S. C. Tsiang:
His Contribution to Economic Theory

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On Loanable Funds, Liquidity Preference and the Monetary Approach: Some Lessons I have Learned

by

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I first became acquainted with S. C. Tsiang in the summer of 1950, which I spent working in the Research Department of the International Monetary Fund. Both the fund and the World Bank were in their infancy: these two great international agencies were jointly housed in what later became known as "A Building"-- just one of a veritable alphabet of World Bank structures. To my knowledge, the Research Department of the fund was the only entity housed outside of that building. We were located in what they called the "Premier Building" -- a very elegant name for a building whose first floor was occupied by a fast-food restaurant of a well-known hamburger chain (White Castle, I believe).

The head of the Research Department was J. J. Polak, who remained in that post until he retired from the fund many years later. His deputy, and our immediate supervisor, was Sidney Alexander, who went on to serve as chief economist for President Truman's Materials Policy Commission, and still later to a professorship in MIT's Sloan School of Management.

The Research Department was quite small at the time. There were others, beside our own group, but I do not recall their names. Our group consisted of five people -- S. C. Tsiang, T. C. Liu, C. G. Chang, a Frenchman named Michel Verhulst, and myself. We were housed in one large suite, and worked at very close quarters with one another. Looking

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back, I feel this was a great stroke of luck, for it helped to foster a lot of interaction among us, and in the case of S. C. (as we called him), T. C., and myself, it was the basis of continued contact and friendship over the subsequent years.

It continually amazes me when I think back to that summer in Washington. On the one hand I never imagined how great would be the contributions of that group. Tsiang and Liu went on to play major roles in the transformation, liberalization, and modernization of the Taiwanese economy. They were in attendance, as it were, at the birth of the first of the East Asian "dragons," and they played crucial continuing roles as Taiwan's economy developed. At the same time they each pursued distinguished academic careers in American universities, and S. C., after his retirement from American academic life, continued as the leader of Taiwan's most distinguish economic research institute.

Alongside these thoughts I fondly recall many social occasions. It was S. C. and T. C. who introduced me to North Chinese cuisine. There were many visits, during that summer as well as later, when I came to Washington on other matters, to the Peking restaurants in downtown Washington and in suburban Chevy Chase Circle. I appreciate to this day the dishes that they introduced me to, and I value the tastes that they helped me cultivate.

S. C. stands out in my mind as one of a small number of economists who in their lifetimes manage to make important contributions both to the academic discipline of economics, and (through their influence on economic policy) to the actual improvement of national economic institutions and of the welfare of their countries and their peoples. In my view, it is characteristic of these economists that they are close and perceptive observers of the world around them, and are constantly searching for better ways of understanding and interpreting how economic forces really operate. As their appreciation of the world is, at least in many aspects, observational and intuitive, there are bound to arise instances in which their sense of what the world is like does not fit with one or another prevailing approach, or theory, or explanation that may have quite wide acceptance among their academic colleagues. This uneasiness with prevailing thinking often leads to seminal contributions, which in turn can stimulate significant change in the way the economics profession looks at the world.

S. C. was certainly such a person. Apart from his enormous

contribution, through wise and sound policy advice, to the development of the economy of Taiwan, he emerged as one of the leading forerunners of what later came to be known as the monetary approach to the balance of payments, and also as a major figure in the debate over the respective roles and relevance of the loanable funds and liquidity preference approaches to the explanation of interest rates.

In this paper I hope to pay homage to S. C. Tsiang by expressing my own thoughts on these and closely related areas of economics. I feel a great kinship to him in that much of my thinking in the field of economics has, like his, had its origins in observations of the real world -- observations that leave one puzzled, troubled, piqued, and disturbed until, if one is lucky, some germ of an idea comes which helps to reconcile the apparent contradictions that stimulated one's uneasiness in the first place.

I feel a kinship with S. C. also in that lines of thinking based primarily on observations have frequently carried me some distance from what might be called mainstream economic thinking, which is, at least in my view, more literature-oriented and more subject to the trends of discussion as they emerge in our journals and our conferences. In this particular paper, I represent a rather extreme case of the above, because for at least a couple of decades now my encounters with monetary and macroeconomics have almost invariably been observational ones, impelled by observations of particular real-world economics and motivated by a desire to understand, to diagnose, and to resolve what seem like puzzling facts and troublesome contradictions.

I have labeled the exposition that follows "lessons I have learned" precisely because I feel that at many points I am quite distant from most of the contemporary literature on the subject -- not necessarily directly contradicting it, but rather on a somewhat different plane, following a different approach or paradigm. Some of these lessons may fit into the vision articulated by contemporary mainstream economics, but others quite probably do not. Some of these other lessons, in differing from today's mainstream, may hark back to the insights of earlier generations of economists. Other of those lessons may diverge from the main line principally on the basis of quite recent observations -- connected, perhaps, to events, reforms, and institutional changes in the economies I have observed quite closely.

Lesson 1
On the Cost of Holding Money

Much confusion has been caused by representation of the nominal interest rate as the opportunity cost of holding money. This representation emerges quite easily from simple models in which money by itself bears no interest and in which there is only one other interest-bearing asset, with an interest rate of r. In such a model, holders of money are forgoing a rate of return of r, which is what they would get by investing in the alternative asset.

Perhaps because of my long immersion in public finance problems with a general-equilibrium flavor, I feel much easier when I am dealing with a simple model that broadens easily to incorporate a number of possible substitute (or complementary) goods. Thinking in this vein, one can look at a number of financial assets, ranging from Treasury bills to long-term bonds. If each of these has a nominal yield of r_j, and if the inflation rate is π, then the real yield of the asset is $r_j - \pi$. This may differ significantly from one asset to another as we vary the index j. It can also be defined in an *ex post* sense using the actual rate of inflation of a past period, or in an *ex ante* sense using the expected rate of inflation for a future period.

I find this way of looking at the problem to be much more satisfying than the view from which we started. For now we can very easily deal not only with different rates of yield on different assets that are substitutes for money, but also with different rates of yield on the separate components of money itself.

On currency, which to my knowledge never bears a nominal yield, the real yield is always $-\pi$ (the negative of the rate of inflation). This is, everywhere and always, the actual real yield of holding cash balances in the form of currency. Holding demand deposits, by extension, has a real yield of $(r_d - \pi)$, and holding savings deposits yields $(r_s - \pi)$, where r_d and r_s are the actual nominal interest rates paid on those two classes of deposits.

Simply changing signs, we can speak of the cost of holding currency as π, that of holding demand deposits as $(\pi - r_d)$, and that of holding savings deposits as $(\pi - r_s)$. From here one can see a change in the rate of

inflation generates an own-price effect on all components of money, while rises in different interest rates generally give rise to cross-price effects. Only for those components of money that actually pay interest can an interest rate change generate an own-price effect, and, for that to happen, the interest rate actually paid on the component of money in question (e.g., r_d or r_s) must be the one that is changing. Changes in all *other* interest rates can only give rise to cross-price effects.

Lesson 2
For Any Component of Money that Pays Interest, a Rise in its Interest Rate Increases the Demand for Real Balances of that Component

This proposition follows directly from Lesson 1. If the cost of holding savings deposits is $(\pi - r_s)$, a rise in r_s will reduce this cost, hence lead, *ceteris paribus*, to an increase in real holdings of such deposits.

Lest readers think that this is just an idle truism, with little relevance for understanding real events, let me recount some pages from the inflationary history of Latin America. When I first started observing the Latin American scene in the mid-1950s, the main inflationary countries were in the Southern Cone of South America. The inflationary disease at that time took a particular and characteristic form. The countries had not yet come to accept inflation as their fate, nor had they learned to cut it off at its root (fiscal deficits financed by rapid monetary expansion). But they were always trying to bring inflation under control. Hence they held on to a number of policies that were at best weak reeds, and at worst downright counterproductive for their economies. Among these policies were: a) exchange rates that were held fixed, long beyond the point when economic evidence would have dictated a change; b) prohibition of interest payments on demand deposits; c) limitation of the interest rates on time and savings deposits (sometimes via regulations, sometimes via usury laws) to maximum levels that ended up being well below the rate of inflation.

