"Up From Sin:
A Portfolio Approach to Salvation"

A study for presentation to the
XVIII G24 Technical Group Meeting
March 8-9, 2004
Palais des Nations, Geneva

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February 17, 2004

Abstract:

This study develops a proposal that has the potential to greatly improve the ability of developing countries to reduce their exposure to other countries' interest rate and exchange rate volatility and to lower their cost of raising capital abroad by borrowing in their own local currency. The key to achieving these goals is the creation of portfolio of emerging market local currency government debt securities that employs the risk management technique of diversification to generate a return-to-risk that competes favorably with other major capital market security indices. This study shows, based on data from the mid-90s through the end of 2000, that a portfolio of local currency debt can generate rates of return relative to risk that compete with that of major securities indices in international capital markets. It is noteworthy that this period includes several shocks to international capital markets including the crises in East Asian, Russia, the failure of Long Term Capital Management and Brazil. The study also provides an analysis of the implications of deploying such a policy for attracting capital to developing countries, the impact on the stability of their financial systems, their costs of borrowing and the implications for future developing of local capital markets.

I. Introduction

One of the most significant financial problems facing developing economies is their exposure to foreign exchange risk. Their exposure to exchange rate volatility is due largely to their accumulation of major currency denominated foreign debt (although derivatives have added substantially to foreign currency denominated liabilities in some cases[1]). Although there were concerns raised about foreign currency debt soon after the 1973 oil price shock, the problem became apparent after Mexico announced it would be unable to meet its debt payments in August of 1982.

More than two decades after Mexico's debt crisis, this problem remains an important policy issue today. During that time, much of the economic policy literature focused on solving the problem of foreign investors managing their credit risk exposure and the problem of developing countries adjusting to the variability of foreign capital flows and their own financial crises. Foreign indebtedness has received renewed attention as a result of a new economic policy diagnosis, termed "original sin" by Eichengreen and Hausmann (1999), and this has led to some new thinking about the challenge developing countries face in moving away from foreign currency denominated foreign borrowing.

This paper takes up that challenge by providing a policy analysis of what will hopefully prove to be a major new financial innovation to financing development. It improves market efficiency by overcoming some existing market imperfections. It requires negligible statutory or regulatory changes. It does not necessarily require the involvement of international financial institutions such as the IMF or World Bank, although it might well benefit from some official or public sector sponsorship.

This proposal is to raise capital in international markets by forming diversified portfolios of emerging market local currency debt issued by sovereign governments (EMLCD). We show that the returns on such a portfolio of local currency securities, if the returns are sufficiently independent to allow a reduction in portfolio variance through diversification, to produce a risk-return profile – measured in U.S. dollars or Euros – that is competitive with major U.S. and European stock indices.

This paper is organized in the following manner. The following section discusses the context of this problem and the economic literature that addresses it. Next, the third section describes the key features of the proposal developed in the "*original sin"* literature. Following that, section four develops the basis of for the EMLCD portfolio and analyzes its likely financial performance in comparison to some familiar alternative investments. Section five then analyzes macroeconomics implications of this new financing facility for developing economies, and lastly section six concludes the paper.

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[1]) See Dodd (2002) for a descriptive analysis of this dimension of the problem.

II. Overview

One key feature that distinguishes advanced economies from developing countries[2] is that they generally cannot borrow in international capital markets in their own currency.[3] While other distinguishing features include the capital-labor ratio, productivity, education levels and sophisticated financial systems, the inability of developing countries to borrow internationally in their own local currency is a critical factor in their financial stability.

Developing countries need capital inflows in order to augment domestic savings so as to obtain a pace of investment that is consistent with rapidly rising growth. In addition to foreign direct investment, developing countries need capital investment in the form of credit. If they are unable to negotiate terms denominated in their own local currency, then they must enter into a Faustian compact in which the joys of lower interest rates are held captive by obligations to repay in hard currency denominations.

Market Description: Foreign Currency Claims

Through 2000, which is latest data available online from the World Bank's Global Development Finance database, the long-term external debt of developing countries was $2,047.7 billion. Of that, 64% is denominated in US dollars, 12% in yen and 9.5% is in German deutsche mark, French franc and British sterling. The six currencies comprise at least 85.5% of long-term indebtedness by developing countries, and the remaining portion is explained by 7.6% in "multiple currencies" (it is likely that these six currency make up a large share of this figure) and 7.2% for all other currencies.[4]

In Korea, prior to the financial crisis at year-end 1996, the dollar composition of their long-term debt was 79%, while that in yen and multiple currencies stood at 13% and 5% respectively. Thus all but 8% of their foreign debt was in two currencies: US dollar and Japanese yen.

Similarly, prior to its financial crisis in December of 1994, 61% of Mexico's long-term foreign debt was denominated in US dollars, 21% in "multiple currency" formulas, and 9% in Japanese yen.

The consequences of foreign currency denominated indebtedness are at the foundation of developing country exposure to international disruptions and disturbances as well as the vulnerability to domestic fiscal solvencies and exchange rate systems. This makes poorer and more fragile economies subject to the impact of monetary policy changes in the country whose currency denominates their international debt. Tighter monetary policy that raises interest rates will increase foreign currency interest payments on variable rate debt and new issuances while it also reduces the market value of outstanding debt. In the 10 months prior to the financial crisis in Mexico in December of 1994, the US central bank raised short-term interest rates six times

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[2]) The article will use IMF definitions for terms such as advanced economies, emerging market economies and developing countries.
[3]) This is also true for most other emerging market economies and some newly industrialized economies.
[4]) The numbers add to slightly more than 100% due to rounding.

from 3% to 5.5% and the dollar rose over 7% against G-10 currencies. This put enormous external pressure on the peso while diminishing the Mexican central bank's capacity to defend it.

