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AND ECONOMIC DEVELOPMENT:
COLLATERAL FOR A TOTAL RETURN SWAP

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ABSTRACT

We argue that a chronic US current account deficit is an integral and sustainable feature of a successful international monetary system. The US deficit supplies international collateral to the periphery. International collateral in turn supports two-way trade in financial assets that liberates capital formation in poor countries from inefficient domestic financial markets. The implicit international contract is analogous to a total return swap in domestic financial markets. Using market-determined collateral arrangements from these transactions we compute the collateral requirements consistent with recent foreign direct investment in China. The data are remarkably consistent with such calculations. The analysis helps explain why net capital flows from poor to rich countries and recent evidence that net outflows of capital are associated with relatively high growth rates in emerging markets. It also clarifies the role of the reserve currency in the system.

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In a series of papers we have argued that a revived Bretton Woods system provides an explanation for periphery governments' willingness to finance the US current account deficit.¹ However, we have not argued that a chronic current account deficit for the center country is a logical consequence of the system. In this paper we extend the analysis and provide a strong link between a successful international monetary system and net flows of savings from periphery (poor) countries to center (rich) countries, that is, for current account deficits for the center and current account surpluses for the periphery. The link is provided by a new approach to the role of collateral in the international monetary system. The collateral approach to international capital flows ties together literatures on sovereign debt default, development strategies and the international monetary system.

The lack of collateral or the means to collect it has long been recognized as the fundamental distinction between domestic and international debt markets. Models of sovereign debt are based on some enforcement mechanism that is "almost as good" as seizing collateral. The mechanisms include limiting future gains from trade and consumption smoothing or the disruption of output while debt contracts are renegotiated.² Each of these is equivalent to some immediate forfeiture of collateral triggered by nonpayment of debt. The relatively small value of these collateral equivalents is often assumed to limit net capital flows to poor countries as compared to flows warranted by expected return differentials. Capital formation in poor countries is constrained and economic development delayed.

More recent work on the role of reserves in the international monetary system has emphasized the role of domestic and international collateral during financial crises.³ The basic idea here is that international credit is limited by a quite different measure of collateral, namely, the expected proceeds of future sales of traded goods. Residents of the debtor country can trade this international collateral among themselves as long as domestic collateral is adequate to support such lending. An intriguing result of these models is that accumulation of international reserves by the government does not, in general, increase the real international collateral available to a debtor country and can actually reduce the incentives for private holdings of uncommitted collateral.

In this paper we explore the implications of a new concept and role for collateral in the international monetary system. We assume that international collateral is restricted to the equivalent value of cumulated net goods and services *already delivered to a foreign counterparty*. Already delivered goods are collateral if the

¹ Dooley, Folkerts-Landau and Garber (2003, 2004).

² Eaton and Gersovitz (1981), Bulow and Rogoff (1989), Dooley (2000a).

³ Caballero and Krishnamurthy (2001), Feldstein (1999).

official sector in the “center country” holding the goods is willing and able to default on or freeze the net financial liabilities to foreigners who have posted the collateral.⁴ *An important implication of this definition is that the government and the private sector of a country cannot borrow from private nonresidents in order to accumulate collateral.*⁵ The empirical counterpart to our definition of international collateral is net international reserve position of the country posting collateral.⁶

We assume that poor countries need collateral to support *balanced trade* in financial assets with the rest of the world. This assumption reflects the almost universal requirement in domestic credit markets that less credit worthy (poor) counterparties must post collateral with more credit worthy (rich) counterparties to cover potential and actual losses on leveraged positions.

Our model provides a rationale for net savings flows from poor to rich countries (to build collateral) and the recent empirical evidence that such flows are associated with more rapid growth in the poor countries. More rapid growth in our framework is the result of the export of gross savings from distorted domestic credit markets that is then returned to the poor country in more efficient channels of financial intermediation, usually in the form of direct investment. In this respect our framework is similar to Obstfeld (1994). In that model growth results from two-way trade in financial assets that allow relatively high risk and high return investment in poor countries. As argued in that paper, such effects can be a very powerful source of growth. The same mechanism would support our conclusions, although the poor country in our framework has to do more than open its borders to foreign investment, it has also to provide collateral for that foreign investment.

A striking implication of our argument is that the center or reserve currency country in the system is the country most likely to freeze or otherwise default on its own or its residents’ net liabilities to poor countries in reaction to a default in the periphery. Private investors in rich countries have strong incentives to pool the collateral in a center country that has a reliable judicial system and a history of willingness to freeze foreign assets. In the current system the United States seems to us the likely candidate. The US cannot accept the collateral unless it runs a current account deficit. It follows that a structural current account deficit for the United States is an important feature of the system in which large, poor countries are anxious to develop rapidly.