When the inflationary fires began to burn, in such a setting, the cost of holding all types of money rose -- currency, demand deposits, time and savings deposits were all rendered less attractive to hold, and, indeed,

holdings of all of them declined in real terms, or at least as a fraction of GDP. But the notable fact was that time and savings deposits tended to decline much more than currency and demand deposits. U.S. dollars proved a far better store of value than did savings deposits during the inflationary episodes of the 1950s and 1960s, and so, too, of course, did virtually any durable physical asset. These types of assets proved to be much more ready substitutes for time and savings deposits than for currency and demand deposits. Hence the ratio of time and savings deposits to M2 fell sharply as a consequence of inflation.

Let us now turn to some of the same countries in the period starting with the mid-1970s. By this time financial markets had been very substantially freed. Interest rates on demand deposits tended to be limited, but those on time deposits were substantially freed. The result was that time deposits remained attractive assets to hold, and in certain cases became almost the single most attractive asset to hold. In Chile, for example, during the period 1976 through 1979, the *real* rate of interest received by depositors on renewable 30-day time deposits averaged over 2 percent per month.

During this more recent period, the reaction of time and savings deposits to the phenomenon of inflation was quite the reverse of what it was in the 1950s and 1960s. Instead of the ratio of these to M2 going way down as a consequence of inflation, it went sharply up, or at worst held its own. .

That this turnabout should have happened, given the changed institutional setting, should be self-evident to economists -- and I believe it *is* self-evident to the great majority of them. What I contend is that we come directly to the point by conceptualizing the cost of holding cash balances as $(\pi - r_j)$, while the idea of a generalized interest rate r as the "opportunity cost" of holding cash balances only leads one astray.

Lesson 3
On Monetary Expansions Driven by the Demand for Credit

In those very episodes referred to in the previous lesson, there had

to be some powerful force underlying the extremely high *real* interest rates that were being paid on time and savings deposits. That force was the demand for credit. And while this demand always comes in part from the government (and the public sector generally) and in part from the private sector, I believe it is correct to say that in the episodes of very high real interest rates that were observed in the Southern Cone, the main driving force came from the side of the private sector.

In the old days, when both rates of interest, r_d and r_s, were held significantly below the rate of inflation, (M_1 / Y) was low because of the mere fact of inflation, and $(M_2 - M) / Y$ was lower still, compared to what it would be in a normal, stable, non-inflationary equilibrium for the reasons set out in Lesson 2 above. The consequent low level of (M_2 / Y) set a limit on the amount of real credit that the banking system could offer -- the system's total assets being pretty much dictated by the size of its total monetary liabilities. In short, as the public ran away from holding real monetary balances because of inflation (or inflationary expectations), the supply of real credit was squeezed.

In the more recent situations, with modernized and competitive banking systems, (M_1 / Y) was squeezed in much the same way as before, but $(M_2 - M_1) / Y$ could be substantially the same as in a non-inflationary equilibrium, or even higher, as holders of time and savings deposits were rewarded with real yields that were almost always positive and much of the time far above the real yields that people were accustomed to, even in non-inflationary environments.

Obviously, in the earlier situations, there existed a problem of rationing credit, that had somehow to be faced. Typically this was resolved by placing limits on the credit banks could extend. Different mechanisms, not mutually exclusive, were used:

a) standard requirements for specified reserves to be held against demand, time, and saving deposits;

b) limitations on bank credit as a fraction of deposits (perhaps different for different types of deposits);

c) limitations on the increment of nominal credit that any bank was allowed to extend during a specified period (month, quarter, year, etc.).

It was these devices that helped to keep inflationary processes from exploding immediately into hyperinflation. For if inflation is 40 percent

per year and the rate of interest on loans is only 20 percent, one can be sure that there exists (at least potentially) a virtually infinite demand for bank loans. Anybody who can get a loan from a bank at those rates can make substantial profits, even by buying such things as gold coins and silver and copper bars, not to mention foreign currency itself and interest-bearing assets denominated in foreign currency.

The rationing mechanisms actually employed gave considerable discretion to bankers. We have no documentation of what fraction of lending was tainted by favoritism, but I have no doubt it was in many cases substantial. Bankers could easily rationalize that giving credit to someone who used it to buy gold coins was, under the circumstances virtually "good as gold," with hardly any intrinsic default risk. But bankers also kept lending to regular business customers, if for no other reason than because no banker wanted to engage in behavior that would call forth close public scrutiny and would carry with it, perhaps, a breath or two of scandal.

So the countries of the Southern Cone lived through these situations of repressed interest rates and credit rationing, with people getting quite accustomed to the system, treating it as almost normal. One sidelight on that era is the characteristics that company managers and boards of directors looked for in their new white-collar employees. Whereas today, a sound grounding in modern business thinking, represented perhaps by an MBA from a top-flight school, is the epitome of what they are searching for; in those earlier days they were much more interested in new employees whose family and other contracts might ease the firm's access to bank credit!!

Needless to say, when the markets for bank credit were modernized, the situation changed dramatically. Interest rates paid by borrowers came to be closely linked to those received by depositors (at least for time deposits). Credit rationing of the old type simply disappeared. As a result, the allocation of investible funds through the banking system came to be much more efficient. The interest rate came once again to play its natural role as a signal for the allocation of credit in the first instance, and beyond that, of investible resources.

I believe that today those economies of Latin America that have modernized their financial markets along the lines just described are better off than they would have been if they had just stuck to the old way of doing things, or moved only slowly along the roads of liberalization and

modernization. But I would be remiss if I did not mention that most of these economies passed through very troubled times along the way. It is hard to put one's finger on the precise origins of the generalized collapse of banking systems that took place in Latin America in the early to mid-1980s. But certainly what was involved was a failure of collateral that is hard to imagine happening in the old days of highly rationed credit at grossly negative real interest rates.

The simplest way to describe the events leading up to the widespread failures of banks is that competition among banks got underway, but with a vengeance. The natural incentives and instincts of bankers led to a fierce competition for deposits, in which the deposits went mostly to those paying the highest interest rates. But those who paid the highest interest rates could do so only by receiving very high rates on their loans, which in turn only happened with the riskiest categories of loans. We now believe that with a greatly improved system of bank regulation, including much better articulated rules for government bailouts of failing banks, the great banking collapses of the 1980s might have been avoided. Certainly the systems of bank regulation that are in place today -- in Argentina, Chile, Mexico and Uruguay -- are far more capable first, of forestalling a chain of events like that of the early 1980s, and second, of weathering the resulting storm should one arise.

Lesson 4
On Stocks and Flows: The Loanable Funds and the Liquidity Preference Approaches

There are many variants of the loanable funds and liquidity preference approaches, but perhaps it is best to start out from two simple equations out of the Keynesian tradition:

(1) $$(M / P) = L\,(y, r)$$

(2) $$S\,(y, r) = I\,(r).$$

Here M represents nominal money balances; P, the general price level; y, real GDP; r, "the" interest rate; S, savings; and I, investment.

The easiest way to fit Equation (1) into what has already been said

is to think of it as applying to a situation where no interest is paid on money balances. The variable r, then, represents the rate that can be earned on other, non-monetary financial assets; the higher is r, the lower the real money balances that people will want to hold.

I have never had problems with Equation (1) as such, but I have never been able to think of it as representing the fundamental mechanism of interest rate determination. To try to put it in a different perspective, think of Equation (1) not as a demand function for real cash balances but as a sort of semi-reduced-form equation describing the operation of the financial system. Looked at in this way it reads as follows: *If*, for a given level of real income, there are large real cash balances, then the banking system will likely be willing to supply a large amount of loans, which in turn will conduce toward low interest rates. Conversely, low real money balances lead to small amounts of bank loans, hence to high interest rates. Here we have what is the quintessential liquidity preference function affecting the interest rate, but only via the supply of loanable funds from the financial system.

Equation (2) looks at the determination of the interest rate via the flows of saving and investment. There are two reasons to take a second look at this equation. First, there is no natural market where savings and investment meet. People can save without supplying funds to the financial market, and can take money from the financial marketplace without investing. Second, and increasingly as the years and decades pass, international capital flows add a further element to Equation (2), rendering equality between domestic investment and domestic saving unnecessary. I truly believe that, in order to understand the economy of any developing country in terms of the variables being discussed here, one must have a very good diagnosis of its capital market linkages with the rest of the world.