If there were an appreciation in the value of the currency of denomination, then this too would raise the cost of servicing foreign debt and put pressure on the international value of the local currency. In the months preceding first East Asian financial crisis, the US dollar appreciated substantially against the Japanese yen. From August of 1996, it rose 8.2% by January 1997, it was up 19% by May when the Thai was hit by speculative attacks and it had risen by 25.5% by December 1997.

The accumulation of international debt denominated in foreign currency poses a danger to more fragile financial systems. In the context of a fixed exchange rate system it creates an economic precipice by dramatically raising the cost of devaluation or even an adjustment to the exchange rate peg.

It undermines the fiscal credibility of developing countries because so much of their sovereign debt is known to be denominated in foreign currency. It also undermines the credibility of central banks in developing countries because their foreign reserves, which might amount to a significant proportion of their imports and trade balances, is dwarfed by the country's foreign currency debt obligations.

This danger from amassing foreign currency debt is so great that it raises the question of the efficiency of international capital markets in the distribution of risk. Why is the foreign exchange risk so disproportionally held by those least able to bear it?

If this distribution of risk is an indication of a market imperfection, then it suggests the need for an innovation or new public policy to rectify it.

RECOGNITION OF A PROBLEM

The recognition of this problem is not new.[5] Soon after indebtedness began to rise rapidly following the 1973 oil price hike, and well before August 1982, there were public policy discussions of this concern. The following two citations from *Foreign Affairs* illustrate the point. One notable contribution to the debate was from Gerald Pollack (1974), of the Exxon Corporation, who argued "the Eurocurrency market has several defects for present purposes" and particularly "the Eurocurrency market is not well suited to resource-poor or politically unstable developing countries with low credit standing." He warned, "[t]his question of financial instability may turn out to be the biggest of the threats posed by the energy crisis."

Following upon the build-up of large foreign debts and facing yet more adjustment borrowing after the second oil price hike, Walter J. Levy (1980, p.1002) warned that, "The debt problem could, of course, be solved if the values of the currencies in which the debts are incurred decline... [which] in fact did occur between 1974 and 1978 .... But it seems now that the jig is up."

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[5]) See Dodd (1989) for a summary of these views.

Additional warnings, although not pitched as alarms, came from Bacha and Diaz-Alejandro (1982) in Princeton's Essays in International Finance published in the May prior to Mexico's debt impasse. While they expressed sanguine views about the international lending up through the 1970s, they expressed concerns about prospective borrowing conditions in the 1980s that were "moderately pessimistic relative to repeating the favorable performance of the 1970s." They identified – based on the market risks faced by developing country borrowers – "A major uncertainty for LDC borrowers looking at the 1980s is whether the low or even negative real rates of interest prevailing during the 1970s will return." In particular they cited the risk of tightening monetary in the U.S. as a factor leading to higher real interest rates and a higher of the US dollar.

The economic literature focused much of its attention on the issue of the credit risk faced by the international banks acting as intermediaries in this recycling process. Two noteworthy technical contributions at the time came from New York Federal Reserve Bank economist Laurie Goodman. In a 1980 study for the bank she described the financial instruments used as the vehicle for recycling petrodollars, and analyzed the pricing of these syndicated, dollar denominated, variable rate bank loans. This principal concern at the time was that the loans were priced as a spread above LIBOR, and that the spreads did not generate sufficient returns to banks' portfolios in proportion to the credit risk of the loans.

In a follow-up study, Goodman (1981) analyzes the possible problems of country or credit risk from the point of view of lenders. She empirically tests a model of diversification to show that banks can gain by diversifying their risks across countries. Although there was limited data available at that time, the study shows that the country risks associated with lending to various developing countries have less in common than in difference, that is, the *unique* risk is greater than the *common* or *systematic* risk. Since it is the unique risk that can be reduced through diversification, then the study suggests that international banks can successfully manage the risk on their loans to developing countries through diversification.

The first reference we have found in the economic literature that discusses market risk (as opposed to credit risk with the focus of most economics literature in the early 1980s) of foreign currency debt in the context of international lending to LDCs was Lessard (1983). He pointed out that the form of debt issued to developing countries was "unsound," because international bank lending alone is inappropriate.

Writing in the wake of Mexico's debt crisis in August of 1982, Lessard (1983, p. 522) pointed out that criticism had been too focused on the quantity of foreign borrowing and not sufficient attention was being paid the fact that "[foreign lending] is structurally unsound and is likely to result in misjudgments and misbehavior on the part of lenders and borrowers." He went on to clarify what he meant by structurally unsound, by stating, "a financial system that relies overwhelmingly on bank credit is unlikely to be an ideal system in terms of world welfare.... it involves debt service patterns tat vary perversely with LDCs' net foreign exchange earnings... [and] it shifts risks from LDCs to world capital markets only through default."

While drawing needed attention to key features of foreign debt such as the problems caused by their variable interest rate structure, Lessard failed to address strictly identify foreign exchange

risk a major source of the "perverse variability of debt service obligations." Perhaps he took for granted that foreign debt would be denominated in foreign currency.

Lessard does foresee the more recent trend in development finance research, discussed immediately below, by recommending that debt service be stabilized through the use of price level index-linked loans.

Hausmann, et al (2002), and in his earlier work, have make a great contribution to the study of development economics and the policies designed to raise living standards in the developing world. What is more, a term was coined to described the core idea of the problem and capture the attention of economists and other concerned with developing country debt and exchange rate policy: "original sin."[6]

Not being able to borrow abroad or long-term in local developing country currency impedes development in several ways. Borrowing in foreign currency causes a "currency mismatch" that exposes the developing country to devaluation or some other international disruptions, and borrowing short-term causes "maturity mismatch" that exposes it to other volatile economic sources so as create a fragile financial system.