⁴ The center country does not have to distribute the collateral to private creditors; it is enough that the center country is willing and able to keep the goods already delivered by defaulting on its net liabilities. Of course the center country must be expected to do so only in reaction to a default in the periphery. The system is more efficient if the private creditors expect to be compensated by the center government. It may also be more efficient if the center government can freeze its own liabilities to the foreign government, that is, its international reserve liabilities.

⁵ We are not aware of other analyses based on this assumption. The existing literature on the demand for international reserves and the role of reserves in preventing crises implicitly assumes that the country is a net debtor (Dooley, 2002). It follows that reserve holding can only affect the liquidity of the government’s financial balance sheet. Under some circumstances this can have real effects but, as emphasized by Caballero and Krishnamurthy (2001), the baseline Ricardian result would be that the level of reserves would not affect the equilibrium. Credits from other governments and international organizations might in some circumstances be equivalent to “goods already delivered” and therefore provide collateral in addition to current account surpluses.

⁶ A less obvious source of collateral would include credit lines to the poor country from other rich governments and international institutions See Dooley (2000b) for an empirical interpretation of financial crises as seizures of collateral.

Gross Capital Flows and Growth

The underlying political economy that motivates periphery governments is set out in Dooley, Folkerts-Landau and Garber (2004). The development strategy of fixed exchange rate “trade account” countries requires rapid export growth and large inflows of direct investment in order to absorb rapidly an initial stock of underemployed labor. The primary policy tool is a real exchange rate that is undervalued by conventional measures and accumulation of international reserves. This undervaluation can be quite large depending on the initial stock of labor to be absorbed by the industrial sector.

We have argued that *if* the exchange rate policy that generates the absorption of excess labor at an optimal rate also generates a current account deficit for the center, periphery governments will finance the center’s deficit through reserve accumulation rather than sacrifice their development strategy.

It might seem natural to assume that the “undervalued” exchange rate would tend to generate a trade surplus in the periphery and trade deficits in the center. But on closer inspection it is also clear that the expected rate of appreciation of the real exchange rate can be quite small because adjustment may last for decades. Since traded goods are almost as cheap today as they will be tomorrow for the center country, and almost as expensive today as they will be tomorrow in the periphery, there is no reason to believe that an absorption relative to output will be tilted to produce deficits in the center and surpluses in the periphery. Surpluses and deficits cannot be explained by inter-temporal substitution.

Put another way, the development strategy we have set out has strong predictions for patterns and magnitudes of gross international trade in goods and capital markets but, as it stands, has little to say about the pattern of current account imbalances between the center and the periphery. But it is exactly the large net imbalances that have generated the most heat in international policy debates.

In this paper we extend our basic analytical framework in a direction that provides a link between successful development strategies in the periphery and net flows of savings from the periphery to the center. In contrast to the usual assumption that capital “should” flow from capital rich countries to capital poor countries to equalize rates of return, we reach the opposite conclusion.⁷ Our framework suggests that a successful development strategy generates net capital flows from poor to rich countries. Net capital inflows to the center provide collateral to center country investors. Without this collateral the development strategy of the periphery is derailed by a lack of international financial intermediation. Indeed, stripped down to basics, this is what it means to be the “center country” or the provider of the “reserve currency”—it is simply the country that is the best depository and manager of collateral.

⁷ This is actually more than an assumption. It is the result of the dominant academic theories on net international capital flows. A country that is going to grow rapidly should smooth out consumption by borrowing now as long as the growth is somehow locked in. This last proviso is where the feeling that the dominant model is correct goes off the tracks; if a growing country decides to party too early, the “locked-in” growth does not materialize and its debt does not repaid.

Gross Capital Flows and Collateral

The basic idea is that financial intermediation by the center that facilitates growth in the periphery also generates asymmetric risks for the center. Such international financial intermediation facilitates periphery growth because it channels domestic savings in the periphery through superior financial markets in the center. A simple example would be the accumulation of direct investment claims by the center matched one for one with the periphery's accumulation of Treasury securities. Balanced gross capital flows imply a balanced current account, in this case an exchange of equity claims for low-yield fixed income claims.⁸

The main point of this paper is that the accounting balance described above does not balance the economic risks faced by participants in international capital markets. We argue below that if current accounts are balanced the periphery's development strategy generates a net exposure for direct investors that will strangle intermediation and limit growth in the periphery. To relax this constraint, *the periphery must post collateral* and, in fact, must post more collateral the more successful is its development strategy. In our view, *the only effective collateral available to facilitate international intermediation is a net export of goods and services from less creditworthy countries*. It follows in the current environment that the US must be willing to run a current account deficit in order to fulfill its role as the center country in the system.