My own preference is to think of the long-term interest rate being determined in the market for long-term bonds and the short-term interest rate being determined in the market for short-term paper. In each of these markets one can look at either stocks or flows, or both. But in reality, I think the aspect of stocks is more central, more critical in the market for, say, 30-year bonds, while the aspect of flows is more important in the market for, say, 90-day paper.

In an economy in which most real magnitudes are growing at around 3 percent per year, the annual "flow supply" of 30-year bonds will be

only about 6 percent of last year's stock, while the annual flow supply of 90-day notes will be over 400 percent of last year's stock.

The biggest task of the interest rate on 30-year bonds is to convince people to keep on holding the 97 percent of last year's stock which does *not* come due this year; once this task has been performed, relatively minor variations in the rate will likely take care of the new flow supply that is coming on the market this year. In contrast, the entire stock of credit turns over four times a year in the market for 90-day paper. So here, flow considerations have a much greater relative importance.

My preference, as far as analyzing the market for short-term funds is concerned, is to focus on the asset side of the consolidated balance sheet of the banking system. Here, the assets can be broken down into net foreign assets, holdings of government (public sector) obligations, and holdings of private sector obligations. This breakdown is presented (and has been presented for more than 40 years) in the monetary survey section (lines 31-32 for banking system assets) of each country's pages in the International Monetary Fund's *International Financial Statistics*. These figures for domestic credit and its components are, of course, stock variables, but it should be realized that bank credit in general, and particularly the component of private sector obligations held by the consolidated banking system, tends to be concentrated on short-term credits with high turnover rates. Somehow, when one looks at the problem in this way, one does not feel compelled to choose between a stock and a flow approach. One can simply accept that a stock supply of credit is turned over several times a year and thus is likely to respond to variables that we might associate with flow supply, and likewise for the stock demand. Or, to put it another way, one can think "loanable funds" when one analyzes the stock supply and the stock demand for short-term credit.

Once one realizes that it is quite possible for real interest rates to be significantly above the world market rate, there arises the question of how to "model" this phenomenon -- how to make it fit into a simplified but self-contained picture of a country's macroeconomy. After much thought on this subject, motivated not only by the present chain of reasoning but by others, arising from different starting points, I have come to the conclusion that the most sensible way to model this phenomenon is via a "supply curve of foreign funds" facing the economy in question, which has a significant upward slope.

One reason to accept this judgment becomes clear when we explore

the consequences of the most natural alternative assumption -- that the supply curve in question is infinitely elastic. The assumption that "world prices are given" is one of the most basic foundations of the economics of the small open economy. Yet it is one of the implications of which should be examined with extreme care if we are to be sure our foundation is firm. What is certainly true, to the point of being patently obvious, is that no small country is going to end up influencing the world price of textiles or computers, of automobiles or wheat, of paper or petroleum. Certainly, no small country has any serious real monopsony power, in the world market for anything. A few small countries may have monopoly power, in the sense of being able to influence the world price of a major export good. Thus Brazil can influence the world price of coffee (viz., the present high coffee prices resulting from cold weather in Brazil); Canada can influence the world price of nickel; and Bolivia that of tin. But these are rare, isolated cases. For the most part countries must take the world prices of their export products as given. If they face a downward sloping demand curve it is likely to be because of product differentiation and/or of transport costs to ever-more-distant markets, not because their actions end up having a significant effect on the whole world market for a particular class of goods.

The same sort of principles hold for the market for credit. Yet we must resist the temptation simply to postulate that a small country typically faces a flat supply/demand curve for credit, at the world interest rate, r^*. Why? Because of its shattering implications. If this assumption were true, then increases in investment demand (or other demand for credit) would simply suck new funds in from abroad. They would not increase interest rates at all. Likewise, governments going to the capital market for funds would not crowd out private investment or other private borrowing. They would simply generate a bigger inflow from abroad. On the other side, big increases in private savings might start out by being put into bank deposits, but would inevitably end up producing an outflow of capital of equal size. And any change in the government's fiscal deficit or surplus would likewise be reflected in a corresponding change in the capital flow from or to abroad.

Savings and investment totally unhooked from each other! Government deficits with no crowding out of private investment! Government surpluses flowing out through the capital account of the balance of payments! I feel very comfortable with this description of what happens in a typical municipality in the United States. But it does not fit

at all with my experience in and observations of developing countries.

For quite a long time I linked the phenomenon of higher-than-world-market interest rates mainly with the existence of controls on international capital movements. But this was belied by Mexico's recent history. Mexico has no capital controls, and has extremely close links to U.S. financial (and other) markets. Yet Mexico has maintained interest rates at levels very substantially higher than the corresponding U.S. rates. Here, the story was very different from the Chilean one. During the administration of President Carlos Salinas, Mexican macroeconomic policy was guided by a series of pacts (*pactos*) in which representatives of labor, management and government agreed to certain limitations on their behavior, for specified periods of time. One clear result of the *pactos* was an extended period in which labor unrest was virtually absent, in spite of real wages being significantly below their peaks of around 1980 and 1981.

The government's main commitment in these pacts had to do with the nominal exchange rate. The peso price of the dollar was first programmed to rise at one (old) peso per day. Then the rise was set at 0.4 (old) pesos per day. Finally the price of the dollar was constrained to a V-shaped band in which the lower arm was flat, while the upper arm continued to rise. Today the band runs from about 3,000 to 3,400 old pesos (3.0 to 3.4 new ones).

One key problem that periodically arose to face the Mexican authorities was market pressure that tried to push the peso price of the dollar above the upper arm of the band. In a market economy, one natural solution to that problem was to bring about a significant increase in the supply of dollars. This in turn would quite naturally happen if the interest rates that could be earned in Mexico were high enough. Thus it was that Mexican interest rates came to reach levels of 15 to 20 percent per year, while U.S. rates, say on Treasury bills, were only around 3 percent and while the peso price of the dollar was rising at no more than 5 percent per year. These high Mexican interest rates accomplished their purpose of keeping the exchange rate within the pacted band, but they did so at a cost of a high price of credit which held down business investment and also the rate of real economic growth.

Lesson 5
On Capital-Flow Linkages to the Rest of the World

I'll never forget coming back to Chicago from a visit to Chile, sometime in 1976 or 1977, and conversing with Milton Friedman concerning what was happening there. When I told him that bank depositors were earning *real* interest rates of 2 - 3 percent per month on 30-day deposits, and that bank borrowers were paying 3 - 4 percent per month, his initial reaction was, "I just can't believe it." Most of us economists who had the chance to observe the phenomenon at first hand were also incredulous. We couldn't deny what we observed, but we also couldn't believe that it would last for long. But in fact it did last a long time.

Part of the explanation lies in the fact that Chile had, at that time, and indeed has had continuously up to the time of this writing (November, 1994), controls on capital movements into and out of the country. There was a period in 1980-81 when these controls were greatly eased, particularly with respect to Chilean banks engaging in borrowing from abroad. During that period real interest rates did indeed go down, but after about 18 months they went back up again. This could be explained simply with the thought that Chilean banks had worked up to the "credit limits" that prudent international bankers would extend to them. Actually, it was a bit worse than that, as the international banking community ended up feeling that it had taken too large a position with the Chilean banks. Its efforts to retrench were an important factor precipitating Chile's episode of the great international debt crisis of the early 1980s. Thus it was that by the end of 1981 Chilean depositors could once again get a real return of over 2 percent per month on 30-day deposits.

The Mexican and Chilean cases are only two out of many in which there is a substantial gap between local interest rates and those of the major world financial centers. It is fashionable today to say that any such difference among interest rates is to be attributed to an expectation of devaluation of the currency with the higher rate. There is no doubt that where there actually is an expectation of devaluation, it will be reflected in the interest rate demanded -- the supply price of funds provided by

foreigners to the market in question, in the form of loans denominated in local currency (pesos). But I believe it is simplistic to collapse the entire differences in rates into a simple expectation of devaluation. I believe that many individuals and institutions have put their money into Mexican CETES in recent years expecting to earn high rates of return, not feeling that the expected rate of return is made just normal, once the probability of devaluation is taken into account. I believe, too, that if the Mexican government substantially increases the supply of CETES, it is likely to attract more investment from abroad, but only to the extent it pays a higher rate. Some of the foreign lenders may think that Mexico's increment of borrowing carried with it a greater likelihood of devaluation, and for that reason may express in the marketplace an increased supply price of their funds. Others may have had a particular view of the riskiness of Mexican CETES, and may not have changed that view -- they may simply be willing to hold 1.5 percent of their assets in the form of CETES if the rate on them is 18 percent (in pesos), whereas before they were only willing to hold 1.0 percent of their assets in that form when the rate on them was just 14 percent. How will we ever be able to distinguish the first type of supplier of funds from the second type?