Foreign borrowing in a "hard" currency exposes the developing country to greater financial sector fragility from exchange rate movements, and this is especially the case for failure of fixed rate systems. Foreign borrowing also reduces the effective of the country to pursue an independent monetary and fiscal policy. Their monetary policy is constrained through its impact on exchange rates and in turn their impact on local currency cost of servicing foreign debt.

One should add, that borrowing in one's local currency adds to the tax base for seigniorage revenue due to the increase in demand for the local currency from the need to use it in the trading of the local currency instrument as well as in the process of making and receiving payments on those securities.

One should also add that the development and growth in local currency government securities markets play a critical role – as a foundation or skeletal structure – in promoting more "mature" domestic securities markets.

III. Summary of EM Index Proposal

The recent literature on causes, costs and dangers of foreign currency borrowing, i.e. the *Original Sin* literature, developed a policy proposal for redemption. The policy proposal in Hausmann, et al (2002) consists of three basic steps. First, construct an index (called an EM Index) that will be used to determine the rate of return on index-linked financial instruments (bank loans, bonds and interest rate derivatives). The index is calculated using the changes in each country's exchange rate and inflation rate, and by weighting each currency in the index by

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[6]) Eichengreen and Hausmann (1999).

the real out of the respective country.[7] The proposal calls for the World Bank to calculate the official index.

Second, the IFIs (official international financial institutions such as the World Bank and Inter-American Development Bank) would issue at least some of their debt denominated in the EM Index. This would enable those IFIs to lend in local emerging market currencies while maintaining a match between the currency denomination of the assets match and that of their liabilities. Similarly, the major developed countries, or G-10, would be called on to issue some of their debt in the EM Index.

The IFIs and G-10 borrowers, it is argued, would be motivated by the advantages of diversifying their liabilities or alternatively capturing savings after swapping their EM Index obligations back into their respective C-5 currency.[8] This would have the desirable consequence of creating an otherwise rare short position in the local currency. The third step would entail the process of the developed countries swapping out of C-5 currency denominated debt back into their own local currency.

Some problems with the proposal

There are several problems with the proposal.

1. The proposal is overly complicated compared to the problem that it solves. It includes requiring advanced industrial country governments to change their debt management policies to include the use of additional currencies, swap transactions and adding exposure to swap related credit risk from counterparties. While the government of Sweden already has been successfully developing more sophisticated debt management policies, these policy recommendations stand in stark contrast to the policies in the United States. Such a change in policy might not prove to be directly beneficial to the U.S., Japan and Euro zone governments. For example, the policy change would disrupt, or diminish the benefits from, regularly scheduled debt auctions. Also, the proposal would requirement the G-10 governments to borrow in a foreign currency and swap back into their own currency at time when it might, as well as when it might not, be cheaper to borrow in their own currency.

2. Individual developing countries might not directly benefit from borrowing in the EM Index because their exchange rate exposure in the index will be just as much a problem as exposure to C-5 currencies.

3. Unless IFI or G-10 governments borrow in local developing currencies, then the emergence of the EM Index will not lead to the need to hedge by taking long positions in local currencies. And without this need to hedge long positions, then the foreign currency swap market in local developing country currencies will remain small in relation to the needs of developing country governments to hedge their short C-5 currency positions.

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[7]) Real output is measured the purchasing power parity (PPP) value of the gross domestic product (GDP), and inflation is measured by the consumer price index (CPI).
[8]) C-5 stands for the countries with the major five currencies: U.S. dollar, Euro, British pound Sterling, Yen and Swiss franc.

4. The EM Index proposal does not clarify how the index-linked debt and securities are to be bought, sold or in general traded. The transaction must be denominated in some single currency unless it is the intention of the proponents that the entire basket of currencies would be used. It would be impractical to buy and sell securities that require multiple currencies for engaging in price quotes, negotiations and settlement. If the EM index is comprised of 22 currencies, as language in the literature suggests, then it will require a basket of 22 currencies to buy or sell. Otherwise, if it is traded in dollars then it will not *directly* help emerging market countries borrow in their own currency or reduce their foreign currency exposure although it would give them a more diversified exposure.

IV. Salvation Through Diversification: A Policy Remedy

There is a better policy solution to the problem of foreign currency denominated indebtedness. This section develops a policy remedy that is both economically more efficient and, if politics is truly "the art of the possible", politically feasible. One important testament to its viability is the fact it has already been successfully pursued by at least one major securities broker-dealer, and there are indications that another – Morgan Stanley – has been operating since 2002 its own version of an MSCI Emerging Markets Sovereign fund that combines investment grade local currency government debt from Hungary, the Czech Republic, Poland and South Africa.

We will call this approach emerging market local currency debt portfolio (or EMLCD). This original idea for this portfolio based approach, based on her experience with such a portfolio, draws heavily from the work of one author, Shari Spiegel, in managing a diversified local currency developing country debt portfolio from 1995 to 2000. The fund was operated with the goal of earning high rates of return paid on local currency securities while reducing risk through diversification.[9]

The proposal does not require that international financial institutions such as the IMF or World Bank play a pivotal role in its success. Official lenders could make highly productive contributions to this process, but their role is not absolutely necessary (see further explanation below).

Although this policy is low cost and feasible, its potential benefit is not meager. It is capable of offering direct help to countries in order for them to borrow in their own currencies – both at home and abroad in what could become a seamless market. The potential gains from this are enormous. Developing economies will benefit from greater stability as a result of reduced exposure to changes in foreign exchange rates and interest rates , which are all the greater because of their correlation, in the US dollar and other major currencies. They will also gain from increased seigniorage and from potentially lower costs of borrowing in their local currency.

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[9]) Where risk management could not be conducted economically through hedging instruments such as derivatives, the alternative was to use diversification.

