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ENSAYOS SOBRE ASPECTOS MONETARIOS  
DE LA ECONOMIA ABIERTA.

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## ENSAYOS SOBRE ASPECTOS MONETARIOS DE LA ECONOMIA ABIERTA.

Este trabajo recopila una serie de documentos escritos mayormente durante la última década. El tema común son los movimientos de capitales y sus efectos sobre variables cruciales de la economía, tales como la inflación, el crecimiento, el tipo real de cambio y el balance comercial.

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## NOTAS SOBRE SUSTITUCION DE MONEDAS E INDEPENDENCIA MONETARIA BAJO REGIMENES ALTERNATIVOS.

Tradicionalmente, los modelos monetarios de economías abiertas han supuesto que la moneda de un país es mantenida solamente por los residentes de ese país (excepto en el caso de los países de moneda de "reserva" cuyas monedas son también mantenidas por los otros Bancos Centrales). Esto implica que una demanda predecible (estable) por la moneda del país puede ser derivada como función de variables domésticas. En la medida que las transacciones dentro del país deban ser hechas con la moneda doméstica existe un claro incentivo para que solo los residentes del país sean los que atesoren la moneda doméstica. Esta última razón, sin embargo, solo toma en cuenta el motivo de "transacciones" para demandar dinero y no incluye otros motivos, en particular el de diversificación de portafolio que ha sido enfatizado por James Tobin. Este demuestra en su trabajo de 1958 que es en la ventaja de un inversor averso al riesgo el incluir en su portafolio activos que no ganen interés en la medida que la inclusión de estos pueda contribuir a la reducción de la varianza en el retorno del portafolio total de activos.

Aún cuando Tobin condujo su análisis en el marco de un modelo con un solo activo que no devenga interés (el dinero del país), el análisis puede ser fácilmente generalizado al caso que haya varias monedas diferentes siempre que exista la posibilidad de cambio en los precios relativos entre las mismas. En este caso podría ser en la ventaja de un individuo averso al riesgo el mantener en su cartera tenencias de otras monedas extranjeras aun cuando ninguna de estas pague un interés explícito. Este fenómeno, donde el stock de moneda de un país es

demandado tanto por los residentes del país como por los del extranjero ha sido denominado "sustitución entre monedas" (vease Girton y Roper, 1975 y Calvo-Rodriguez, 1978.) y presenta varios problemas interesantes relacionados tanto con la existencia de un conjunto de niveles de precios y de tipos de cambio de equilibrio como a la vez impone severos límites a la habilidad de las autoridades para la ejecución de una política monetaria, aun en el caso de tipos de cambio flexibles.

Aun cuando ha sido recientemente revivido, el concepto de "sustitución monetaria" no es de ninguna manera nuevo. De hecho estaba vivamente presente en las discusiones sobre el Bi-metalismo con referencia al problema de si los gobiernos debían o no intervenir en la fijación del precio relativo entre los dos metales circulantes, plata y oro (vease, por ejemplo, Shumpeter, "The Instability of Capitalism, 1928).

En la Argentina hemos tenido en repetidas oportunidades situaciones de control de cambios en el mercado oficial acompañadas de tenencias sustanciales de divisas por parte de la población cuyo precio era "libremente" determinado en el mercado paralelo. La posibilidad de que, de implementarse un tipo de cambio flotante, la población decida mantener tenencias de moneda extranjera no es por lo tanto desechable. Una situación presente real que indica la posibilidad de "sustitución entre monedas" esta dada por la importante expansión del mercado del Eurodolar donde enormes montos de depósitos denominados en dolares son mantenidos por individuos que no son residentes de los Estados Unidos. Cuan importantes son realmente esas tenencias de dolares por extranjeros, particularmente en relación al total de la oferta mundial de dólares y cuan grande puede ser la presencia de estos para afectar la habilidad de los Estados Unidos para conducir una política monetaria independiente aun bajo tipo de cambio flotante son al momento preguntas especulativas dada la au-

sencia de estudios empiricos mas detallados.

Los problemas que impone la sustitución entre monedas para el funcionamiento de un sistema de tipos de cambio flotantes pueden ser ilustrados a través del siguiente ejemplo, extremo quizas en sus supuestos:

Supongase que existen solo dos países (1 y 2) y dos monedas, que los residentes de cada país solo se interesan por el valor real (en términos de bienes) del total de sus tenencias y no por su composición (de esta manera, las dos monedas serían sustitutos perfectos desde el punto de vista de los tenedores de activos). Supongase además (esto por simplicidad) que en cada país se demanda una cantidad constante de saldos monetarios reales.