I have no easy answer to that question, but I believe there is an approach to the problem of capital flows that is capable of dealing with cases like those of Mexico and Chile, and at the same time can handle other cases, like perhaps Luxembourg and Switzerland, where interest rate premia simply do not arise.

The key element in this approach is the supply curve of foreign funds facing the country or other relevant entities in question. Consider for the moment not a country, but a city, say, Peoria, Illinois. In a small city like Peoria, it is very likely that saving and investment are in fact totally independent. If the Caterpillar Corporation, or some other major business there, decides to build a massive new plant, investment in Peoria might for a year or two be equal to or greater than the entire "national income" of the city. And this can happen without a rise in interest rates or any other observable strain on the credit markets of Peoria. Why? Because Caterpillar can (and does) borrow in the national capital market of the United States. The funds for building Caterpillar's new factory do not have to come at the expense either of consumption in Peoria or of other investments in Peoria, but from a huge capital market outside that city. And that market will, if it lends to Caterpillar, be assessing Caterpillar's riskiness as a borrower, not Peoria's. Assuming Caterpillar to be a

"prime" borrower, it will be able to get the prime rate, even if its borrowings are very large in relation to the size of Peoria's economy.

Likewise, if some citizen of Peoria were suddenly to strike it rich, winning the Irish Sweepstakes or the California Lottery, that bonanza would not lower interest rates in Peoria, and probably would not even affect investment there, unless the lucky person decided to build a new house. The most likely outcome would be that the proceeds of the bonanza would be invested in the U.S. capital market (and maybe the capital markets of the world). There would be a huge jump in the amount of national savings from Peoria, without a remotely corresponding jump in its gross domestic investment, or even in its gross domestic product.

Peoria here is a case *par excellence* of a geographic entity which faces a flat supply curve of funds. Here we can say without cavil that the external capital market is the sponge that absorbs incremental savings on the one hand and that yields up the capital resources needed for incremental investment on the other. In all of this, the capital market probably does not even ask questions about Peoria as such -- only about Caterpillar or any other entity that is actually borrowing money.

Without knowing the case of Luxembourg at first hand, I feel quite sure, nonetheless, that it is quite like Peoria. Any new factory locating there will very likely get its funds from French or Belgian sources, or more broadly from the European capital market. The chance is very small indeed that either the consumption of Luxembourgers or other investments taking place there will be squeezed out by the construction of a new factory. Nor will the spending of others (either on investment or consumption) likely be stimulated if some Luxembourger is lucky enough to win a major lottery. The interest rate, for Luxembourg, is simply the world interest rate r^*, adjusted for the risk characteristics of the borrower of course, but with no special adjustment or differential associated with Luxembourg as such.

Thus, I see Luxembourg as facing a flat, infinitely elastic supply curve of funds (over the relevant range of variation). But this obviously was not true of Chile or Mexico in the instances cited, and is not true of a great many developing countries where we observe significant differentials between their interest rates and those of the world market. Here, I believe the simplest approach is to postulate an upward-rising supply curve of funds, without attributing the rate differential exclusively to an expectation of devaluation.

Lesson 6
On "Expected" Magnitudes: Interest Rates, Inflation Rates, Devaluation Rates, etc.

The previous lesson is part of a whole family. The best way that I can describe the central issue is the degree of unanimity of the "market's" opinion. A "unanimous" market has one expected price; where opinions diverge, we can really only talk about the expectation of the marginal participants, which can easily change as demand and supply shifts to modify just who is marginal.

The capital asset pricing model -- one of the great achievements of economic understanding of the past 50 years -- makes a very bold assertion. People, in valuing, say, securities in the New York Stock Exchange, are not really valuing General Motors, IBM, Monsanto, CBS, etc. Rather they are valuing expected future income streams with particular properties of means, variances, covariances, etc. And, more or less, at any given time the market will evaluate these characteristics of the above companies, and will come out with prices for their respective shares. Few shareholders have sentimental attachments to particular companies whose shares they own, and any who do will be distinctly inframarginal as far as market events are concerned. From here comes the idea of a representative shareholder, a representative agent with a representative opinion about the various securities available in the market.

I believe that we have gotten enormous mileage out of the capital asset pricing model, and out of similar insights applied to other areas, including expected rates of inflation and expected rates of devaluation in some circumstances.

But there are important cases where the collapsing of expectations into a single representative view can fall far wide of the mark. In these cases we must recognize that supply and demand are more fundamental economic concepts, in the sense that we can (and do) have many markets in which the concept of a representative agent makes no sense.

There is no such thing as a representative demander of beer. There are some who are not sated until they have finished their second quart each day, and others who drink not at all, but buy beer to serve to their guests.

Some women, I'm told, use beer as a rinse for their hair. In Mexico there are some famous donkeys who spend the day drinking beer from bottles, held for them by tourists who get their pictures taken in that unusual pose.

Land in or near an evolving resort community may be bought by one person for farming, by another to build a vacation home, by yet another for building much later for retirement living, and by still others as pure market speculation.

In both these cases the market demand curve has its usual economic meaning. Price and quantity are determined by the intersection of demand and supply, and one does not need to know the purpose for which beer is used or for which land is wanted in order to use the concepts of demand and supply for market analysis.

In any case like the above, of things used for multiple purposes to fulfill quite different desires, it is quite clear that the relevant curves are unlikely to be flat. I believe that the supply curves of funds confronting Chile and Mexico in the instances cited were truly upward rising at any given moment. Certainly the world financial market views both these countries now quite differently from the way they did, say, in the late 1970s or the mid-1980s. What has happened in the meantime is that the supply curve of funds facing each of them has shifted sharply to the right, so that today we have a larger total amount of borrowed funds associated with a lower premium over LIBOR. But at any one point in time -- either then or now -- any major increment of demand for funds by these countries could, I believe, only be met by moving out along the then-prevailing supply curve of funds, and in the process, paying a higher premium.

We can postulate a rising supply curve of funds without asking that its slope be only due to expectations of devaluation, and without imagining that "typical" market participants all share the same view on such a matter. If we simply stick with the idea of a rising supply curve, we can build a view in which incremental demand for funds in a developing country raises interest rates there, widening the spread between its interest rates and those of the world market. Within this framework, the incremental demand will be met partly by displacing investments, partly by stimulating domestic saving, and partly by attracting incremental funds from abroad. This vision of the process fits the evidence we have from most developing countries much better than does the notion of infinitely elastic supply curves of funds.

Lesson 7
On Shifting Appraisals of Developing Country Capital Markets

One thing we can be quite sure of is that any scheme that tries to rationalize actual events in developing country capital markets must recognize that world market perceptions change through time -- sometimes very dramatically. This observation holds regardless of whether one imputes a high degree of unanimity to market opinion or if one accepts the idea, propounded above, that there are significant differences among the expectations, perceptions of risk, etc., of different suppliers of funds to a given market at any one time.

What we observe is that the interest rates actually paid have changed importantly through time, and that there have also been major changes in the amounts of foreign capital located in (or flowing to) particular developing countries. Whether one thinks in terms of a flat supply curve of funds (at any given moment), or a rising curve, the fact that the curve is shifting must be recognized. This is because, as the world financial market comes to "like" a country, the premium charged on loans to that country goes down, while the amounts of loans (usually in both stock and flow terms) goes up. And, as the financial market looks on the same country with less favor, its premium goes up and loan amounts go down.

That is why cross-sectional analysis using observations from different countries has been so difficult. The shifts of the supply curves of funds to different countries bring about a situation where the favored countries have high borrowings (in relation, say, to their GDP) at low rates, while the disfavored countries have low borrowings at high rates. Since nobody at any point in time can get extra money at lower rates, it is clear that these observations do not imply a downward sloping supply curve of funds facing any given country. So, whether the curves are flat or upward sloping at any point in time, we must recognize and accept that they undergo substantial, often dramatic shifts through time.