In keeping with the theme of Christian theology inspired by Hausmann's work, the EMLCD portfolio will lead to – if not outright redemption of "original sin" – absolution of worldly sins so as to make progressive steps towards salvation.

Description of the Portfolio Approach

The core idea of this approach is to apply the insights of portfolio theory[10], which is part of the discipline of financial economics, towards enabling developing countries to borrow in their own currencies. The insight offered by portfolio theory is that a portfolio comprised of different securities whose returns are sufficiently independent (and especially so if they are negatively correlated) can yield superior risk-adjusted rates of returns than the individual securities. In other words, the volatility of the whole is less than that of the sum of its parts.

Figure 1
Debt Ratings: Long-term Maturities

	Foreign Currency	Local Currency
Brazil	B+	B+
Chile	A -	A+
Colombia	BB	BBB -
Costa Rica	BB	BB+
Egypt	BB+	BBB
Estonia	A -	A+
Korea	A	AA -
Malaysia	BBB+	A
Mexico	BBB-	BBB
Mozambique	B	B+
Peru	BB -	BB+
Phillipines	BB	BB+
Poland	BBB+	A+
S. Africa	BBB	A -
Thailand	BBB	A -

* Fitch Ratings, February 2004

The EMLCD portfolio would work by buying local currency government debt[11] instruments from many different developing countries and combining them so as to produce a portfolio whose return and variance would be competitive in international capital markets. The market risk, which is comprised of the uncertainty of local currencies interest rates and exchange rates, of each local currency security is often high and can even be high even in comparison to the market rate of return. It is very expensive to reduce this market risk through hedging because there are a disproportionate amount of short-hedgers in the market and a shortage of speculators

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[10]) The foundation of portfolio theory in the words of one of the great contributors to the theory is: Sharpe, William. 1970. *Portfolio Theory and Capital Markets.* New York: McGraw Hill.
[11]) The term security will be used to describe government debt instruments, although the portfolio could potentially contain government loans.

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willing to speculate on long-positions in local currencies.[12] In this context, the most cost-effective method for mitigating risk exposure is achieved through diversification across different countries' local currency debt.

Diversification is also means of reducing credit risk. However most developing countries are more highly rated for debt obligations in their own currencies than foreign currencies. Figure 1 shows several recent examples – Brazil is an exception – of how local currency credit ratings are usually two steps above that on foreign currency debts. Thus the major problem dealing in local currency debt is market risk, and it is the *unique* aspect of this risk that can be substantially reduced through diversification.

An expression for the returns on the portfolio – which are comprised of changes in the exchange rate, interest payments and the change in price of the local debt instrument – can be derived from the following equation for interest rate parity, where *r* is the US dollar or major currency rate of return (coupon payments plus change in market price), *r** is the local current rate of return and *e* is the exchange rate in consecutive periods.[13]

$$1+r = [(1+r^*)e_t/e_{t-1}]$$
(1)

The following equation (2) represents the returns from period *t* to period *t+1* from investing in *n* countries' local currency securities where each country is weighted by a factor *x* in the portfolio.

$$r_p = \sum_{i=1}^{n} x_i(1+r_i^*)e_t/e_{t-1} - x_i$$
(2)

The role of diversification in forming the portfolio is critical. The EMLCD portfolio would consist of a sufficient number of different securities from different countries so as to reach acceptable levels of market and credit risk.

The variance of the portfolio (σ_p) is determined according to the following equation (3), where *x* is the weights of the securities in the portfolio, ρ is the correlation coefficient, σ is the standard deviation and the subscript *p* denotes portfolio and the securities in the portfolio are represented by *i* and *j*.

$$\sigma_p^2 = \sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j \sigma_i \sigma_j \rho_{ij}$$
(3)

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[12]) The term short-hedger refers to an investors whose business normally involves a long position in the local currency and needs to hedge that exposure by taking a short position in the derivatives market.
[13]) The US dollar is chosen as an example. The same would be true of other currencies. The rate of return refers to the sum of interest payments and any change in price of the security. This equation yields a continuous time version: r = r* + ė + r*ė

In order to help provide an intuitive understanding of these economic ideas, there is an appendix to this paper that offers brief explanations and graphic illustrations of volatility, variance and diversification. It illustrates how securities with different distributions can be combined so that the variance of the whole combination is less potentially less than the particular securities. If the securities have a negative correlation, then the variance of the combination, that is the portfolio, can be very small. If they are not negatively correlated, but nonetheless are independent then the portfolio variance can also be greatly reduced. This reverses the old saw, so that we can now say the variance of the whole is less than that for the sum of the parts.

The securities would be included in the portfolio based on their returns and their volatility in relation to that of other securities in the portfolio. There are basically three interrelated decisions to be made, and these include the optimal number (n) of securities to be included, which local currency securities to include amongst the n in the portfolio, and the weight of each security in the portfolio.

The decision of the optimal number of securities to include in the portfolio depends upon the marginal benefit of the nth security to the portfolio variance. Both theoretical reasoning and empirical testing support the case that the marginal benefit to diversification declines as the number of securities is increased. The rate at which the benefits diminish will depend upon the degree of independence of the returns so that a portfolio of completely independent securities will quickly exhaust the benefits of diversification by eliminating all "unique" risk and leave only "systematic" or common risk. In actual markets there are degrees of independence and interdependence. As the marginal benefit diminishes, the transactions costs and portfolio management costs rise with the number of securities.

Empirical studies of the U.S equity markets, such that discussed in Sharpe (1970), estimate that a portfolio with 10 securities will have 7% more risk than the minimum (i.e. that of the market portfolio which is without diversifiable risk) and a portfolio of 20 securities will have only 3% more than the minimum. The actual determination of the optimal number of securities will depend on the transactions costs required to obtain and manage such a portfolio.