Denotaremos por  $M_{ij}$  a las tenencias de moneda del país  $i$  por parte de los residentes  $j$ , por  $p$  al precio monetario de los bienes en términos del dinero del país 1 y por  $e$  al precio de una unidad de moneda del país 2 en término de la moneda del país 1. Suponiendo que ambos países producen y consumen los mismos bienes, el nivel de precios en el país 2 es  $p_2 = p/e$ . También denotese por  $k_1$  y  $k_2$  a la demanda total por saldos monetarios reales de los residentes de cada país. Las condiciones de equilibrio en este mundo simplificado estan dadas por las siguientes expresiones:

$$1) M_{11} + e.M_{21} = p.k_1, \text{ la demanda por dinero en el país 1;}$$

$$2) M_{12} + e.M_{22} = p.k_2, \text{ la demanda por dinero en el país 2;}$$

$$3) M_{11} + M_{12} = M_1, \text{ la oferta total de dinero del país 1;}$$

$$4) M_{21} + M_{22} = M_2, \text{ la oferta total de dinero del país 2.}$$

Bajo un sistema de tipo de cambio flexible, solo las ofertas totales de dinero de

cada país,  $M_1$  y  $M_2$ , están dadas. Quedamos por lo tanto con 4 ecuaciones para resolver los valores de las seis incógnitas ( $M_{ij}$ 's,  $e$  y  $p$ ). Sumando las ecuaciones (1) y (2) y usando las otras dos restantes, el sistema (1) - (4) puede ser reducido a:

$$(5) M_1 + e.M_2 = p.(k_1 + k_2) \quad ,$$

la cual, dadas las dos ofertas monetarias totales y los  $k_1$ 's muestra que hay infinitas combinaciones de nivel de precios y tipo de cambio consistentes con el equilibrio total en todos los mercados. Por lo tanto, en el caso de perfecta sustitución entre monedas cualquier tipo de cambio es un tipo de cambio de equilibrio, aun dadas las ofertas monetarias de cada país. Este último hecho, por supuesto, impone serios problemas para la estabilidad de un sistema de tipos de cambio flexibles. Imaginemos, por ejemplo, que un día alguna autoridad respetable expresa su creencia que el tipo de cambio va a saltar por un 30% la próxima mañana. Si suficiente gente realmente le cree (hay alguna razón para que no?) el tipo de cambio puede perfectamente saltar en 30% y permanecer allí por cuanto, como hemos visto, cualquier nivel del tipo de cambio puede equilibrar todos los mercados (de suceder esto, note-se por (5) que el nivel de precios del país 1 debe subir por 30% multiplicado por la fracción del dinero del país 2 en el total de la oferta monetaria mundial).

En esta situación extrema los países pierden la habilidad de controlar su propio nivel de precios a través de la política monetaria. Por ejemplo, un incremento del 10% en la oferta monetaria del país 2 puede ser seguido por una depreciación del 10% en su propia moneda (una caída en  $e$ ) con un nivel de precios constante en el otro país y por lo tanto un incremento del 10% en su propio nivel de precios o, alternativamente, por ninguna variación en el tipo de cambio pero un aumento en el nivel de precios de cada país igual a 10% multiplicado por la fracción de la moneda del país 2 en la oferta monetaria mundial. Y estas son solo dos posibilidades pues toda otra combinación de cambios en  $e$  y  $p$  que satisfagan la ecuación (5) también son

factibles.

En este contexto, entonces, aparece la posibilidad de importantes fluctuaciones en niveles de tipos de cambio<sup>ó</sup> de que un aumento en la oferta monetaria de un país resulte en un aumento en el nivel de precios de ambos países en vez de solo en el suyo aún bajo un sistema de tipos de cambio flexible.

Como en el caso de existir sustitución perfecta entre monedas los países pierden la habilidad de conducir una política monetaria independiente, poco se pierde realmente al implementar un tipo de cambio fijo en tanto que mucho puede ganarse en términos de reducir las fluctuaciones en el tipo de cambio. De esta manera, de existir perfecta sustitución entre monedas, tipos de cambio fijo son preferibles a tipo de cambio fluctuantes. Notese, sin embargo, que un tipo de cambio fijo no resuelve el grado de indeterminación del sistema por cuanto quedan aún 5 variables ( $4 M_{ij}$  y  $p$ ) y solo 4 ecuaciones y por lo tanto la posibilidad de grandes movimientos en reservas internacionales aún estará presente. Claramente, sin embargo, movimientos erráticos en reservas internacionales son preferibles a movimientos erráticos en niveles de precios o tipos de cambio.