Taking the supply curves of funds to be upward sloping, as I have argued they are, we can somewhat enrich the simple picture of "shifting curves." For not only do these curves shift with changing circumstances, but there are systematic changes in their elasticities. If Luxembourg faces

a curve of virtually infinite elasticity and no premium, and perhaps Angola or Burma a curve of very low elasticity and a high premium, then the situations of other countries can take virtually any position in the spectrum thus defined.

It is clear to me and to other observers of the Latin American scene that the supply curve of foreign funds facing countries like Argentina, Chile and Mexico has undergone major shifts in the past 30 years or so. Private capital virtually boycotted Chile during the Allende Period (November, 1970-September, 1973), but it took several years after Allende's overthrow before there was any net flow of capital into Chile. Then, as world financial markets came to appreciate, even admire, the many economic reforms completed and the many others underway in Chile, that country became the darling of the great multinational banks. Only the controls on capital movements (previously mentioned) kept the 1981 inflow of capital into Chile at "only" 15 percent of that year's GDP.

A few years later, the only flow of private loans to Chile consisted of forced rollovers of old credits, that came as a consequence of successive debt renegotiations with the international banks and with other creditors. The debt of Chilean banks sold in 1983-85 in the secondary market of New York at discounts of 40 or 50 percent.

But gradually, the stern attitude of the international financiers softened, and by 1990, the country was back in favor, capital was beginning to flow once again, and premiums over LIBOR were moderate. Mexico, Argentina, Peru, and other countries have all experienced similar vast changes in the conditions of supply of credit from abroad.

Lesson 8
The Position and Elasticity of the Supply Curves of Funds Facing a Country are Critical for Understanding and Diagnosing its Economy

This was already intimated in previous lessons. Luxembourg lives in a world much like that of Peoria, so far as linkages to the outside capital market are concerned. Most developing countries live in a very different world in this respect.

If the supply curve of funds from abroad is such that only small flows take place, and if they are not readily expandible, then it is quite appropriate to look at that country's capital market equilibrium as being fundamentally determined by domestic factors and forces. That is how real interest rates of 2 and 3 percent per month can come about. I believe that there were periods during the past 30 years in which not just Chile, but also Argentina, Uruguay, Bolivia, Peru, and Mexico all fit this characterization quite well.

As yet we have no Latin American country that looks like Luxembourg in its world capital market connections. But a few are getting close, perhaps even closer than they would like.

The following story goes back to early 1985. Chile had suffered the biggest shocks associated with the international debt crisis back in 1982 and 1983. GDP had fallen by more than 15 percent in real terms. Real wages had fallen even more. Unemployment had peaked at about 25 percent during the crisis. In 1985, a new finance minister, Hernán Büchi, undertook to lead the country out of the post-crisis morass in which it found itself. Following the example of a number of countries (including Taiwan and Korea) which had succeeded in achieving sustained development through a strategy of export-led growth, Büchi sought to do the same.

The first pillar of Büchi's strategy was a dollar that was expensive in real terms. This would give a strong incentive to develop export activities and also would foster a healthy type of import substitution. But while it is quite feasible (if not always easy) for a country to fix its nominal exchange rate with the dollar or some other foreign currency, the same cannot be said for the real exchange rate. Adjustments in real exchange rates may take place under a flexible system via movements of the nominal exchange rate. Under a fixed rate system, the same adjustments occur through internal inflation and deflation. A fixed nominal price of the dollar, initially set high, does not guarantee a high real rate for any significant length of time. The high dollar price would soon generate trade surpluses; these would be cashed at the Central Bank, causing monetary expansion. This would go on, in principle until the trade surplus was eliminated, which would happen when the real exchange rate was again in equilibrium. But this real exchange rate would entail a real price of the dollar quite a bit lower than the starting point, in which the price of the dollar was raised from an initial equilibrium level, with a view to

stimulating exports.

The puzzle facing Büchi was how to set the real exchange rate high, and keep it there. The high real exchange rate was built to produce a trade surplus, and an excess supply of dollars. How could one keep this excess supply from driving down the real prices of the dollar?

The Büchi team found an ingenious way to accomplish its purpose. Recall that Chilean private debt was trading in New York at 50 to 60 percent of par. Private speculators had discovered this and had begun a process of buying up such debt then exchanging it with the debtor Chilean banks, usually in exchange for new debt denominated in pesos, but sometimes in exchange for peso cash. The huge gap between par value and the discounted price in New York guaranteed plenty of profit for everybody.

What the Büchi team did, taking advantage of the foreign exchange control system that had been in existence all along, was to auction off to the private speculators the right to engage in this sort of debt repatriation. Since the demand of the speculators to do this was quite large, the government in effect extended the length of time over which the process was distributed. But that was not the purpose. The purpose was that of producing equilibrium in the market for foreign exchange at the real exchange rate that the government was targeting.

What happened was that the government calculated the nominal exchange rate that this week (or month) would approximately produce its real exchange rate target. The Central Bank would then buy and sell foreign exchange at this rate. Under the circumstances, with the high targeted real exchange rate, normal purchases virtually always exceed normal sales, so the Central Bank found itself with incremental reserves. To forestall the price rise that might ensue, it was wise to "mop up" the extra pesos the Central Bank had just printed. The trick that the Büchi team employed was to auction off the "excess" foreign exchange it had just bought, in the form of "rights" to engage in debt repatriation operations.

Given the large amount of debt that was held abroad, and the great desire on the part of speculators to engage in the operation, the Central Bank had no difficulty at all in creating enough extra demand for dollars so as to bring about an equilibrium of supply and demand at the "real price" -- the real exchange rate -- that the policy-makers had targeted. In addition, the Central Bank ended up collecting, through the auction

process, the lion's share of the profit that was generated in the entire operation.

Using this scheme, the Büchi team maintained the real exchange rate at its target level, or, later, in its targeted band, for something like four years. Toward the end, things began to get more difficult, but the real problems came under the successor government of President Aylwin. This new government, which took office in early 1990, faced two facts that Büchi did not have to confront: a) the foreign debt that was suitable for this sort of operation had sharply dwindled, and b) the discount in the New York market had almost disappeared. These two new facts pretty much dictated that the Central Bank had to find some new way of maintaining a high price for the dollar, or else give up the attempt.

In any event, they found a new way, which was in a sense a cousin of the earlier scheme. The earlier scheme had involved reducing Chilean liabilities (the discounted bonds) abroad, and (typically) an expansion of peso debt at home (as the banks exchanged new peso debt for the old bonds, or else issued new debt in order to pay off the bonds in cash). The Aylwin government's team did something quite close -- they issued peso debt at home and with the proceeds built up dollar assets abroad. The big difference was that under the earlier scheme it was private banks that issued debt, and the implicit interest saved -- that on the discounted price of the bonds in New York -- was maybe 12 - 16 percent in dollars; now, under the new scheme, the government paid 6 - 7 percent real interest on the Central Bank purchasing power bonds it issued, while it got only one to three percent in dollars on its holdings (counted and treated as part of the Central Bank's international reserves) in New York. Thus, the new scheme was quite a bit more costly than the old, but one should recognize that continuing the old scheme was no longer an option -- the fruit of that particular tree had simply been exhausted.

The new scheme did, however, continue to serve its principal purpose, which was to add to the demand for dollars (here quite distinctly in a flow sense), so as to maintain the real peso price of the dollar within the target band. But even this objective became increasingly hard to reach, as the supply curve of foreign funds facing Chile kept shifting outward and becoming more and more elastic.

This is where we see in action the sort of scenario that we have been treating in the last several lessons. Chile's government was going into the capital market for funds, as Chile's private debtor banks had been doing

previously under Büchi's leadership. This pressure on the capital market brought about interest rates that were above world market levels. So long as the supply curve of foreign funds was not too elastic, it did not create a problem for the authorities. And so it was in fact. Even as late as 1989, one could get purchasing power bonds in the Chilean market at real rates of return of 12-13 percent. Yet from 1992 up to the present, the yield of those bonds has oscillated in 6 - 7 percent range.