While it is difficult to anticipate the actual transactions costs and portfolio management costs, empirical evidence from the authors' analysis of data from emerging markets in the 1990s indicates the benefits to diversification flatten off sharply after the 19th security. Thus a portfolio of 20 securities is good preliminary estimate of the optimal size.

The decision to choose certain securities for inclusion in the portfolio will depend upon their returns and the distribution of those returns. The greater the independence, or if not independent the degree of negative correlation, will determine a security's potential margin benefit to the portfolio. If the distributions of returns on the n securities have sufficient independence, then that their combined yield and variance will produces a portfolio return and variance that competes with benchmark portfolios from the advanced capital markets in the major currency economies, e.g. S&P 500 stock index, DAX, FTSE 100 or the Nikkei 225.

The decision over the weighting of securities in the portfolio can be driven by different motivations. One approach is to replicate the share of the respective economy or the market size

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of the security's issuance relative to the others represented in the portfolio.[14] Most, but not all, security indices in advanced capital markets are based on weights that reflect the market capitalization of the security.

Another approach is to choose weights so as to produce the desired return to risk trade-off in the portfolio. In this approach, high yielding securities with low covariance with the portfolio would be weighted more heavily than those with lower returns or higher covariance.

Even if for simplicity the securities are equally weighted, i.e. each constitutes 5% of the portfolio, the set of sufficiently independent security returns can outperform the return-to-risk of major security indexes. If the portfolio weights are chosen, based on their independence of even negative covariance, so as to minimize the variance of the portfolio, then even greater results can likely be obtained. This might result in a portfolio contained more securities from a relatively small country or even a country that experience relatively greater volatility so long that its volatility differs substantially from that of other countries.

One important implication of the second approach is that this portfolio approach of choosing greater weights from countries with greater independence would have the positive effect of rewarding countries that successfully pursued independent policies and achieved independent results.

The ownership of the portfolio can take many desirable shapes. For one, a major financial intermediary can construct and hold the portfolio as part of its own balance sheet. Certainly the major money center banks are capable of creating a successful portfolio. However the minimum viable size is not large, and so securities broker-dealers, medium sized banks, mutual funds and even hedge funds could offer this type of investment vehicle.

Yet another approach would be to securitize the EMLCD portfolio in a manner is akin to that successfully pursued by US mortgage banking titans Fannie Mae, Freddie Mac and Ginnie Mae or even smaller examples of asset-backed securities. They pool together financial assets into a pool that is held by a trust, and then trust issues securities that represent ownership shares of the pool of assets. These shares can then be traded in a liquid and transparent market so that the process results in price discovery of the return and risk of the underlying investments. This attracts additional capital to the market, provides investors greater diversification, and most of all it helps development good standard market practices that are often lacking in the market for the underlying assets or securities.

These EM debt-backed securities could be denominated in any currency, although the most advantageous would be the U.S. dollar, Euro or Yen. The trust would simple be authorized and

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[14]) In comparison to the EM Index approach, the index weights are decided by GDP so that the largest countries have the largest impact on the index and their currencies would be in greater demand in subsequent transactions. This replicates and reinforces one of the causes of original sin, namely the size of the economy. This portfolio approach would not.

empowered to convert the various local currencies into the securities currency of denomination each payment date.[15]

As the great wit and sage Yogi Berra put it, "If you can't copy them, don't imitate them." In this case, however, the application of this ABS experience to local currency developing country debt is fairly straight forward and thus lends itself to imitation.

Attracting investors in international capital markets

The high performance of this portfolio, which compares favorably with the dollar return on major U.S. equity indices, U.S. corporate bond returns and Sterling denominated FTSE returns, will attract portfolio capital from individual investors, managed funds and financial institutions.

Of course, it might attract additional investor interest if shares were sold on different classes of the portfolio. This is a common practice in the securitization of debt through structured securities known as collateral debt obligations where different tranches of the pool – based on the priority in which debt service payments fulfill debt obligation – are sold separately. This generates different classes of shares based on credit worthiness, such as a class AAA, a class BB and junk class (i.e. speculative grade debt). However since this EMLCD portfolio would not be burdened with very much credit risk – most developing countries are highly rated for debt payments in their own currency – the different classes of shares would be differentiated based on market risk. Thus Class A might offer a very high likelihood of providing an 8% return in US dollars, while Class B might offer a strong likelihood of 10% and Class C offer a speculative return of 14%.
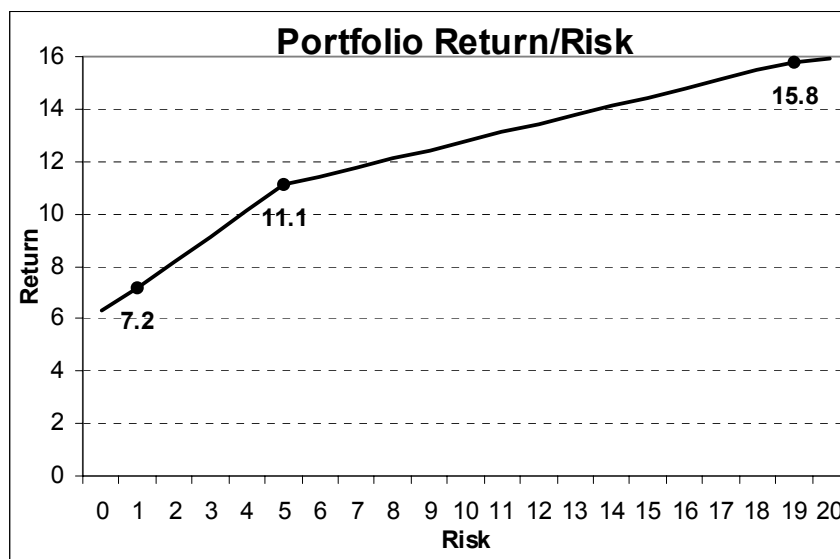
Track record

The actual returns experienced by such a portfolio of local currency government securities during the last half of the 1990s succeeded in generating an average annual rate of returns in US dollars of 11.1% over the period while maintaining low volatility (a standard deviation of 4.66% (measured as changes from month to month). These results are especially encouraging considering that the positive US dollar returns and the low level of volatility was achieved for a period that included the financial crises in East Asia, Russia and Brazil.