La importancia de todo lo anterior para determinar una preferencia por un sistema de tipo de cambio fijo debe ser juzgada exclusivamente por el grado de validez de los supuestos utilizados. En este contexto, es imperativo continuar observando en detalle los desarrollos del mercado del Eurodólar como asimismo aquellas experiencias recientes en Argentina donde este fenómeno pudo haber estado presente en mayor o menor grado.



**CAPITAL FLOWS AND FOREIGN EXCHANGE CONTROLS:  
THE ARGENTINE EXPERIENCE**

Standard capital flows are derived from the difference between national savings and investment rates. Argentina traditionally has had a low savings rate and a high investment rate, and therefore a tendency towards capital inflows. However, other factors have conspired against this "normal" outcome. These factors have to do with portfolio relocations in the financial markets and with illegal transactions in international trade.

Capital outflows are often the result of a weak national currency. The expectation of a currency devaluation induces holders of local currency to shift to foreign currency. Dollarization is common among high inflation countries, and Argentina has been no exception. Other factors which often induce capital outflow are profits from illegal activities derived from the existence of multiple exchange rates or high import or export taxes.

Illegal transactions are difficult to measure as they occur in the black market where their amounts are not recorded, although the "premium" usually is. In Argentina, restrictions on the sale of foreign exchange have systematically produced increases in the black market premium, a symptom of a higher demand for foreign exchange in the illegal market and therefore of capital outflows. Figure 1 shows the behavior of the black market premium, defined as the excess of the free dollar rate over the official rate.

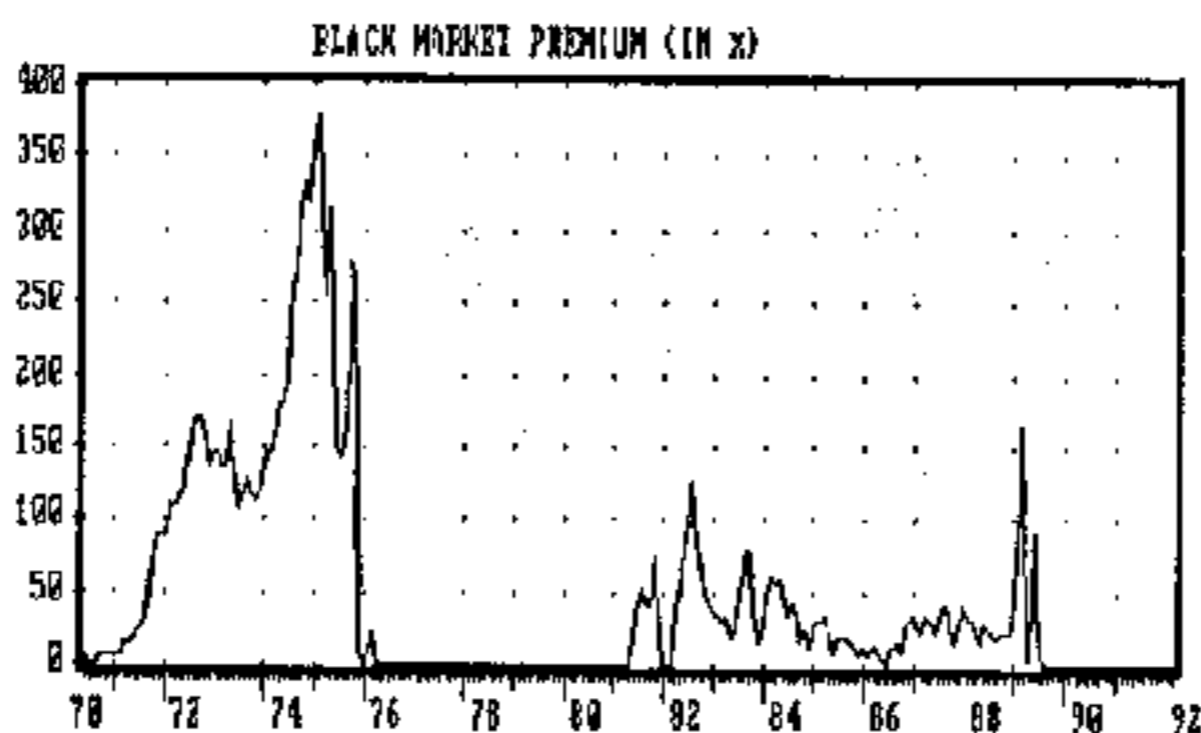
There were two recent experiences with exchange controls and restrictions on capital flows: 1971-75 and 1982-89. In both instances macroeconomic disequilibria prevailed and inflation was rampant. These factors alone are enough to induce capital outflows as the public runs to foreign currency as an inflation hedge. In addition, authorities tried to cope with the situation by imposing a variety of controls that, in general, did more harm than good as they distorted markets, induced illegal activities and distracted attention from the most needed macroeconomic adjustment, particularly on the fiscal front.