The force driving this major change in capital market equilibrium was Chile's ever-closer linkage to the world capital market, with the quantities of foreign capital in Chile becoming ever bigger, and the premium over world interest rates becoming ever smaller. This brought with it the danger that as the government sucked funds out of the domestic market (in order to buy foreign exchange to keep the real exchange rate on target), foreign funds would quickly flow in to replace what the government got. In a perfectly linked capital market (à la Peoria and Luxembourg), this would lead to a situation where: a) interest rates do not change, and b) neither does the real exchange rate move from outside to within the target zone. In effect, the government would be rendered virtually impotent, using the actions previously described, to influence either the interest rate or the real exchange rate.

It did not get quite to such a point in Chile, but things certainly moved in that direction. In fact, the Chilean government moved to impede the flow of short-term capital into Chile, by requiring that a portion (20-30 percent) of foreign loans to Chilean borrowers be kept on deposit (earning zero interest) at the Central Bank for the duration of the loan. At the deposit requirement of 30 percent, then, a foreign loan of 1,000 had to carry an interest rate of 10 percent on the "active" portion of 700, in order to yield 7 percent to the foreign lender on the full face value of the loan.

This was, to my knowledge, the only major control that the Chileans used to insulate their capital market from that of the rest of the world. Government economic policy was guided, in general, by a substantially free-market orientation; this precluded the use of heavy-handed prohibitions and purely arbitrary credit allocations. Moreover, there was always, in Chile, a parallel foreign exchange market, through which funds moved quite freely in both directions. The effect of this market on the overall equilibrium was limited, to the best of my knowledge, only by the fact that large institutional transactors were *ipso facto* precluded from using this informal mechanism. In addition, Chilean firms began spreading their

wings, acquiring subsidiaries and other assets abroad, particularly in Argentina and Peru. Once such firms had multinational operations, they pretty much had to be given substantial freedom to move funds around. And finally, at about the period of transition from the military government to the Aylwin presidency, the Chilean authorities permitted the establishment of several foreign mutual funds, restricted to the acquisition of Chilean shares and other securities.

We can only speculate as to what might have happened in a different policy environment. What we know is what actually happened in the policy environment just described. It simply became more and more difficult to hold the Chilean real exchange rate within the targeted band. Despite an effort to dissuade speculation by permitting more day-to-day fluctuation in the nominal exchange rate and in local interest rates, the real price of the dollar in Chile has moved progressively downward, even as the nation's foreign exchange reserves have moved ever upward, setting new historical records month after month. I attribute these results to the progressive outward shifting of the supply curve of funds facing Chile, together with a concomitant sequential reduction of the premium needed to attract foreign funds to the Chilean capital market.

Lesson 9
On the Determination of the Equilibrium Real Exchange Rate

It is hard to talk about international capital flows without explicitly facing the question of how the real exchange rate is determined. Here the underlying analysis goes back perhaps even to the very origins of the theory of international trade and the principle of comparative advantage. Most of that analysis was firmly based on the idea that a nation "exports in order to import," and "pays for its imports with the proceeds of its exports." Early models of international trade had two countries symmetrically facing each other; the demand for imports of each was simultaneously an offer of exports, the intersection of the "offer curves" of the two countries determined the price of imports in terms of exports (i.e., the terms of trade). In these models, the terms of trade would be altered by the introduction of a capital flow, or by the imposition of a tariff

by one or both countries.

Modern economists studying individual countries have been well-advised to steer away from the traditional, symmetrical model. Far better is the view that the small country faces a specified world market, in which it buys imports at prices totally beyond its control and in which it sells exports under given conditions of world demand. In this view of the world, it is not the terms of trade which change to produce the equilibrium of international trade. Rather, it is the real exchange rate. (The nominal peso price of the nominal dollar is the nominal exchange rate; deflate this by a general index of peso prices and you have the real price of the nominal dollar; multiply this latter, in turn, by an index of dollar prices [ideally restricted to tradables] and you have the real price of the real dollar. This last is the most useful definition of the real exchange rate.)

Movements in the real exchange rate (RER) typically entail changing relative prices as between tradable and nontradable goods. An upward movement of the RER results in the peso price of all tradable goods rising relative to the general price index (and, of course, relative to nontradables). This can happen without any change in the world prices of the country's imports and exports, hence without any change in that country's terms of trade. This is why it is important to think of the RER rather than the terms of trade as the key equilibrating variable of a country's international transactions.

If the country has a flexible exchange rate, the nominal exchange rate will move to equilibrate the demand for foreign exchange (arising out of the demand for imports) with the supply of foreign exchange (arising out of the supply of exports), for, given world prices and given internal monetary conditions, this will determine the equilibrium real exchange rate. If the country has a fixed exchange rate system, the equilibrating mechanism is like that under a gold standard. A surplus in the balance of trade leads to an expansion in the money supply and a consequent rise of the prices of nontradables relative to tradables; a deficit works the other way. Thus, the equilibrating process under fixed exchange rates works through the country's general price level rather than through its nominal exchange rate. But, either way, the real exchange rate, as defined above, can seek and reach its equilibrium level.

The real exchange rate (i.e., the real peso price of the real dollar) can fall when the country undergoes an export boom, which greatly expands the supply of dollars, or when it imposes import restrictions, which

artificially curtail the demand for dollars. When capital movements come, the result depends on what those capital sums are used to buy. If they are used to expand the demand for tradables, we have both supply and demand for dollars increasing, by the same amount, hence there is no *prima facie* cause for the RER to change. But to the degree the capital inflow is used to buy nontradables, a fall in the real price of the dollar will ensue, the supply curve of foreign exchange having shifted without a corresponding shift in the demand curve.

Obviously, a capital flow into a country can be counterbalanced by corresponding outflow. So if, in the above example, there were Mexican citizens waiting to buy the dollars that were being exchanged in order for the foreign investors to finance investment spending on nontradables, this could obviate any need for RER adjustment. Here the Mexican demand for dollars would have shifted so as to mop up the excess supply of dollars that would otherwise exist.

Capital flows into countries like Argentina, Chile, and Mexico are rarely for the purpose of simply holding cash balances, but when they are, the effects on the real exchange rate are similar to those that would occur with capital movements spent on nontradables generally. The same goes for capital that comes not to finance particular investment projects or particular companies but rather to buy stocks or bonds in the open market. All these lead to an excess supply of dollars in the Mexican market; mopping up this excess supply requires a fall in the RER.

In a similar vein, when Chileans or Mexicans demand dollars for portfolio investment abroad, they tend to raise the equilibrium real price of the dollar. But it is important to realize that this impact comes from the flow demand for dollars, not the stock demand. And the effect is the same, regardless of whether the demand is for dollars to place in a bank deposit abroad, or for dollar bills to hold as an asset at home (in Mexico or Chile).

Mexicans may have billions of dollars of assets in the U.S.; that fact by itself has no impact on Mexicans' real exchange rate, But if they are in the process of building up those assets, *that* fact operates to raise the real price of the dollar above what it would otherwise be, and if they are in the process of reducing their asset position abroad and repatriating their capital, *that* fact operates to lower the RER.

One final point: it should be clear that the relationship between the total stock of dollars outstanding and the share of them that Mexicans want to hold has absolutely no bearing on Mexico's real exchange rate. One is

not interested in whether Mexicans hold U.S. dollars, U.S. stocks, U.S. bonds, U.S. real estate, U.S. cattle, or any other U.S. asset. They all play the same role as far as Mexico's real exchange rate is concerned. And, for that role, it is not the stock of these assets that matters, but the net purchases or sales of them by Mexicans. And even this matters only to the extent that Mexicans enter the foreign exchange market using pesos to buy the dollars needed for, or to convert into pesos the proceeds of a sale of, dollar-denominated assets.

Lesson 10
On the Relationship between Real-Exchange-Rate Analysis and the Monetary Approach to the Balance of Payments

Much confusion has been generated by an inaccurate interpretation of the monetary approach to the balance of payments (of which, as mentioned earlier, S. C. Tsiang was a notable forerunner). The story starts with what might be called the quintessential exercise of the monetary approach. Assume a country with a fixed exchange rate system, and let there be an exogenous increase in bank credit, with a counterpart increase in the money supply, in that country. The older analysis would have predicted that this extra injection of money would eventually be offset by losses of international reserves. But to reach this conclusion, it would be thinking in terms of two traditional mechanisms: a) a price-specie-flow mechanism whereby prices rise internally (relative to world prices), thus inducing people to spend more on tradable goods and to produce less of them, and b) an interest-rate-capital-flow mechanism whereby the monetary expansion leads to a fall in interest rates, which in turn induces people to reduce their holdings of bank deposits and other assets, and instead acquire similar assets abroad.

