_e, can be estimated by using an extended CAPM:

$$k_e = R_f + \beta(EMRP) + \gamma(CDS), \quad (1)$$

If R_f is the risk free rate, β is the beta of the investment, and EMRP is the equity market risk premium, and γ is the sensitivity of the particular equity to its country's CDS spread. Theoretically, the correct EMRP is that of the global equity market. However, as discussed above this is not what practitioners use for pragmatic reasons. As such, I use the US stock returns in my empirical work. Intuitively, β captures an equity's comovements with the stock market, that is, the undiversifiable, systematic risk embedded in the equity. Similarly, γ captures the ADR's sensitivity to the CDS.

The WACC is calculated as follows:

$$WACC = k_d(1-t)\, D/(D+E) + k_e\, E/(D+E), \quad (2)$$

Where k_d is the cost of debt, t is the company's marginal tax rate and E/(D + E) and D/(D + E) are the market value-weighted equity-to-capital and debt-to-capital ratios, respectively. Note that the WACC is used to present value after-tax, unlevered free cash flows. The WACC is closely associated with enterprise value to EBITDA multiples.

B. Country Risk

In this paper we will assume that all of country risk is incorporated in the political risk premium. Though this statement is not correct from the purist's point of view, it is consistent with the way practitioners model the world. For a more detailed analysis of these issues, see Zenner and Akaydin (2002), and the literature review presented in Section I. The political risk premium represents the incremental return that investors require for use of their funds in international investments, and represents non-systematic risks, such as expropriation, currency blockage, and other political acts that would reduce the present value of an investment.

To elaborate, Pereiro (2002) writes:

- "When segmentation seems to be present, the practitioner may resort to a local CAPM where the local risk-free rate is a composite of the local risk-free rate, and the country risk premium.
- Country-risk is not fiction. Several empirical studies have clearly shown that its effect on stock returns is frequently more sizable than the industry effect.
- The country risk premium is usually computed as the spread of sovereign bonds over global bonds of similar denomination, yield, and term.
- The reader may wonder whether such ad hoc manipulations do not go counter to the spirit of rationality inherent to the CAPM. Indeed, if we assume that country risk is not geographically diversifiable, then why not define a non-CAPM-based, personal hurdle rate? Though the question is reasonable, the answer is obvious: Practitioners feel at ease with the local CAPM, because it allows for the 'scientific' adjustment of a component of unsystematic risk that the standard version misses.
- Another option would be to factor expropriation or exchange risk directly into cash flows, not into the discount rate. Such risks may be countered by contracting international insurance with agents such as the Overseas Private Investment Corporation (OPIC) or Lloyds's; insurance costs can be precisely computed and added to or subtracted from the cash flows as country risk evolves over time. A general adjustment to a constant discount rate would not be able to account for the time-varying nature of country risk.
- However, it is extremely difficult to envisage the precise effects of country risk on a company's expected cash flow, which may explain why it is more popular to use rate than cash flow adjustments. One survey confirms that, with the exception of taxes – which are more easily modeled into cash flows – country-dependent idiosyncratic corrections tend to be introduced into the discount rate.
- In short, practitioners seem to be comfortable adjusting the discount rate according to the degree of perceived segmentation, incorporating its many drivers into a single number: the country risk premium."

Though adjusting the discount rate is a second-best alternative from a theoretical point of view, it is noticeably the choice that most practitioners prefer for reasons discussed above.

Traditionally, practitioners have used the spreads between dollar-denominated Yankee, Euro, and Brady bonds versus US Treasuries. This practice has been the case when fixed-income markets have been well-developed for a specific country. Such estimates are representative of the incremental return required by investors for lending to an international entity, and capture the market's view of an appropriate political risk premium.

Historically, and in cases in which no liquid dollar-denominated securities traded, practitioners have relied on proprietary political risk premium models, as well as qualitative factors. With the spectacular growth of the CDS market mentioned previously, most countries now have readily available CDS spreads, which I will use as a proxy for political risk in our empirical analysis.

The empirical work presented in this paper has the following characteristics:

- Covers ADRs that are domiciled in the following emerging markets: Brazil, China, Argentina, Chile, Mexico, Russia, Greece, Indonesia, Portugal, and Turkey.
- Uses weekly data for the period 2005-2010.
- Uses the S&P 500 as a proxy for global capital market returns.
- Uses CDS spreads for country political risk.