The Swap Analogy

We find it useful to compare the implicit economic contract between the center and the periphery to a standard derivative contract: a total return swap. A total return swap is a promise by one party to pay the total return (capital gains plus dividends) on the notional amount of an asset such as an equity or equity index for some future interval in exchange for receipt of fixed income on notional principle over the same interval. In a typical private contract, a floating reference interest rate is set by the market at LIBOR adjusted by 20-30 basis points so that the contract initially has about zero market value.⁹ The interesting aspect of such contracts for our argument is that the less creditworthy party to the contract is required to post collateral for actual and potential mark to market losses. Failure to provide the collateral terminates the contract, effectively a cancellation of principal on both sides and a taking of collateral to cover at least the current market value.

The application of this contractual arrangement to the international monetary system is straightforward. The periphery promises to pay the US the total return on US direct equity investment in the periphery. The US promises to pay a fixed interest rate on reserve assets. An important difference between a private total return swap and the international contract is that most of the time in the latter there

⁸ See Garber (1998) for a discussion of the role of derivatives in risk sharing associated with net capital flows.

⁹ Suppose for example, that an AA bank agrees to pay the total return on \$100 million notional value of a corporate share and will receive Libor plus. It can hedge this by borrowing \$100 million at Libor and buying \$100 million of the corporate shares. This is why the swap starts at zero market value. In practice, there will be some markup on the Libor it receives to provide for its costs, risks, and a profit margin.

is no direct contact between the counterparties. It is only in a default situation that the two governments would consolidate their national claims and then net liabilities against claims. But conceptually, the creditworthy (center) country should demand collateral from the less creditworthy (periphery) country on a mark to market basis. Since international default is a fairly common event, private investors have to consider the value of their claims in the event that all foreign gross claims and liabilities are nationalized and they are paid a part of the net result. Clearly, the more negative the net investment position of the US the better is the value of gross claims on the periphery and the more willing would investors be to acquire such claims.

How Much Collateral and in What Form?

There are two additional complications. First, what is the mark to market value of the international contract? Second, how does the periphery post collateral? For the implicit international contract, we have shown elsewhere that there is a subsidy element to the foreign direct investor on initiation of the contract. That is, effectively, the equity leg of the deal is provided at below market value; so the swap starts already in the money. Also, the interest rate on the fixed income leg is determined by the risk free treasury rate. It follows that the initial expected present value of the contract is positive for the US and negative for the periphery. For simplicity, it is not a stretch to assume that the “original sin” of the periphery is that it is born being a credit risk and that the entire expected present value of the swap will have to be matched by collateral, as well as some additional coverage for future valuation risk.

In typical total return swaps, collateral is determined by multiplying potential volatility of the underlying asset over the next ten days by a factor dependent on the credit risk of the counterparty. For example, a more creditworthy counterparty might pay 15% collateral on an asset-based swap whose underlying 10-day volatility is 10%, while a lesser credit might have to deliver 30%. An additional factor might be added to cover foreign exchange risk and country risk for foreign or emerging market underlying assets. Some examples of the range of collateral actually required are: for a total return swap on a highly liquid US equity, a hedge fund (less creditworthy) would be asked for 15%, for the S+P index 10% collateral would be required, for Gazprom in Russia 50% initial margin would be required. Swaps in listed China equities draw a similar haircut.

But this is only the initial collateral required for new investment. If, as seems likely, the total return on direct investment exceeds the return on the fixed interest leg, one hundred percent of the mark to market gain on private contracts must be collateralized every day. The implication is that, in addition to the collateral required for the new flow of direct investment, the mark to market gain on the stock of direct investment requires additional variation margin.

Collateral and Growth

The mechanical but important implication is that a successful development strategy—where investment pays off with large returns—generates capital gains

on direct investment and therefore rapid growth of collateral balances. Recent empirical research suggests that rapid growth in emerging markets is correlated with net lending from those successful economies to the rest of the world. Aizenmann et al. (2004) conclude:

There is no evidence of any growth bonus associated with increasing the financing share of foreign savings. In fact, the evidence suggests the opposite: throughout the 1990s, countries with higher self-financing ratios grew significantly faster than countries with low self-financing ratios. This result persists even after controlling growth for the quality of institutions.¹⁰

This empirical result is clearly at odds with the conventional wisdom that net capital inflows to emerging markets are necessary to augment domestic savings and promote rapid growth of the domestic capital stock. The evidence is, however, consistent with our analysis. In effect, net capital outflows are required to support efficient domestic capital formation. What is really at stake in economic development is the quality rather than the quantity of domestic investment.