The period 1971-1975, was characterized by persistent fiscal disorder and government intervention through price controls, extremely high export and imports tariffs, import prohibitions and quotas, and a wide range of exchange rates supported by capital controls. Money creation to finance the persistent fiscal deficits rapidly made any official fixed exchange rate obsolete. Since devaluations were seen as cause of inflation (rather than the consequence) authorities relied on controls to sustain the official rate. This resulted in a black market premium for foreign exchange at times reaching 300% or more. Capital outflow in this period was clearly favored by the profit opportunities arising from state intervention in the price system and the search for dollars as an

inflation hedge. In addition, the beginning of a guerrilla movement generated expectations of political instability which also fostered capital outflow by reducing the rate of investment.

The illegal demand for foreign exchange was fostered by the existence of multiple exchange rates and export tariffs that made it attractive to overinvoice imports and underinvoice exports. Since there were strict foreign exchange controls, the dollars so acquired had to be kept abroad or used for smuggling, something frequently done to use the excess dollars and avoid the high costs of import restrictions. During these periods large fractions of local crops were smuggled (export taxes were more than 60% at times) to neighboring Paraguay which registered huge exports of crops it never actually produced. The premiums to be gained by illegal action were so large that efforts at custom controls failed completely. In fact, there is the strong presumption that the most corrupt were those working at customs. Corruption, potentially large gains, and low salaries for government officials made policing the illegal capital outflows virtually impossible.

Figure 1



Another reality is that the price distortions created by the government were unpopular and the public appreciated the possibility of operating in the black market (which was widespread both for goods and for foreign exchange). Severe penalties on transgressors, while leaving the incentives constant would have made the government even more unpopular.

It is clear that the capital outflows of the 1970s resulted from bad economic policy that created incentives for illegal transactions in foreign exchange. Argentina does not import food or energy so there was no pressing social need to maintain an elaborate system of exchange and trade controls so that these basic goods would be cheaper. Rather, the trade controls taxed agricultural exporters in order to subsidize the industrial sector.

The capital outflows of the 1970s were typical of highly distorted economies which provide incentives to acquire foreign exchange illegally and an economic setup where it is very unattractive to reinvest the funds locally. In consequence, the funds have to remain invested abroad or used for smuggling. It is estimated that about \$7 billion of undeclared external assets were generated during the 1970s. This number is small in comparison with the \$24 billion that were accumulated during the first half of the 1980s. However, the economic and regulatory environment that generated the capital outflows in the early 1980s differs substantially from that of the early 1970s.

With a military coup in March 1976, the peronist government fell and convertibility was restored at a single exchange rate for all transactions. Export taxes were eliminated, and import duties reduced. Large amounts of capital started flowing in and the government even put some restrictions to discourage capital inflows. Excessive borrowing during this period was seen as the major factor to the external debt crisis that took place in 1981 when the prefixed exchange rate rule was abandoned.

During the period 1976-81, the external debt grew by an amount larger than was needed to finance the current account deficits and reserve accumulation. This meant that some market participants were hoarding foreign exchange, which proved wise since there was a large devaluation in 1981. The government fell prey to the complaints of those with registered external debts and assumed those debts while offering the debtors easier terms to repay in local currency. The final result of this process of "nationalization" of the external private debt was that the government assumed the external debts while being paid minimal amounts from the original local debtors, about ten cents on the dollar.

This situation arose because the government had no record of who had acquired the foreign exchange that was the counterpart of the accumulation of external debt. At that time the monetary authorities only kept a record of external borrowings but no record of foreign exchange purchases by individuals at currency exchanges. In consequence, those who got in debt abroad could register the debt at the Central Bank, sell the foreign exchange for pesos and then repurchase it in any exchange house leaving no record of the last transaction. With a fully convertible currency the transactions described above are fully legal and under normal circumstances there would be no need to keep records of any of them (except if needed for tax purposes). In practice, however, the government had to pardon the debtors without being able to raise any tax on those who had the foreign exchange. Hence, the government was left with the debt and the private sector with the dollars.