We use the S&P 500 and CDS spreads for the following pragmatic reasons:

- Ease and prevalence of use.
- Length and consistency of data series.

Stated differently, though global capital market returns should be one of the factors in the global CAPM, in my experience as an investment banker at Chase Manhattan Bank, Salomon Brothers – Citigroup, Credit Suisse and Samuel A. Ramirez and Co. during 1984-2011, I have never seen it used. All the practitioners that I have come into contact with have always used the S&P 500 as a proxy for global capital market returns for the simple reason that a Global Capital Market Return Index is exceedingly difficult to construct. And even if one firm invested enough resources to construct such an index, its counterparts would be lacking it and thereby rendering it useless as a benchmarking tool.

Similarly, in the current environment CDS spreads have supplanted Brady or Yankee bond spreads simply because:

- The CDS market is extremely liquid and readily comparable across countries.
- The Brady bond market no longer exists.
- The Yankee bond market has lost its edge compared to more than a decade ago.

In principle, political risk may affect either discount rates or cash flows. Theoretically, the following hold true:

- If political risk is a function of world macroeconomic conditions, then it should be reflected in the discount rate.
- If political risk is independent of world macroeconomic conditions, then the relevant cash flows should be appropriately altered.

Historically, political risk has been more closely correlated with local conditions than with world macroeconomic conditions. If so, theory suggests that expected cash flows should be penalized because of political risk. However, adjusting expected cash flows because of political risk can be as ad hoc as adjusting the discount rate. Indeed, in practice, most adjustments for political risk are made to the cost of capital used in discounting cash flows.

Moreover, evidence gathered since the financial crisis erupted suggests that most global asset classes are significantly correlated (for example, the correlation between the S&P 500, FTSE 100, CAC 40, and the DAX indexes are in the low 80%).

Additional factors may affect the political risk penalty applied to the discount rate. For instance, if the investment is in a politically sensitive industry sector or geographic area, the political risk may need to be adjusted accordingly. Sometimes, investments in emerging countries might be considered to reduce risk if they result in diversifying the project portfolio of the parent firm. Developed country stock indexes are highly correlated with the US stock market (for example, the FTSE 100 and the DAX have respective betas versus the S&P 500 of 0.83 and 1.10 with R^2s of 70%). On the contrary, emerging market stock indexes have very low correlations to the US market (for example, the Shanghai SE Composite beta versus the S&P 500 is 0.10, with an R^2 of 0%). As such, political risk premiums may be approximately reduced to account for diversification.

Historically, political risk has been more closely correlated with local conditions than with world macroeconomic conditions. If so, theory suggests that expected cash flows should be penalized because of political risk. However, adjusting expected cash flows because of political risk can be as ad hoc as adjusting the discount rate. Indeed, in practice, most adjustments for political risk are made to the cost of capital used in discounting cash flows. Moreover, evidence gathered since the financial crisis erupted suggests that most asset classes are significantly correlated.

C. Country and Sector Growth

The macroeconomic growth rate of the specified country. Most developed economies grow at about 2%-3% per year in real terms. Emerging economies such as China may grow at much higher rates reaching the 8%-10% level. The analyst, however, needs to realize that growth rates such as China's cannot go on forever. As trees do not grow to the sky, even China's growth rate will eventually converge to the range applicable to developed economies such as those in North America, Western Europe and Japan. Whether such a convergence will take place in five, ten, or thirty years is the critical modeling judgment.

Table I. Brazilian ADRs vs. S&P 500 and CDS, 29 Apr 2005 - 23 Apr 2010

Brazilian ADRs show very strong statistical dependence on the S&P 500 and Brazilian CDS spreads.