The great flourishing of the monetary approach in the early 1970s came as a result of empirical work showing that the adjustment took place much faster than would be implied by the above mechanisms, and often with little or no movement in prices or interest rates. The answer was that a third mechanism (c) was at work -- one that in a sense bypassed the

previous two, without in any relevant sense invalidating them.

This third mechanism, which to me defines the monetary approach, derived from the critical insight that when people have excess cash balances, they will want to spend them. Part of this spending will be on nontradables, which will tend to raise their price, but part will surely be on tradables, which (in a fixed exchange rate system as well as in a number of alternative, related exchange rate arrangements) will lead to a loss of international reserves. Suppose that the initial monetary expansion is of 1,000, and that people get rid of 40 percent of their excess cash balances within three months, with half of that amount being spent on tradable goods and services. In this case, there will be a reserve loss of 200 in the first quarter, after which excess cash balances of 800 will remain. The presence of these will lead to 320 of induced extra spending, half of which will again be on tradables, inducing a further loss of 160 in international reserves. Now there are 640 of excess cash balances, but the process continues (200, 160, 128, 102.4,...) until the full initial monetary expansion of 1,000 has been nullified by a reserve loss.

The key observation in the empirical studies of the 1970s was that this third mechanism (c) not only worked, but actually worked so fast that it often led to an initial monetary expansion being fully offset (through the losses of international reserves that it induced) long before mechanisms (a) and (b) had had time to come into play.

Operating in a fixed exchange rate system, mechanism (c) could, and often would, lead to the original equilibrium being restored, but of course with a lower volume of international reserves. And indeed, this automatic mechanism could work without there being any change in either the nominal or the real exchange rate.

Observations of fast adjustments via mechanism (c) may have led people to conclude that the discovery of mechanism (c) meant that mechanisms (a) and (b) were redundant -- simply unneeded. This may have been the reason why some early converts to the monetary approach tended to argue as if the real exchange rate was practically exogenous, from the standpoint of a small open economy. But whatever the reason, these early converts were badly mistaken.

For many years now, I have been suggesting that the demand function for tradable goods (T) should take the form

(3) $T^d = a_0 + a_1(p_T / \bar{p}_d) + a_2 y + a_3 B + a_4(M^s - M^d)$

Here

T^d = quantity demanded of tradables
p_T = price of tradables
$\bar{p}_d$ = a general price index (that includes nontradables)
y = real domestic product
B = net resource transfer from abroad
M^s = supply of money (a broad concept like M_2)
M^d = demand for money balances.

This form of demand equation incorporates the elasticities approach to the analysis of international adjustment problems via the relative price term $(p_T / \bar{p}_d)$.

It incorporates the income-expenditures approach through the net resource transfer variable B. When a country truly receives capital from abroad -- in the net -- it must import more than it exports by the amount of B. B can be thought of as the sum of net lending to the country, plus net portfolio investment in the country, plus net direct investment in the country, minus net interest paid by the country on earlier loans, and minus net dividends and profit remittances from the country on prior direct and equity-portfolio investments there. Increments or decrements of a country's international reserves should be counted in calculating B. Thus, an excess of spending over production can be generated either by a new loan coming to the country or by a reduction of the country's international reserves (or any other assets held abroad).

Finally, Equation (3) incorporates the monetary approach in the term $(M^s - M^d)$. Contemporary macro-theorists shy away from terms implying a disequilibrium between supply and demand, and seek to explain every point along an adjustment path as a (very temporary) equilibrium position. For myself, I have never been uncomfortable with the terms like $(M^s - M^d)$, having learned from the most brilliant of Alfred Marshall's insights that an observed point can simultaneously be one of equilibrium (in a short-term sense) and of disequilibrium (in a longer-term sense). To me, the existence of excess cash balances does not mean that it then becomes a puzzle why people are holding them. It means instead that so long as the other relevant determining variables remain the same; people will choose to

engage in an adjustment process by which they bring these balances down to the longer-run demand level M^d.

The reservations that I have about Equation (3) are not conceptual, but more practical in nature. I do not feel very easy about trying to estimate this equation econometrically, because from the very outset I do not see a_3 and a_4 as firm behavior parameters. Consider the variable B. I believe I actually know of instances (the construction of the El Cajón dam in Honduras is a case in point) in which capital flows to a country precisely for the purpose of covering the incremental demand for foreign currency that a project generates. In such a case, a_3 would be 1. But I also know of cases (Mexico and Chile in 1980-81 are examples) in which the great bulk of the capital inflows went to finance projects with very low inputs of tradables. Here a_3 might be 0.1 or 0.2, rather than 1.0. I like the formulation of (3) precisely because, by keeping B as a separate variable, it focuses attention on it. (In contrast, I have always felt uneasy about the relatively common practice of combining $y + B$ into a total expenditures variable. This to me tends to connote not only that a_3 is constant, but also that it is equal to a_2 -- i.e., that borrowed money tends to be spent in the same pattern as ordinary income.) In an ideal appreciation of Equation (3), I would ask the investigator to identify every year's capital movement, and to find out on what goods and services it was spent. One would thus build up a series of $a_3 B_t$, which one would insert into (3) for each year, rather than trying to estimate a constant a_3 as a coefficient of B. Even if one cannot do this, careful observers can try to get a sense of what is being done with each given year's resource transfers, and to use this information in diagnosing each year's situation.

The story is not quite the same with respect to the coefficient a_4. Here, our ignorance is even greater than with respect to a_3, for we have no strong reason to assume that people will get rid of excess balances in just one particular way, each time such balances appear. The most natural use of excess balances is to purchase assets or pay off debts, as distinct from treating such balances as if they were increments to income. Thus, people with heavy consumer or mortgage debt might make their excess balances evaporate within a week or a month, while others might hold such balances for a lot longer time before buying, say, a car or a refrigerator or an airplane ticket. I feel that it is quite appropriate to take a relatively agnostic position on precisely how and when excess cash balances will be spent. But we can, I believe, identify when they exist, estimating M_d via demand functions for real cash balances (aimed at identifying equilibrium

demand in the middle-to-long run) and identifying ($M^s_t - M^d_t$) as the contemporaneous residuals from such functions. *Ex post*, at least, we can then also identify the changes in ($M^s - M^d$) from one period to the next, and recognize that a reduction in this variable means a corresponding extra amount of spending that has to be reflected in some set of markets, whether for goods, for services, or for assets. Happily, tradables comprise a large bundle of items, and we may be able to identify (at least *ex post)* movements in the demand for tradables that have their likely origin in the spending of excess real cash balances.

Lesson 11
On the Tantalizing Analogy between International Capital Flows and the Expansion of Domestic Bank Credit

We saw in Lesson 10 how the spending of borrowings from abroad would lead to incremental demand for goods and services, the precise composition of which would vary, depending on the purpose of the loan. We saw, too, how an exogenous increase of bank credit, and with it, of money, could lead, through successive rounds of spending, to a loss of international reserves and to an ultimate restoration of equilibrium between M^s and M^d. Now since an expansion of domestic credit is at least in one sense just like an inflow of borrowed money, the tempting question arises of how far we can extend the analogy. I do not at this point have my own answer to this question, but I consider it one of the most fertile fields for further thinking and discussion.

In the first place, it is clear from the outset that the analogy is not complete. We already have in economics a vision of a capital market in which added pressure of demand for funds operates through interest rates to displace consumption plus other investment. We can imagine the displaced consumption to be reflected in increased bank deposits, and the displaced investment to be reflected in decreased demand for bank loans, and we have a complete story. Banks lend 500 to a new borrower, of which 100 comes from increased deposits and 400 comes from loans not given to others. In the national accounts there is an increase of 100 in

investment and saving. The resources for the new investment came 100 from reduced consumption and 400 from reduced other investments. Harking back to Lesson 3, people are willing to hold higher balances, M_2, because the interest rate paid on savings deposits has been bid up.

In the above case we don't know what would happen to the demand for tradables, but we do know that there would be no first-order effect arising from a change in aggregate demand. The only effect would come through a different fraction of the loan proceeds being spent on tradables by the borrower than the fraction that corresponded to tradables of the spending foregone by consumers and other investors. For completeness, we can assume a flexible exchange rate which adjusts to accommodate this second-order effect, without generating any loss of reserves by the banking system.