After the collapse of the exchange rate in 1981 and the conflict with England in the South Atlantic, the debt crisis exploded and convertibility was suspended in mid-1982.

Between 1982 and 1989, the foreign exchange market reversed to a situation similar to that of the early 1970s. Exporters were forced to surrender the foreign exchange to the Central Bank at the official exchange rate. Importers would obtain the foreign exchange at the official rate if their import demand application was approved. The most common sources of illegal capital outflows were the smuggling of exports and the overinvoicing of imports. In many instances exporters would ship the products and then simply manifest that they could not get paid by the foreign importers. Local importers would apply for import permits on low tariff items only to import pebbles, a manoeuver facilitated by deep corruption at customs and the high profits offered by the significant black market premiums for foreign exchange.

At times, strict limits were set on amounts available for tourism and a special system was set for the service of the external debt, on which the country was in arrears most of the period. In essence, private debtors transferred their dollar debt to the government who would then negotiate service with the banker's committee. In general, no foreign exchange was available for private debt service or amortization on the denominated "old debt" (originated before the debt crisis of 1982). New external credits were exchanged at the official exchange rate if they later were to provide access to funds for service and amortization. The Central Bank would issue a certificate of foreign exchange availability entitling the owner to access to foreign exchange for the service of his debt, at the ongoing official rate. No exchange rate insurance was offered in this case.

At times the Central Bank, pressed for foreign exchange, would offer forward contracts on the exchange rate in order to lure banks to bring dollars, exchange them for pesos and take advantage of the high local interest rates with a limited devaluation risk.

Under Argentine Law, first offenders to the foreign exchange regime would be penalized by the Central Bank who could only apply monetary fines. Only second time offenders were tried in criminal courts where they could receive jail terms. In practice, no one has ever gone to jail for violations to the foreign exchange regulations.

Foreign exchange holdings were never illegal in Argentina, although at times transacting in foreign exchange violated the exchange controls. However, the government issued a dollar denominated bond (the BONEX) starting in 1980 that was used to practically legalize black market transactions. This bonds could be transacted for dollars or pesos in the stock market. Therefore, anybody holding dollars and wanting pesos could buy BONEX with the dollars and then sell them for pesos. In this way, dollars could be exchanged for pesos without going to the black market and therefore violating foreign exchange regulations. Foreign exchange obtained through illegal trade transactions could be converted legally into pesos in this same way.



In general, it seems that the Argentine authorities were not fully devoted to preventing capital outflows and black market foreign exchange transactions during the 1980s. The economy had become heavily dollarized and the local currency was so unstable that any serious effort against the use of foreign currency would have seriously affected real economic activity. Rather, authorities tried to attack the problem by offering attractive financial conditions to those bringing foreign exchange into the system. Unfortunately, the interest rates paid were inconsistent with the treasury's fiscal realities and the result was a complete lack of monetary control and hyperinflation in 1989.

Policing capital outflows and the black market proved inviable because of corruption and the unpopularity of the measures. The incentives offered to illegal transactions were huge due to the existence of exchange controls in the presence of significant macroeconomic disequilibrium which made the official rates unrealistic.

It seems apparent that the main incentive for illegal capital outflows has been the attempt to sustain a weak currency through exchange rate and trade restrictions. The official exchange rate generally has been set at levels inconsistent with macroeconomic equilibrium and resulted in black market premiums that were so large that illegal transactions simply could not be policed. Attempts to compensate the capital outflows by government borrowing transitorily helped the external payments situation, but soon proved devastating to the quasi-fiscal deficit and had to be abandoned.

In the Argentine experience, as soon as a viable macroeconomic policy was announced and the currency was made convertible at a single price, capital outflows reversed. This happened in 1976 and also after the hyperinflation of 1989. In both cases, the foremost post-stabilization problem was the real exchange rate overvaluation due to the significant capital inflows.

An interesting point is that the country did not have a significant collapse of economic activity despite important changes in exchange rate policy after the 1989 hyperinflation. Nowadays, (four years later) the real exchange rate is one sixth of what it was at the height of the hyperinflation, while real output is about 25% higher. After the crisis of 1989, the exchange rate regime shifted from flexible to fixed, passing through a period of managed float. The common factor is that the currency is fully convertible (for both current and capital account transactions) and foreign exchange holdings and transactions are widely accepted and legal. In addition, the exchange rate convertibility is guaranteed by the authorities' commitment to fiscal balance and the belief that, if necessary, convertibility will be maintained at the expense of real exchange rate adjustment, as has been done in recent years.