Company(Ticker)	Industry Group	S&P500 Coefficient (*t*-statistic)	5 Yr CDS (*t*-statistic)	Adjusted R^2
PETROBRAS SA	Oil &Gas	1.19	-0.15	0.66
(PBR)		(7.98)	(4.08)	
VALE SA-SP	Mining	1.32	-0.12	0.52
(VALE)		(9.06)	(3.30)	
ITAU UNIBANC	Banks	1.07	-0.28	0.65
(ITUB)		(8.17)	(8.52)	
BRADESCO	Banks	1.10	-0.24	0.66
(BBD)		(8.98)	(7.88)	
SID NACIONAL	Iron/Steel	1.53	-0.15	0.52
(SID)		(8.89)	(3.60)	
GERDAU SA	Iron/Steel	1.50	-0.21	0.60
(GGB)		(9.32)	(5.38)	
ELETROBRAS P	Electric	0.40	-0.28	0.29
(EBR)		(1.99)	(5.71)	
BRASIL FOODS	Food	0.78	-0.20	0.36
(BRFS)		(0.17)	(0.04)	
VIVO	Telecommunications	0.88	-0.20	0.36
(VIV)		(4.74)	(4.43)	
TELESP	Telecommunications	0.40	-0.18	0.39
(TSP)		(3.37)	(6.29)	
CPFL ENERGIA	Electric	0.63	-0.18	0.42
(CPL)		(4.74)	(5.53)	
PAO ACUCAR	Food	0.79	-0.24	0.52
(CBD)		(5.74)	(6.97)	
TIM PARTICIP	Telecommunications	0.80	-0.23	0.44
(TSU)		(4.95)	(5.80)	
ULTRAPAR PA	Chemicals	0.44	-0.21	0.33
(UGP)		(0.15)	(0.04)	
TELE NORTE	Telecommunications	0.86	-0.20	0.46
(TNE)		(5.73)	(5.52)	
CEMIG SA	Electric	0.34	-0.24	0.41
(CIG)		(2.60)	(7.48)	
BRASKEM SA	Chemicals	1.08	-0.20	0.46
(BAK)		(6.32)	(4.81)	

Notes: Data are weekly, regressions are in differences of logs.
Results are ranked by market cap.

Source: Bloomberg.

Table II. Chinese ADRs vs. S&P 500 and CDS, 22 Sep 2006 - 23 Apr 2010

Chinese ADRs show strong statistical dependence on the S&P 500 and Chinese CDS spreads.

Company(Ticker)	Industry Group	S&P500 Coefficient (*t*-statistic)	5 Yr CDS (*t*-statistic)	Adjusted R^2
PETROCHINA	Oil &Gas	1.05	-0.11	0.51
(PTR)		(9.61)	(4.09)	
CHINA MOBILE	Telecommunications	0.78	-0.05	0.32
(CHL)		(7.06)	(2.01)	
CHINA LIFE	Insurance	0.85	-0.04	0.27
(LFC)		(6.60)	(1.27)	
CHINA PETRO	Oil &Gas	1.06	-0.07	0.41
(SNP)		(8.67)	(2.24)	
CNOOC LTD	Oil &Gas	1.36	-0.09	0.53
(CEO)		(11.02)	(2.98)	
BAIDU INC-SP ADR	Internet	0.94	-0.17	0.27
(BIDU)		(4.91)	(3.62)	
ALUMINUM COR	Mining	1.47	-0.10	0.41
(ACH)		(8.50)	(2.50)	
YANZHOU COAL	Coal	1.49	-0.14	0.49
(YZC)		(9.35)	(3.59)	
CHINA EASTRN	Airlines	0.84	-0.15	0.14
(CEA)		(3.30)	(2.48)	
HUANENG POWR	Electric	0.85	-0.05	0.24
(HNP)		(5.94)	(1.38)	
CHINA SOUTH	Airlines	0.91	-0.08	0.16
(ZNH)		(4.27)	(1.60)	
SINOPEC SHA	Chemicals	0.86	-0.10	0.27
(SHI)		(5.63)	(2.63)	
CTRIP.COM	Internet	1.04	-0.09	0.29
(CTRP)		(6.27)	(2.32)	
NETEASE.COM	Internet	0.82	-0.04	0.22
(NTES)		(5.81)	(1.27)	
NEW ORIENTAL	Education	1.29	-0.04	0.34
(EDU)		(8.13)	(1.07)	
GUANGSHEN RA	Transportation	0.88	-0.07	0.35
(GSH)		(7.26)	(2.32)	

Note: See Table I.

Table III. Argentine ADRs vs. S&P 500 and CDS, 17 Feb 2006 - 23 Apr 2010

Argentine ADRs show low statistical dependence on the S&P 500 and Argentine CDS spreads.