Now we have two polar cases. The first (from the beginning of Lesson 10) is generated by a new increment of demand for borrowed funds, together with a jump in bank credit to the new borrowers, without any displacement of old credit and without any stimulation of new savings. Here, there is an increment of money consisting of the deposits newly created by the banking system at the time the loan is extended. The second polar case is the one just presented, in which the increment of investment is fully accommodated via resources released either from consumption or other investment.

It is the first case that I want to pursue here. This case can certainly occur with a fixed exchange rate system (whose analysis actually gave rise to the monetary approach), but it can also occur in a flexible exchange rate system, if the monetary authorities are prepared to lose enough reserves. Indeed, one can create an extreme version of the first case by having an increment of credit fully balanced by an equal loss of international reserves, precisely in the same period. The scenario would run as follows. The banking system expands credit to one or more new borrowers, creating in the process incremental deposits. These borrowers spend the loan proceeds on some combination of tradables and nontradables. If the entire amount is spent on tradables, the banking system accommodates this with a loss of reserves. No change in the exchange rate is necessary, and since the loss of reserves exactly matches the increment of bank credit, there is no change in the money supply.

If the increment of bank credit is only partly spent on tradables, this would in the first instance leave a net increment of the money supply equal

to the amount of the loan proceeds that was spent on nontradables. But the banking system can offset this increment of money by dumping a like amount of its international reserves on the foreign exchange market. The foreign exchange rate (the peso price of the dollar) would then fall, and the money supply would remain unchanged.

Now, I ask, is this scenario not very similar to that of an inflow of capital from abroad, spent partly on tradables and partly on nontradables, with the (now flexible) exchange rate allowed to fall so as to solve the transfer problem without an increment in the money supply? To me, the only difference lies in the fact that in the one case the country's foreign liabilities increase, while in the other case its foreign assets decrease. This is hardly a major difference.

Now let us examine the case where we have a fixed exchange rate, or a flexible rate which is being held fixed by the Central Bank for a span of time. Here let us consider:

a) a capital flow from abroad spent fully on tradables, and

b) a credit expansion at home to the same borrowers, also spent fully on tradables.

Once again we have a corresponding loss of reserves, and when all the accounts are in, we have an increase in foreign liabilities in case a), and a loss of foreign assets in case b).

If, now, the capital flow is not fully spent on tradables, and the exchange rate is held fixed, we have a net increment in the money supply and the accumulation of excess money balances ($M^s - M^d$) in the hands of someone in the economy. As these balances are spent, the part spent on tradables disappears through loss of international reserves, leaving only the part spent on nontradables, now as excess money balances in the hands of someone else.

The process goes on, not necessarily in a regular fashion (i.e., with the fraction of ($M^s - M^d$) spent on tradables quite possibly changing from one step to the next), until there are no (or negligible) excess cash balances left.

But consider that the above scenario can work equally well for case c), where the increment of money comes from the banking system, converting into pesos the portion of a dollar loan that is to be spent on nontradables; or for case d) where the increment of money amounts to the full amount of a new bank loan in the first instance, but where quickly this

increment is offset by losses of international reserves corresponding to the portion immediately spent on tradables.

In case c) we might have a loan of 1,000 coming in, with 400 initially spent on tradables and 600 ending up initially as an unwanted increment in the money supply in the hands of those who sold nontradable goods and services to the investment project. In case d) we have an expansion of both credit and money equal to 1,000, with 400 of this increment of money being immediately offset as it is spent on tradables, while 600 remains, exactly as in case c), initially in the hands of the sellers who provided the nontradable goods and services bought by the project in question.

It seems to me that we have a near-perfect parity between cases a) and b), as well as between cases c) and d). Some people have argued that issues of perception may arise between cases a) and b) and between cases c) and d). In particular, they suggest that losses of international reserves, by, say, the Central Bank, may not, in cases a) and c), be perceived as a reduction in assets by any of the real economic agents in the system, They would contrast this with the case of a foreign loan where, they would say, the borrowing entity knows perfectly well that its liabilities have increased in the amount of the loan.

I do not want to enter into this particular set of speculations here. I would only point out that the analysis I have presented above works on the basis that the loss of banking system foreign assets in cases a) and c) is perceived in exactly the same way as is the increase in foreign liabilities in cases b) and d). We are thus here on the side of those who would impute to economic agents a rational perception of the value of changes in the banking system's net foreign asset position.

I do not claim here to have solved the puzzle of how far to extend the analogy between foreign borrowing on the one hand and domestic credit expansion on the other. I do hope, however, to have stimulated readers to puzzle and speculate further on this fascinating set of issues.

Concluding Thoughts

It is very difficult to rationalize the scenarios and experiences recounted in these lessons in terms of the highly sophisticated models of

contemporary. macroeconomics. Neither a representative agent approach nor a formalized capital asset pricing model framework seems to help much in the task of interpretation. Of greater value are the perhaps more rudimentary models of supply and demand -- supply of and demand for monetary instruments, supply of and demand for credit or for loanable funds, supply of and demand for foreign currency. The first of these -- the demand for money -- can most appropriately be interpreted in "stock" rather than "flow" terms, the underlying concept being the demand for real cash balances of different types. The second of these, the demand for credit or for loanable funds, can be understood in either of the two senses, but preferably in both. Outstanding credit is always a balance sheet item, and in the consolidated balance sheet of the banking system, domestic credit is typically the most important asset item, whose magnitude in real terms is strongly conditioned by the amount of real monetary balances (the most important liability item) that people are willing to hold. But flow concepts are also important in interpreting and understanding the market for credit, especially at the short-term end of the scale where bank loans are concentrated. Big jumps in the demand for credit were the driving force for high real interest rates at certain moments; at such times the need was to draw big net increases of loanable funds into the financial system. At other moments, high real interest rates stemmed from sharp curtailment of real monetary holdings, and banks were driven to deny renewal for a large share of the loans coming due.

When it comes to the demand and supply of foreign exchange and the determination of the real exchange rate, we are at the other extreme. Here it is folly to think in terms of stocks, and it is utterly essential to work with flows. The basic flow demand for foreign exchange stems from the demand for imports of goods and services; the flow supply comes from the supply of exports. These are fundamental demand and supply concepts; the real exchange rate that equilibrates them also equilibrates the demand for tradables as a whole with the supply of tradables as a whole.

The "correct" way to view capital movements is simply as a way of permitting (usually only temporarily) a situation of excess demand or excess supply to prevail in the market for tradables (i.e., imports/exports). Certainly each individual foreign loan generates flows in one direction when the loan is granted and in another as it is repaid with interest. These cancel each other exactly, in present value terms, when the rate of yield on the loan is used for discounting.

It comes as a corollary of the above that increments of dollar cash holdings are to be treated just as one of any number of assets (stocks, bonds, real estate, etc.) that citizens of Chile or Mexico might acquire abroad. It makes no sense to juxtapose them to the total supply of dollars in the world, or even to worry about them as a component (too small to be meaningful) of the world's demand for dollars to hold.

It is the act of converting dollars to pesos as new loans (in net) come in, or of converting pesos to dollars, as old loans are paid off that causes the real exchange rate to be below or above the point corresponding to balanced trade (or better, of zero net resource transfer.) As far as I can see, one cannot deal with the problem of real-exchange-rate determination except in terms of flows.

The monetary approach to the balance of payments suggests a close analogy between capital flows from abroad on the one hand, and expansions of internal credit on the other. I call this a tantalizing analogy because it is quite easy to create scenarios in which the analogy is close to perfect, while at the same time one can create scenarios, as we did at the beginning of Lesson 11, in which the analogy does not hold. So I leave it as food for further thought.

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As a final note, let me express the wish that these reflections serve as a fitting tribute to the person of S. C. Tsiang, and also to his great professional achievements, as exemplified by his performance as a policy advisor, as well as by his scientific writings and teachings. I would like to feel that he would find the lessons presented here to be quite in harmony with his own way of thinking, and that he would be happy to know that one old friend named A. C. Harberger is continuing to struggle with the subtle insights that are yet to be derived from the study of stocks and flows, loanable funds and money supplies, credit expansions and capital movements, and with the influence of all of the above on real exchange rates and on interest rates.