A non-convertible currency invites capital outflow for the simple reason that the holder of a dollar loses the right to repurchase it if he surrenders it to the government. A common fear among policy makers is that if convertibility is granted there will be a rush to purchase foreign exchange at any price. This presumption, however, has not been correct, in general, in the Latinamerican experience. As soon as the public believes that it is possible to get in and out of foreign exchange, much of the incentive to hold foreign exchange is reduced. Local currency seems to be strengthened by convertibility, not weakened. Uruguay floated with full convertibility in 1974 and there was no explosion in the price. Their currency has been convertible since then.

Most Latinamerican countries have restored convertibility in recent years (Brazil, Argentina, Peru, Bolivia) and this has been one of the main factors for the observed inflow of foreign capital to the region. In no place has the local currency been completely displaced by foreign currency because of convertibility. However, foreign currency has taken a significant part of transactions and coexists with local currency (quite significantly in the cases of Argentina, Uruguay, Bolivia and Peru). Argentines have brought back a large fraction of the foreign exchange they sent abroad during the 1980s and have deposited it in dollar accounts in the banking system: one third of the total money supply is composed of dollar deposits at local banks.

In our experience, exchange rate controls cannot cope with macroeconomic disequilibrium in a sustainable way. Capital outflows, black markets, illegal transactions and administrative corruption make the system unsustainable. On the contrary, macroeconomic disequilibrium can coexist with a convertible currency that is floating. The market will fix the price that is consistent at any time, and this normally does not imply an explosive outcome. The actual experience of Brazil illustrates this case; deep fiscal disequilibrium keeps it on the border of hyperinflation, yet the economy still grows while running Current Account surpluses.

## NOTAS SOBRE SISTEMAS MONETARIOS

Modulo (I)

### CUENTAS NACIONALES EN LA ECONOMIA ABIERTA

$$(1) Y = C_d + G_d + I_d + X$$

$$(2) M = C_m + G_m + I_m$$

Sumando (1) y (2)

$$(3) Y + M = (C_d + C_m) + (I_d + I_m) + (G_d + G_m) + X$$

ó

$$(4) Y = C + I + G + (X - M)$$

Definamos ABSORCIÓN DOMESTICA:  $A = C + I + G$ , luego

$$(5) Y = A + (X - M).$$

Pero Balanza Comercial =  $X - M$ , por lo cual

$$(6) \text{Balanza Comercial} = \text{Ingreso menos Absorción} \\ (\text{Enfoque elasticidades}) \quad (\text{Enfoque absorción})$$

Modelo de los tres gaps

$$(1) Y = C + I + G + (X - M)$$

$$(2) Y = C + S + T, \quad T: \text{Impuestos}$$

$$(3) S = Y - C, \quad S: \text{ahorro}$$

$$\text{Luego: } (M - X) = (I - S) + (G - T)$$

Deficit Comercial = Inversión menos Ahorro + Deficit Publico

Conclusiones: (i) Política Comercial afecta la composición del comercio pero no necesariamente la diferencia entre X y M.

(ii) Una mejora de la balanza comercial requiere (a) reducción en A respecto de  $y \Rightarrow$  Reducción de gasto y además que X suba más que  $M \Rightarrow$  Desplazamiento de gasto, que posiblemente requiera corrección de precios relativos. Ni (a) ni (b) por sí solos son suficientes. Reducción de gasto sin devaluación produce recesión (como en un modelo Keynesiano), mientras que devaluación sin reducción de gasto produce inflación.

(iii) El exceso del ahorro sobre la inversión privadas tiene dos usos: financiamiento del deficit interno, o ahorro externo, pues  $X - M$  debe ser igual a la salida de capitales. Por ejemplo, en Japon,  $S - I$  es positivo ya que el ahorro es muy alto (digamos que es 10%); además hay superávit fiscal, o sea que  $G - T$  es, digamos, -2% del PBI. Por lo tanto,  $X - M$  debe ser igual a 12% del PBI.

El tipo de cambio debe convalidar ese superavit pero no es el determinante fundamental. A la vez EEUU esta en la posición inversa: bajo ahorro privado y alto deficit del sector público ==> debe tener deficit comercial. Por lo tanto, el problema del deficit comercial americano y el superavit japonés es fiscal y no de tipo de cambio.