Company(Ticker)	Industry Group	S&P500 Coefficient (*t*-statistic)	5 Yr CDS (*t*-statistic)	Adjusted R^2
YPF SA	Oil &Gas	0.61	-0.02	0.10
(YPF)		(3.95)	(0.35)	
TELECOM ARGE	Telecommunications	0.79	-0.19	0.23
(TEO)		(4.33)	(3.26)	
GRUPO GALICI	Banks	0.95	-0.26	0.37
(GGAL)		(5.77)	(4.87)	
IRSA SA	Real Estate	0.70	-0.16	0.21
(IRS)		(4.20)	(3.03)	
NORTEL INVER	Telecommunications	1.13	-0.21	0.25
(NTL)		(5.05)	(2.91)	
TRANSPORT GA	Pipelines	0.56	-0.21	0.20
(TGS)		(3.24)	(3.78)	
ALTO PALERMO	Real Estate	(0.16)	-0.40	0.02
(APSA)		(2.42)	(1.97)	
METROGAS	Gas	0.50	-0.15	0.09
(MGS)		(2.34)	(2.11)	

Note: See Table I.

Table IV. Chilean ADRs vs. S&P 500 and CDS, 13 May 2005 - 23 Apr 2010

Chilean ADRs show modest statistical dependence on the S&P 500 and and Chilean CDS spreads.

Company(Ticker)	Industry Group	S&P500 Coefficient (*t*-statistic)	5 Yr CDS (*t*-statistic)	Adjusted R^2
ENERSIS SA-ADR	Electric	0.98	-0.03	0.47
(ENI)		(12.20)	(1.17)	
BANCO SANTAN	Banks	0.95	-0.11	0.50
(SAN)		(10.90)	(4.25)	
QUIMICA Y-SP ADR	Chemicals	1.10	-0.12	0.36
(SQM)		(8.19)	(3.10)	
BANCO CHILE-ADR	Banks	0.86	-0.12	0.39
(BCH)		(8.22)	(3.92)	
LAN AIRLINES-ADR	Airlines	1.17	-0.03	0.46
(LFL)		(11.89)	(1.24)	
CERVEZAS-ADR	Beverages	0.63	-0.06	0.28
(CCU)		(6.91)	(2.38)	
CORPBANCA SA	Banks	0.42	-0.04	0.12
(BCA)		(4.23)	(1.41)	

(Continued)

Table IV. Chilean ADRs vs. S&P 500 and CDS, 13 May 2005 - 23 Apr 2010 (*Continued*)

Company(Ticker)	Industry Group	S&P500 Coefficient (*t*-statistic)	5 Yr CDS (*t*-statistic)	Adjusted R^2
VINA CONCHA-ADR	Beverages	0.32	-0.10	0.14
(VCO)		(3.05)	(3.32)	
PROVIDA-ADR	Investment Companies	0.73	-0.11	0.33
(PVD)		(7.11)	(3.64)	

Note: See Table I.

Table V. Mexican ADRs vs. S&P 500 and CDS, 13 May 2005 - 23 Apr 2010

Mexican ADRs show strong statistical dependence the S&P 500 and Mexican CDS spreads.

Company(Ticker)	Industry Group	S&P500 Coefficient (*t*-statistic)	5 Yr CDS (*t*-statistic)	Adjusted R^2
AMERICA MO	Telecommunications	1.06	-0.17	0.63
(AMOV)		(9.31)	(6.47)	
FOMENTO ECON	Beverages	0.84	-0.13	0.45
(FMX)		(6.50)	(4.42)	
TELEF MEXI-ADR L	Telecommunications	0.76	-0.06	0.36
(TMX)		(6.75)	(2.22)	
COCA-COLA F-ADR	Beverages	0.77	-0.11	0.40
(KOF)		(6.25)	(3.66)	
GRUPO TELEV-ADR	Media	1.05	-0.08	0.60
(TV)		(11.02)	(3.54)	
CEMEX SAB-SP	Building Materials	2.50	-0.06	0.69
(CX)		(15.76)	(1.53)	
DESARROLLADO	Building Materials	1.85	-0.15	0.63
(HXM)		(11.42)	(3.92)	
EMP ICA-ADR	Engineering &Construction	1.24	-0.26	0.58
(ICA)		(7.62)	(6.69)	
GRUPO AEROPO	Engineering &Construction	0.75	-0.03	0.25
(ASR)		(5.65)	(1.06)	
INDUS BACHOC	Food	0.75	-0.08	0.26
(IBA)		(5.03)	(2.14)	
GRUMA SAB-ADR	Food	1.42	-0.03	0.28
(GMK)		(6.56)	(0.65)	
GRUPO CASA S	Pharmaceuticals	0.42	-0.02	0.08
(SAB)		(2.96)	(0.69)	
GRUPO RADIO-ADR	Media	0.93	-0.14	0.21
(RC)		(3.78)	(2.42)	
GRUPO TMM-ADR A	Transportation	0.82	-0.23	0.21
(TMM)		(2.91)	(3.41)	

Note: See Table I.