Table 1. Direct Investment and Collateral, USDbn

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Direct Investment	3	11	34	66	99	137	179	220	257	295	332	379	426
50% Collateral Initial													
Contract	2	4	12	16	17	19	21	21	18	19	19	23	23
100% Collateral Capital													
Gain	0	1	3	7	10	14	18	22	26	29	33	38	43
Total Stock Collateral	2	7	22	44	71	104	142	185	229	277	329	391	457
Stock of Reserve Assets	22	21	22	53	75	107	143	149	158	168	216	291	408
Cumulated Current													
Account	13	20	8	15	17	24	61	92	113	134	151	187	233
Private Claims on													
Nonresidents	1	30	59	82	116	154	219	278	326	385	390	399	397

Source: IIF

We can get a feel for the economic importance of these effects by estimating what collateral would be required by private investors for direct investment in China. Table 1 applies the general concepts developed above to recent data for China. The first row of the table shows annual data for the cumulated flow of foreign direct investment into China from 1991 – 2003. At the end of 2003 the book value of the stock of direct investment was about \$426 billion.

Row 2 shows the new initial collateral that would be required for the flow of direct investment in each year assuming that the aggregate implicit contract carries the 50% collateral required for private total return swaps with China. Row 3 shows the

¹⁰ Joshua Aizenman, Brian Pinto, and Artur Radziwill, (2004). Similar econometric results are reported in Gourinchas and Jeanne, (2003).

new variation margin required each year for the net capital gain on the stock of direct investment. This assumes that there is 100% collateral required against mark to market gains and that net capital gains each year equal 10% of the book value of direct investment. The implied cumulated stock of collateral is shown in row 4. In 2003 the stock of collateral would be about \$457 billion, an amount slightly larger than the book value of direct investment because of capital gains.

The stock of international reserves is shown in row 5. In 2003 the stock was about \$408 billion, clearly the right order of magnitude if we interpret the government's reserve assets as the primary measure of collateral.

Rows 6 and 7 round out the balance of payments identity. Row 6 shows the cumulated current account surplus over the period. The cumulated balance from 1991-2003 was about \$233 billion, suggesting that net trade in goods and services accounted for about half of the collateral accumulated. Net credits from bilaterals and multilateral institutions and small net inflows from banks account for the remaining net inflows. We assume that such credits require no collateral or less collateral as compared to direct investment.

Direct investment inflows are matched by private capital outflows from China. The cumulative stock of private Chinese claims on nonresidents, \$397 billion in 2003, is shown in row 7. The interesting conclusion is that private direct investment in China has been roughly matched by private Chinese investments in the rest of the world. These are analogous to the two matched legs in a total return swap. We do not know much about the nature of these outflows since they are largely unrecorded in official statistics. The social collateral needed to support this international financial intermediation has been concentrated by accumulation of reserve assets.

Delivering goods and services up front is a crude form of collateral. But there is no credible alternative. Market participants individually could pledge financial assets in the center country, but the only way that the aggregate of the periphery can acquire assets in the US is to run a current account surplus. In an important sense, the goods and services already delivered to the US support the stock of US claims on the periphery; it is the collateral that powers the entire development strategy.

The nature of the social collateral is so obvious it is hard to see. If the center cannot seize goods or assets *after* a default, it has to import the goods and services *before* the default and create a net liability. If the periphery then defaults on its half of the implicit contract, the center can simply default on its gross liability and keep the collateral. *The periphery's current account surplus provides the collateral to support the financial intermediation that is at the heart of Asian development strategies.* The interest paid on the net position is nothing more than the usual risk free interest paid on collateral.

Conclusions

The collateral approach to international capital flows ties together literatures on sovereign debt default, development strategies and the international monetary system. The mechanism of modern large scale development is straightforward.

Rapid industrialization in the periphery requires a large inflow of direct investment; and, in turn, a large current account deficit for the center is required to provide the collateral.

Contrary to almost universal opinion, successful economic development is powered by net savings flows from poor to rich countries. The current account imbalances of the rich countries do not pull the periphery by providing global aggregate demand; they push the periphery by securing efficient capital formation. Seemingly balanced shifts within a country's capital account actually drive its current account through a need to collateralize resulting risk imbalances. The US current account deficit is an integral and sustainable result of its role as the center country in the revived Bretton Woods system.

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