By comparison, the US dollar rate of return from investing in the stocks that make up the S&P500 index for the same period was 15.8% with a standard deviation of 18.6% (for the total rate of return which assumes reinvestment of dividends and measured as month over month from the previous year). Another comparison can be made to an investment that returns the yield on corporate bonds rated Aaa by Moody's. The returns on that investment for the same period would have been 7.16% with a standard deviation of 0.42%. In order to visual this comparison, these risk-reward profiles are charted in Figure 2 which shows that the EMLCD portfolio lies somewhere between – and above – a portfolio of the equity shares in the S&P500 index or a portfolio of corporate bonds rates Aaa by Moody's.

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[15]) Note that MBS involve a similar process of collecting receipts from the portfolio that fall across many different dates and then efficiently managing these cash flows until the regularly scheduled payment dates on the MBS.

Figure 2

Another comparison – and by way of contrast – that illustrates this point is one with the dollar returns on the FTSE – a UK sterling denominated equity index. This portfolio is diversified across the 100 securities that make up the FTSE index, but it is not diversified with regards to foreign currencies because the US dollar exchange rate with the UK sterling introduces additional risk to the FTSE equity index. The average annual returns over the same period were 7.52% and the standard deviation was 17.73%. This represents a lower yield and higher risk than the EMLCD portfolio, and lower yield for about the same level of risk for the S&P500 or alternatively about the same yield but for much higher risk than a portfolio of US Aaa corporate bonds.

These results constitute a preliminary analysis, and we anticipate more research with more sophisticated financial economic methods in the near future. Based on these results from returns over the period from 1995 to 2000, we show that there are substantial gains to diversification in a portfolio that includes local currency securities from 20 countries.

V. Economic and development consequences

In addition to the primary goal of helping developing countries borrow in their own currency, and thereby reduce their exposure to foreign exchange risk that has functioned to trigger many financial crises in the past decades, there are some other important economic consequences of a widespread adaptation of EMLCD portfolios that would lead to more local currency, and less foreign currency, debt issuances.

The macroeconomic consequences include: 1) attract more foreign capital, and likely to do in more steady volumes because the returns and risks will be more akin to those found elsewhere in advanced economies' capital markets; 2) raise the demand for local currency government

securities, and by association other local currency securities, so as to reduce the returns (that is, lower the rate of interest) and thus costs of capital in those markets; 3) the increase in use of local currency debt will promote the growth and maturation of local currency debt markets that will lower the cost of borrowing in those markets; 4) the lower local currency interest rates will stimulate investment and growth; and 5) the increase in use of local currency for trading in local currency denominated assets will increase seigniorage and together with the improved conditions for economic growth will improve the fiscal position of developing country governments.

There is a special warning that must accompany this new power to borrow abroad. Some developing economies in the recent past have suffered due to their governments' fiscal imbalances whereby large and persistent deficits were financed by borrowing that was subsequently monetized as part of monetary policy. The consequences for inflation, output and growth were sometimes dire. In this context, relaxing the constraints on developing country governments to borrow in their currency is expected to raise concerns about the possible hazard of eliminating the usual discipline of foreign borrowing.

While expanding the market for local currency financial instruments, this policy will not necessarily reward any particular country for pursuing reckless fiscal or monetary policies, as it does not guarantee any particular country the right to sell its local currency securities abroad. It does though offer greater rewards for being able to do so. In this regard it does not eliminate any disciplinary "stick" but rather adds "carrots".

The microeconomic consequences include: 1) the EMLCD portfolio approach will create a new benchmark in international financial markets; 2) the new benchmark would "price" the "market risk" – inflation, nominal interest rates and exchange rate risk – of investing in developing country debt instead of the credit risk; 3) the portfolio, by eliminating most if not all "unique" risk from each security, will establish the price of "common" or "systematic" risk in developing country debt markets; 4) this benchmark rate of return will have the effect of sharpening competitive pressures on international investors by identifying where local currency rates of return exceed that justified by the benchmark; and 5) the local currency interest rates and exchange rates will have the *excess* risk premiums priced out of them.

These above points warrant some elaboration. Consider first the point that establishing international markets in local currency debt will result in a move from pricing credit risk to market risk. The pricing focus will be changed from credit spreads to the risk premium reflecting the combined risk from the volatility of local currency interest rates and the local currency exchange rate.

The rate of return on US dollar denominated developing country debt (r_{EM}) is priced as a credit risk spread (φ) above the risk-free dollar rate of return (r_f), such as the U.S. Treasury rate, for the same maturity.

$$ r_{EM} = r_f + \varphi \tag{4} $$

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As the dollar, or other hard currency, rate of return on the EMLCD portfolio competes with other hard currency investments, its price will come to reflect the volatility of its returns and how they compare to the entire market of securities. Equation (5) expresses the returns on the EMLCD portfolio according to the capital asset pricing model, where r represents the rate of return and the subscripts represent the portfolio, the risk free rate and the "market" or benchmark. The coefficient beta is expressed in equation (6) as the quotient of the covariance of the portfolio and the "market" over the standard deviation of the portfolio.

$$r_p = r_f + \beta_p [(r_m - r_f)/\sigma_m]$$ (5)

$$\beta_p = Cov(r_p, r_m)/\sigma_p$$ (6)

The new benchmark rate of return on the local currency portfolio can then serve as the basis for international investors to price the returns on individual country's local securities. Equation (7) expresses how the return on country i's government securities should reflect its own volatility and its covariance with the EMLCD portfolio – but no more. If the returns exceed that indicated by their relationship to the benchmark, then excess profits can possibly be earned by investing in the country's debt.

$$r_i = r_f + \beta[(r_p - r_f)/\sigma_p]$$ (7)

This investment analysis can be further broken into simpler parts to make the decision easier. Recall that $r_i^* = r^* + \dot{e}$, so that equation (7) becomes the following.

$$r_i^* + \dot{e} = r_f + \beta[(r_p - r_f)/\sigma_p]$$ (8)

Now consider an example in which the model indicates that the rate of return based on the right side of equation (7) should be 12%, but the actual current local currency rate of return (r^*) is 25%. Under these circumstances, the investment will generate excess profits if the rate of currency depreciation does not exceed a 13% rate during the investment period.