Table VI. Other Emerging European and Asian ADRs vs. S&P 500 and CDS, Various Dates

A medley of Russian, Greek, Indonesian, Portuguese and Turkish ADRs show very strong statistical dependence on the S&P 500 and the associated CDS spreads.

Company(Ticker)	S&P500 Coefficient (*t*-statistic)	5 Yr CDS (*t*-statistic)	Adjusted R^2	Country (Sector)
MOBILE TELES-ADR	1.22	-0.24	0.45	Russia
(MBT)	(6.94)	(5.39)		(Telecommunications)
MECHEL-SPON ADR	2.38	-0.16	0.51	Russia
(MTL)	(10.56)	(2.86)		(Iron/Steel)
WIMM-BILL-DA-ADR	1.76	-0.09	0.34	Russia
(WBD)	(7.83)	(1.55)		(Iron/Steel)
COCA COLA HE-ADR	0.94	-0.11	0.40	Greece
(CCH)	(4.82)	(2.26)		(Beverage)
NATL BANK GR-ADR	1.42	-0.21	0.46	Greece
(NBG)	(4.95)	(3.02)		(Banking)
HELLENIC TEL-ADR	0.59	-0.08	0.27	Greece
(OTE)	(3.39)	(1.95)		(Telecommunications)
TELEKOMUNIKA-ADR	0.62	-0.07	0.25	Indonesia
(TLK)	(5.85)	(2.59)		(Telecommunications)
INDOSAT-ADR	1.29	-0.02	0.38	Indonesia
(IIT)	(9.86)	(0.62)		(Telecommunications)
PORTUGAL TEL-ADR	0.73	-0.09	0.48	Portugal
(PT)	(6.72)	(2.71)		(Telecommunications)
TURKCELL ILE-ADR	0.41	-0.33	0.42	Turkey
(TKC)	(3.11)	(8.16)		(Telecommunications)

Note: Data are weekly.
Russian ADRs: 29 Apr 2005 – 23 Apr 2010.
Greek ADRs: 30 Jan 2009 – 23 Apr 2010.
Indonesian ADRs: 6 Jan 2006 – 23 April 2010.
Portuguese ADRs: 5 Sep 2008 – 23 Apr 2010.
Turkish ADRs: 13 May 2009 – 23 Apr 2010.

Source: Bloomberg.

Sector specific cash flow growth rates. Young industries' growth rates initially exceed the economy's growth rates; i.e., their income elasticity of demand is greater than one. As an industry matures, however, its growth converges to the economy's and may even fall below that level converging to an income elasticity of one, or less. The behavior of the wireless industry in the US illustrates this case.

IV. The Empirical Evidence

A. ADR Returns versus the Market and CDs

More than two decades after the initial privatization waves, I now have ample data to test the hypothesis that the cost of international equity capital is a function of the industry-specific cost of capital worldwide and the specified emerging economy's global borrowing cost, or CDS spread.

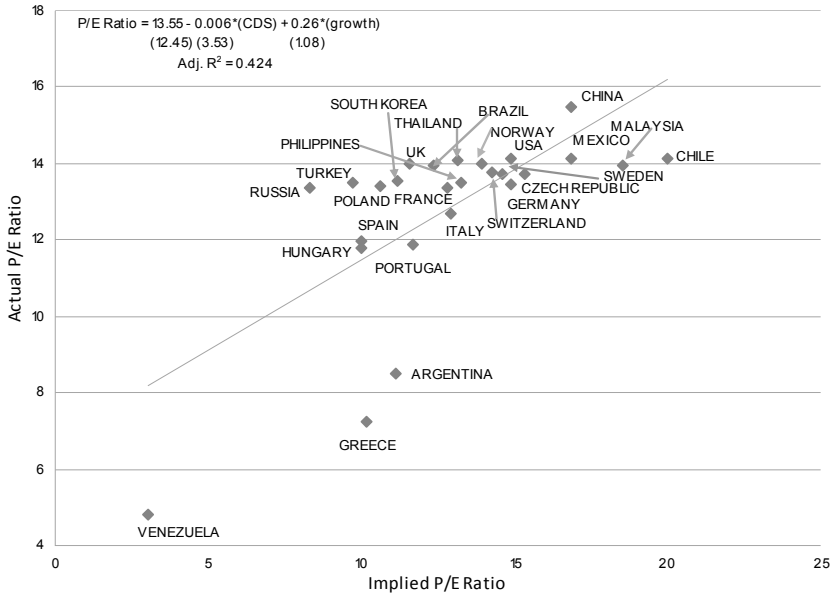
Tables I-VI present the regression results of returns on emerging market ADRs as a function of returns on the S&P 500 and associated CDS spreads.