#### MODULO (II): Determinación del Tipo Real de Cambios y Política Cambiaria

(1) Tipos de cambio real de exportación y importación. Efectos de aranceles.

(2) Dinámica del proceso de ajuste a un desequilibrio comercial. Ajuste via tipo nominal de cambios o via precios.

(3) Entrada de capitales: sus efectos sobre el tipo real de cambio de equilibrio.

(4) Efectos del deficit público sobre el sector externo.

(5) Efectos de una Devaluación sobre el equilibrio externo: Enfoques absorción y elasticidades. Devaluaciones competitivas.

(6) Sistema Monetario Internacional: Rol del IMF y del Dólar.

(7) Ajuste con tipo de cambio fijo o flexible. Rol de la flexibilidad de precios en el ajuste del tipo real de cambio.

(8) Enfoque monetario del Balance de Pagos. Balance del Banco Central.

#### MODULO (III)

##### DISCUSION DE SISTEMAS MONETARIOS

(i) Demanda por Dinero :  $M = p \times Q \times L(r)$

M: Cantidad nominal de dinero

p: Nivel de Precios

Q: Producto real ( $Y = p \cdot Q$ )

L(r): Demanda real por dinero, r: tasa de interés

Determinación de r: (a) Con Movimiento de Capitales  
 $r = r^*$

(b) Sin Movimiento de Capitales  
 $S(r) = I(r)$

(ii) Paridad del Poder Adquisitivo (PPA)

$p = E \cdot p^*$  , donde E: tipo nominal de cambio  
p\*: Precios internacionales  
p: Precios domésticos



(iii) Oferta de dinero

$$M = R + C$$

, C= Credito interno del Banco Central  
R= Reservas Internacionales  
M= Base Monetaria

TIPO DE CAMBIO FIJO

$$E = E_0 \implies$$

$$P = E_0 \cdot P^*$$

$$M = E_0 \cdot p^* \cdot L(r) \cdot Q$$

$$R = E_0 \cdot p^* \cdot L(r) \cdot Q - C$$

TIPO DE CAMBIO FLEXIBLE

$$R = R_0 \implies$$

$$M = R_0 + C$$

$$p = (R_0 + C) / [L(r) \cdot Q]$$

$$E = (R_0 + C) / [p^* \cdot L(r) \cdot Q]$$

Temas de Discusion:

(i) Sistema cambiario y deficit fiscal: que sistema cambiario es mas conveniente dado un deficit fiscal?. Tablita Cambiaria y Plan de Convertibilidad. Existe una relacion de consistencia entre la tasa de devaluacion y el deficit fiscal:

$$\text{Deficit} = D = d \cdot Y = \Delta M$$

Dividiendo por M y recordando que  $MV = Y \implies$

$$d \cdot V = (\Delta M / M)$$

La tasa de expansion monetaria ( $\Delta M / M$ ) debe ser igual a la tasa de inflación INF, por lo cual la relación entre inflación y deficit es:

$$INF = d \cdot V$$

En el mediano plazo se requiere que la tasa de devaluacion sea igual a la tasa de inflación domestica menos la tasa de inflación internacional a fin que el tipo real de cambio ( $e = E \cdot P^* / P$ ) se mantenga constante:

$$DEV = INF - INF^*$$

Por lo tanto, la tasa de devaluación de equilibrio es:

$$DEV = d \cdot V - INF^*$$

Con tipo de cambio flotante, la tasa de devaluacion de equilibrio se obtiene automáticamente. Con tipo de cambio manejado el Banco Central debe instrumentar esa tasa en promedio, o determinar una tablita que sea consistente con la misma.

(ii) Plan de Convertibilidad. Rol del respaldo de 100% de reservas: cual es la demanda correcta por reservas internacionales?. Que agregado monetario debería ser respaldado: Base, M1 o M2. Debe respaldarse los depósitos en dólares en el sistema?. Todo depende de la fortaleza para soportar una corrida. Sin garantde depósitos, con respaldar la Base es suficiente, sin embargo, antes que se pierdan reservas equivalentes a la Base ya habrán quebrado todos los bancos. Relaciones contables entre reservas, encajes, y los distintos agregados monetarios.