IV. Conclusion

This study describes how to construct a portfolio of emerging market local currency government debt. This portfolio can generate US dollar and UK Sterling rates of risk-adjusted return that are competitive with familiar financial market benchmarks such as the S&P500 and FTSE indexes. It is a feasible proposal that can be promoted at negligible expense by public policies by G-7 governments, the Finance for Development process at the UN or the international financial institutions. They could inexpensively play a helpful role in establishing a demonstration project that would produce widely available market information on prices, returns and risk.

At the same time it might well prove to be successful without official support if private financial markets adopt it for its profitable opportunities. By comparison it stands as a more simple and straightforward policy than that proposed by Hausmann and others because it does not require approval and active participation of major currency governments and the World Bank. It is also more flexible in that the portfolio approach can be used to construct a variety of different types of portfolios that can be directly owned or securitized and can be sold off in uniform shares or in risk-related tranches.

This lesson stands as implicit criticism of the World Bank and Inter-American Development Bank as well as the private financial markets. It shows that for decades the IFIs have failed to identify this as a policy opportunity that would allow them to use their already country diversified asset portfolio to lend in local currencies. Instead they have doggedly practiced a flawed policy of lending in major currencies and then having to make more major currency loans to help developing countries structurally adjust to shocks from changes in foreign exchange and foreign interest rates.

Private financial markets too have overlooked, for the most part, this investment opportunity. In an industry that prides itself on its innovation and its top-flight financial analysis of arbitrage opportunities, this is a large, squandered opportunity. It is an example of the proverbial $20 bill on the ground, which theoretical economists believe cannot exist.

This EMLCD portfolio approach has enormous potential as a development policy. It has the capacity to not only reduce financial sector vulnerability in developing countries, but also to promote a more sound foundation for fiscal policy and the maturation of local financial markets.

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APPENDIX A

A Background Primer on Volatility, Distribution and Portfolio Variance

The value of financial assets is generally uncertain. Economic models usually have to assume a risk-free or risk-less asset, and then approximate it with some short-term government security such as the U.S Treasury bill.
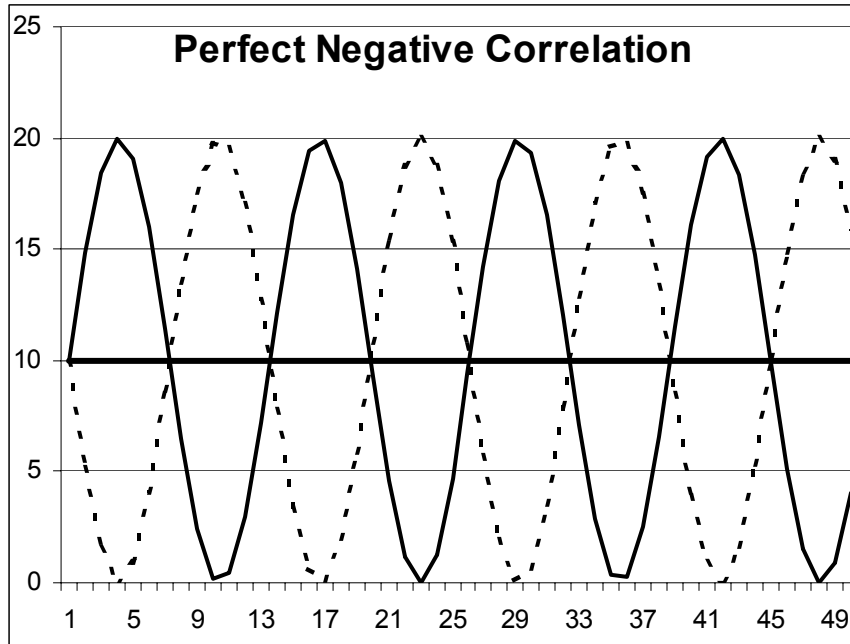
Policy analysis needs to be as practical as possible and so the actual uncertainty of financial assets is something that must be dealt with. One practical was of conceptualizing this uncertainty in order to make it intellectually tractable is to focus on the distribution of the uncertain events. Knowing something about the distribution of the returns on financial assets allows us to act rationally in making individual as well as policy decisions. In this way, economic policies about how to deal with uncertain future events can be developed, studied and compared to other plans. Although rational it is not exact and not a perfect substitute for certainty, but is the best known way to operate in a world that is appropriately described by the great wit and sage Yogi Berra's remark, "It's tough to make predictions, especially about the future."

The core of our paper is that risky securities can be combined into a portfolio so that their combined volatility is reduced. This allows an investor to combine different securities in order to produce a risk-return trade-off that is better than that on any one of the individual securities.