The overwhelming conclusion arising from Tables I-VI is that returns on emerging country CDSs significantly affect returns on various emerging equities. Specifically, an analysis of the above mentioned tables suggests the following results:

- Most country regressions have relatively high R^2s.
  - With the possible exception of Argentina.
- Most S&P 500 coefficients are statistically significant.

Figure 4. International P/E's vs. CDS and Growth, 2010

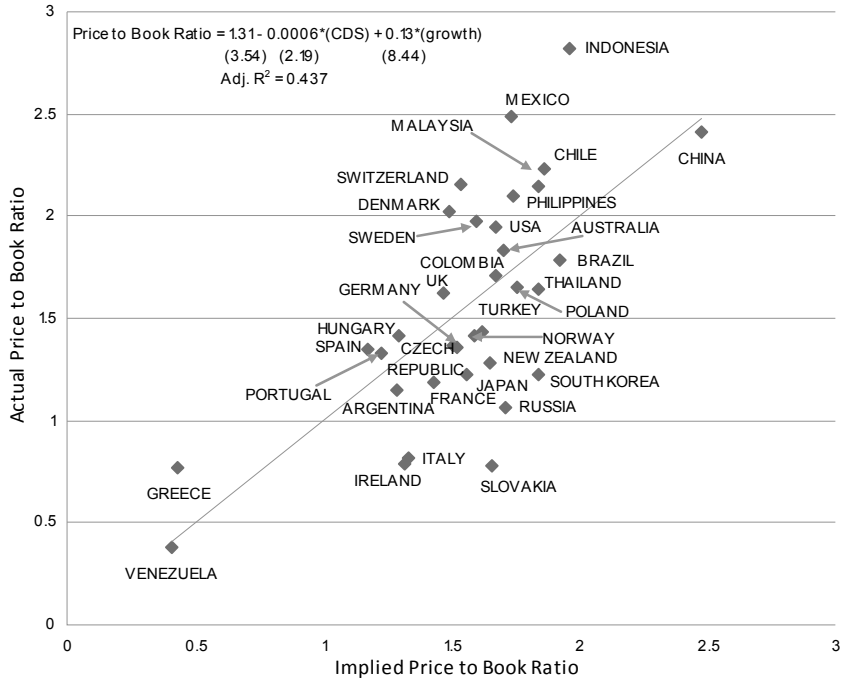
International P/E multiples are strongly and negatively correlated with CDS spreads.



Notes: *t*-statistics are in parentheses.
Source: Bloomberg

Figure 5. International Price-to-Book Ratios vs. CDS and Growth, 2010

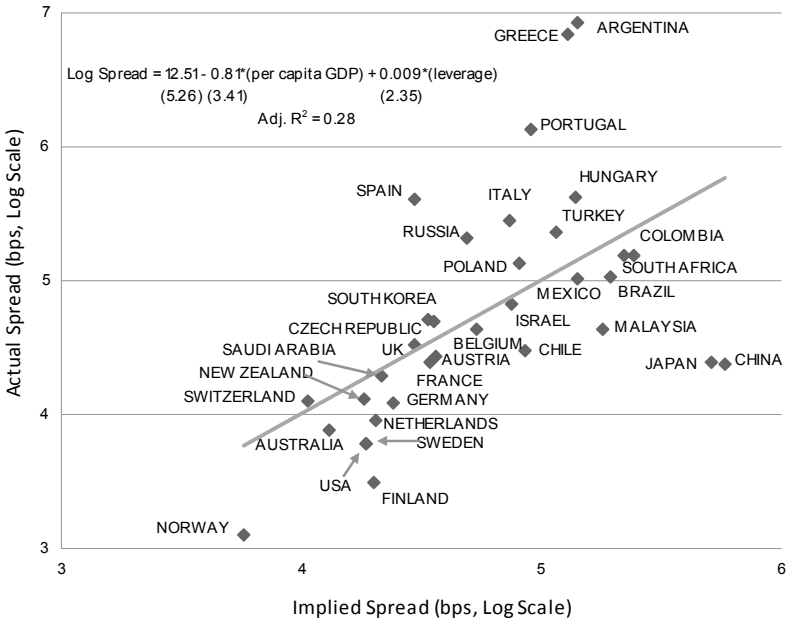
International Price-to-Book ratios are strongly correlated with CDS spreads (negative), and economic growth rates (positive).



Note: See Figure 4.

Figure 6. Factors Determining CDS Spreads, 7 May 2010

CDS spreads are strongly correlated with per capita GDP (negative), and government indebtedness.



Note: See Figure 4.

- With betas statistically indistinguishable from corresponding industry betas in the US (due to space constraints, we do not report the statistical evidence here).

- Most CDS coefficients are statistically significant and negative.

To establish a benchmark for our analysis, we analyze returns on several well-known US companies, and find that US equity returns are statistically dependent on S&P 500 returns, but are independent of US Treasury Bond returns (we do not report the regression results here due to space constraints). Therefore, this benchmark study underscores the importance of emerging market CDSs in determining emerging market equity returns.

B. International P/E Ratios versus CDS and Growth

Figures 4-5 respectively illustrate international P/E and price-to-book ratios (P/B) versus CDS and macroeconomic growth rates. The regression reported in Figure 5, demonstrates that international stock valuation is indeed a function of CDS spreads and economic growth rates. Though the P/E regression reported in Figure 4 is not as strong (judged by the *t*-statistic on growth) as the P/B regression reported in Figure 5, its broad conclusion points in the same direction. The reason that the P/E regression is not as strong as the P/B regression is probably due to significant divergences in international accounting standards. Another reason might be that earnings are more volatile, and as such less reliable, than book values. A more thorough examination of this question is beyond the scope of this paper. See also Figure 6, for factors determining CDS spreads.

International P/E and P/B comparisons should be taken with a grain of salt due to differences in international accounting standards. Nonetheless, practitioners frequently rely on these measures as benchmarks. It is in this spirit that I include a statistical analysis of these ratios as a function of CDS and economic growth rates. This analysis should be viewed as a cornerstone for more detailed explorations of international valuation multiple differences.

Theoretically,

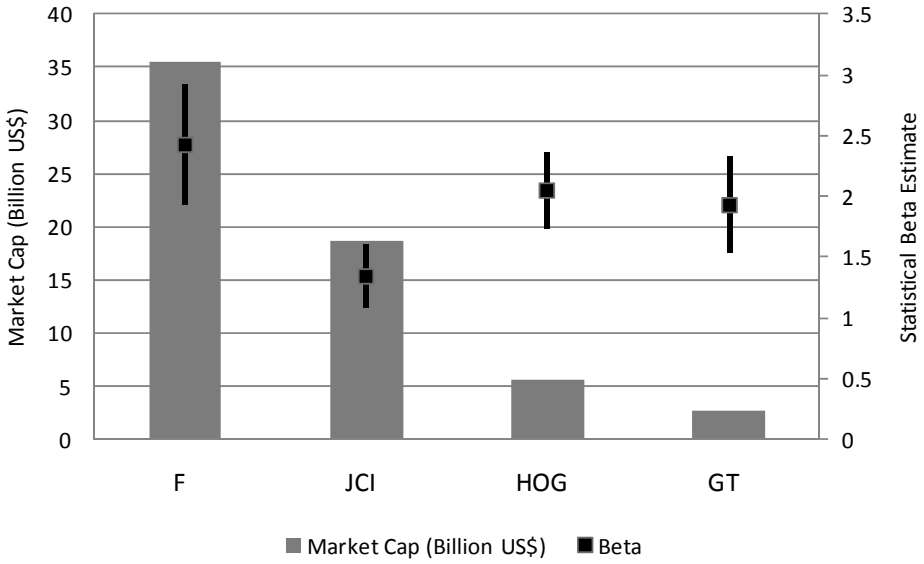
$$P/E = 1/(k_e - g), \quad (3)$$

Where P/E is the price-to-earnings multiple, E is the forward earnings, k_e is the cost of equity, and g is the growth rate of earnings. Because the international cost of equity depends on the CDS, based on equation (3), we would expect international P/Es to be a function of CDSs and macroeconomic growth rates, as illustrated in Figures 4-5.