This key to taking advantage of the combination of risky securities is known as diversification. In order to benefit from diversification, the returns must be sufficiently independent or negatively correlated in order to generate this benefit.
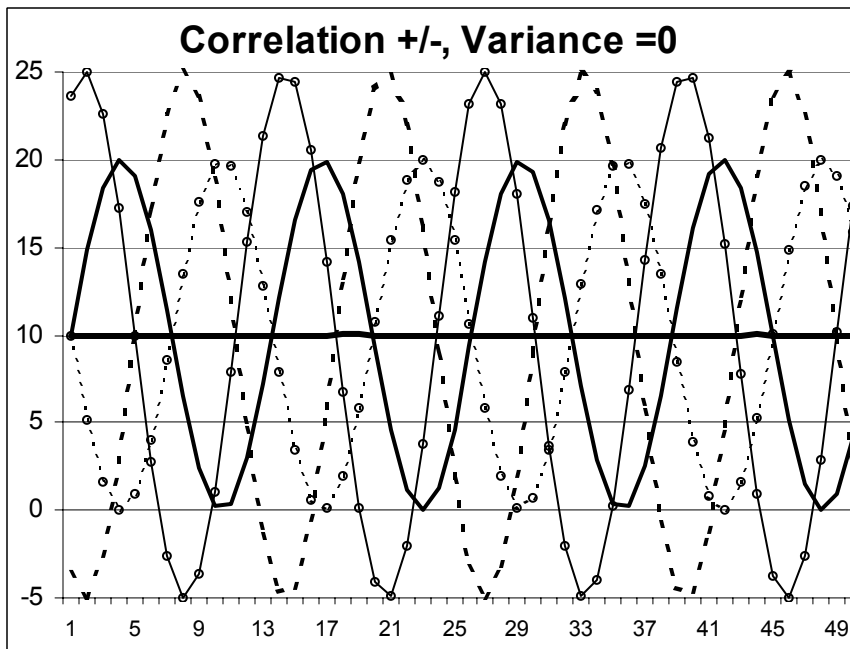
In order to explain the concepts of negative correlation and independence, it helps to visual what this means. Figure 1.A below illustrates a portfolio of two securities whose returns vary between 20% and 0%. The fact that one is always high when the other is low, or is equal to zero when the other is equal to zero, means that the combination of the two constant is constant at 10% (in bold).

Figure 1.A

Of course find two such perfectly and negatively correlated assets is unlikely (one exception would be short and long derivatives positions, but the combined return would be zero). Consider a slightly more complicated portfolio of four securities that are two pairs of perfectly negatively correlated securities but the two pairs are not perfectly correlated. This is illustrated by Figure 2.A below. Note that one pair has a greater volatility than the other pair, and that this illustrated by the high amplitudes (both positive and negative) of the waves of returns.
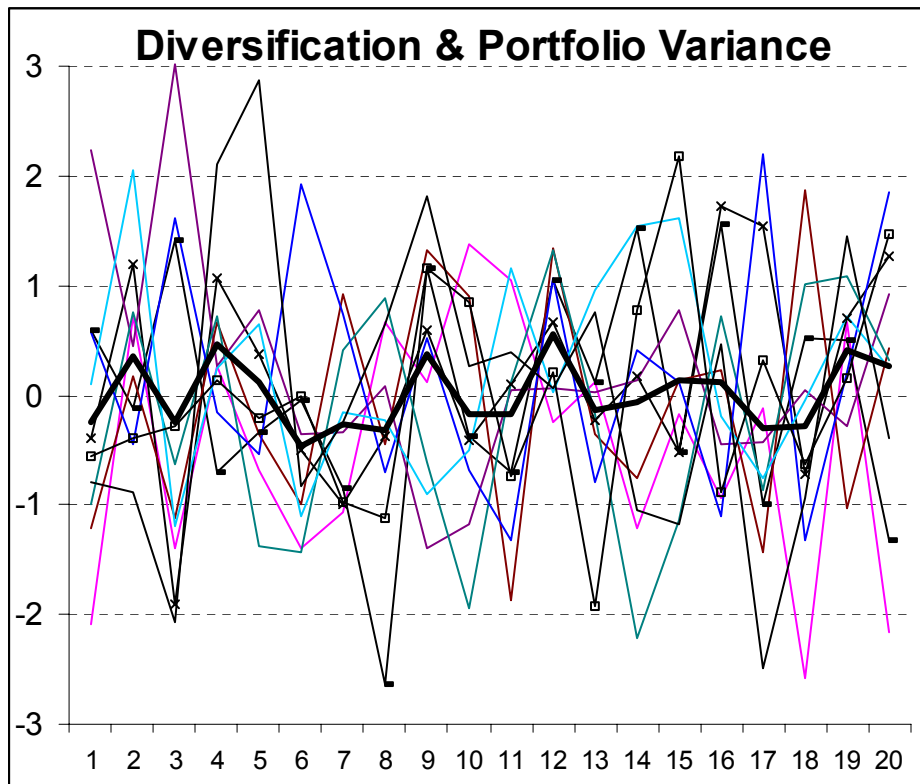
Figure 2.A

Again, if it were unlike to find one pair of perfectly negatively correlated securities then it would be even less likely to find two. The point here is to illustrate the potential of combining different securities, and larger number of different securities, into a portfolio so as to reduce overall risk or volatility.

The next point to consider is independence. In order to illustrate this point, Figure 3.A below shows a portfolio of hypothetical returns created by a random number generator. Each security is not perfectly independent but is sufficiently independent that the portfolio variance, represented by the dark bold line, exhibits substantially less volatility than any of the individual securities.

Figure 3.A

A concluding word of caution. The past distribution is not a guarantee of future distribution. The world, as Heraclitus pointed out some time ago, is constantly changing. And that applies also to the distribution of changing or uncertain things. This point was illustrated graphically but tragically when Long Term Capital Management collapsed when they investment strategy ran into uncharacteristic distribution of interest rates. Perhaps an easier way to remember this caveat is to recall again the words of the great wit and sage Yogi Berra who said, "The future is not what it used to be."