P/E is the most commonly used and the most commonly cited measure of valuation. Its biggest strength is its simplicity and its currency of use. As with most measurements, it has various shortcomings, both as a pure domestic measure and especially as an international measure (for example, international P/Es vary considerably with Venezuela trading at about 3x, and Japan trading at about 33x). We list below these shortcomings:

Figure 7. Betas of S&P 500 Companies in the Automobile and Components Sector, 2008-2010

The betas of companies within a certain industry tend to converge towards an industry median.



Note: Betas are calculated using trailing 104-week data supplied by Bloomberg.
Market capitalizations are recorded on 28 June 2010.

Source: Bloomberg

- Earnings are an accounting measure, while price is a market measure. As such, the numerator and the denominator are frequently asynchronous. Moreover, when I am making international comparisons, I need to understand how accounting conventions may differ (see, for instance, Abuaf and Carmody (1990) for a detailed analysis of cost of capital and accounting differences between the US and Japan in the 1980s).

- Because earnings may be erratic, or may follow the macroeconomic cycle, a multiple of last year's earnings may be misleading for:

  - A company that has just taken big losses or big gains (this suggests that forward P/E multiples may be more stable as they do not suffer from historical one time losses or gains).

  - Companies that are going through the macroeconomic cycle (see, for example, Smithers (2009) for a detailed advocacy of cyclically adjusted P/E multiples).

- In addition to differences in country CDSs, and growth rates, international P/Es may differ because the nature of stocks in a certain country's index may differ than the nature of stocks in another country's index. For example:

  - 15%-20% of companies in the S&P 500 are in the technology sector, while less than 1% of the FTSE is comprised of technology companies. Because technology companies have high growth rates, we would expect the S&P 500 to have a higher multiple than the FTSE.

  - Conversely, oil and gas companies make up about 20% of the FTSE 100, while comprising about 10% of the S&P 500. Because oil and gas companies have low growth rates, I would expect the FTSE 100 to trade at a lower multiple to the S&P 500.

- Authers (2010) argues that cultural differences may also lead to different valuations across countries. For example, he argues that:"Americans have long been more disposed to buy stocks than Britons.

  - And the DAX index for Germany, with much less of an equity culture than Britain, also historically trades on a lower multiple than the US."

I do not agree with Authers (2010) on this last point as global equity markets are fully integrated. A thorough analysis of Authers's (2010) position is beyond the scope of this paper.

C. Company Betas by Industry Sector

Figure 7 plots the statistical beta estimates of the automobiles sector of the S&P500 stock index. I also explore

the beta estimates of other sectors in the S&P 500 stock index, which I do not report here due to space constraints. Theoretically, a company's capital structure and the size of its market capitalization may affect its beta. In practice, however, companies in the same sector tend to gravitate towards similar capital structures.

Indeed, as in Abuaf and Solomon (1999), our current analysis also suggests that by and large, most industries' betas are scattered around a median with little statistical dispersion.

V. Conclusion

I find statistical evidence that well-traded ADR returns statistically depend on the S&P 500. In addition, returns on ADRs issued by countries with significant levels of macroeconomic and political instability statistically depend on corresponding CDS returns. Based on these statistical findings, I conclude that ADR returns are a function of the S&P 500 and CDS returns.

I find statistical evidence that well-traded ADR returns statistically depend on the S&P 500. In addition, returns on ADRs issued by countries with significant levels of macroeconomic and political instability depend on corresponding CDS returns. Indeed, I also find evidence that P/E and price-to-book multiples, which are simple and widely-used though flawed measures of equity valuation, also statistically depend on CDS spreads and macroeconomic growth rates.

This conclusion supports earlier research detailed in Section I that the cost of capital for an equity investment in an emerging economy is a function of the global cost of capital for that industry and of the specific country's borrowing cost. Consequently, I recommend that:

- In estimating an international cost of capital, adjustments have to be made for political risk. Such risk includes currency inconvertibility, expropriation, civil unrest and institutional instability.

- When estimating political risk, the analyst should rely on CDS spreads. Moreover, different industries may have differing levels of susceptibility to political risk. If this observation is supported by the data, the analyst needs to adjust the global industry cost of capital by the industry's CDS beta. ■

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