(iii) Mecanismos de oferta monetaria

Banco Central:

Reservas + Credito Interno = Encajes + Circulante + Letras

Bancos Comerciales:

Encajes+Creditos = Dep. Vista + Depositos Plazo + Depositos dolar

Base = Encajes + Circulante : \$ 16000 millones  
 = (7000) + (9000) = 16000

M1 = Circulante + Depositos Vista:\$ 17000  
 = (9000) + (8000) = 17000

M2 = M1 + Dep.Plazo: \$ 32000  
 = (17000) + (15000) = 32000

M3 = M2 + Dep.Dolar:\$ 32000+19500 = 51500 millones  
 = (32000) + (19500) = 51500

## -El Deficit de EEUU y el Cambio Dólar-Yen

Un caso interesante para comparar con nuestra situación es lo ocurrido entre Japón y EEUU sobre la continuidad de los déficits comerciales bilaterales (de EEUU) a pesar de la enorme devaluación que los mercados de capitales han infringido sobre el tipo de cambio bilateral del dólar y Yen. Aca nuevamente vemos en acción la confusión entre tipo de cambio y déficit comercial. El tipo de cambio es el resultado y no el causante de los déficits. El déficit de EEUU se debe a la entrada de capitales que enfrenta. En la medida que la deuda americana aumenta, el dólar se devalúa por ser este mas abundante en los mercados internacionales, pero esta devaluación no tiene porqué reducir la tasa de entrada de capitales. En la medida que se mantenga la alta tasa de ahorro Japonesa y el déficit fiscal de EEUU, cabe esperar que los déficits comerciales se mantengan y el dólar continúe devaluándose.

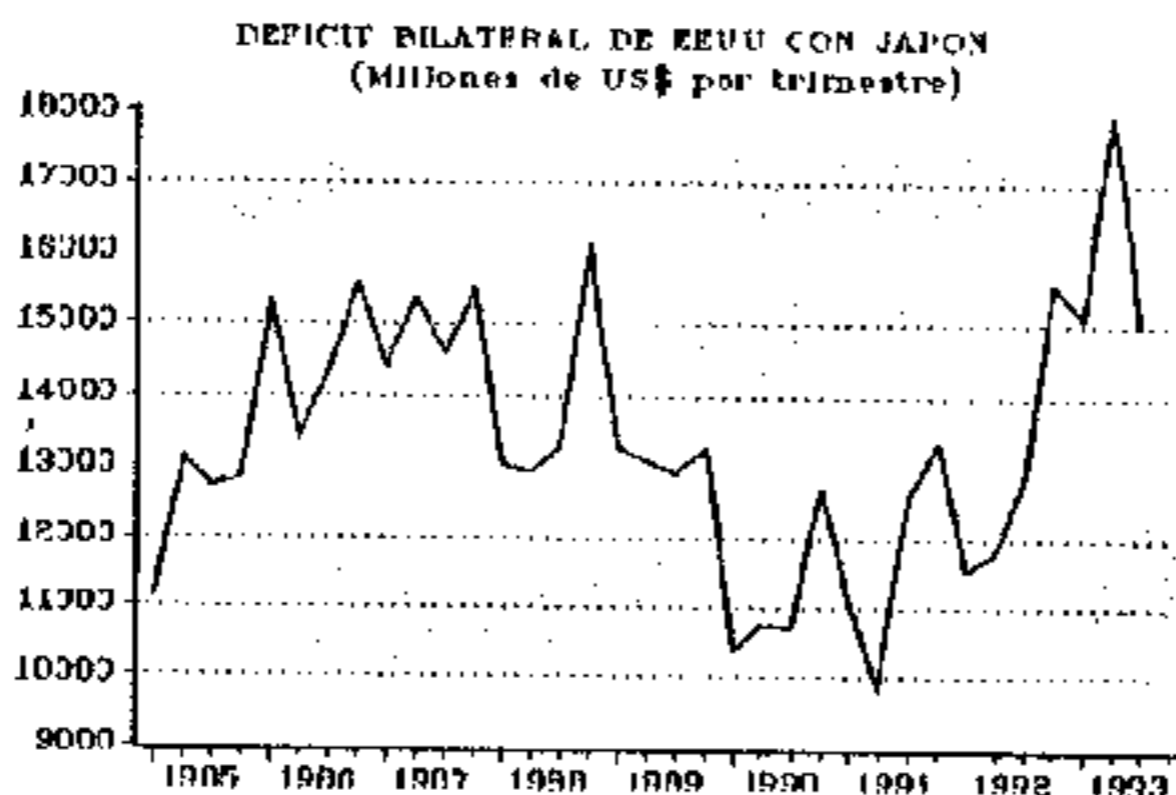


Figure 1

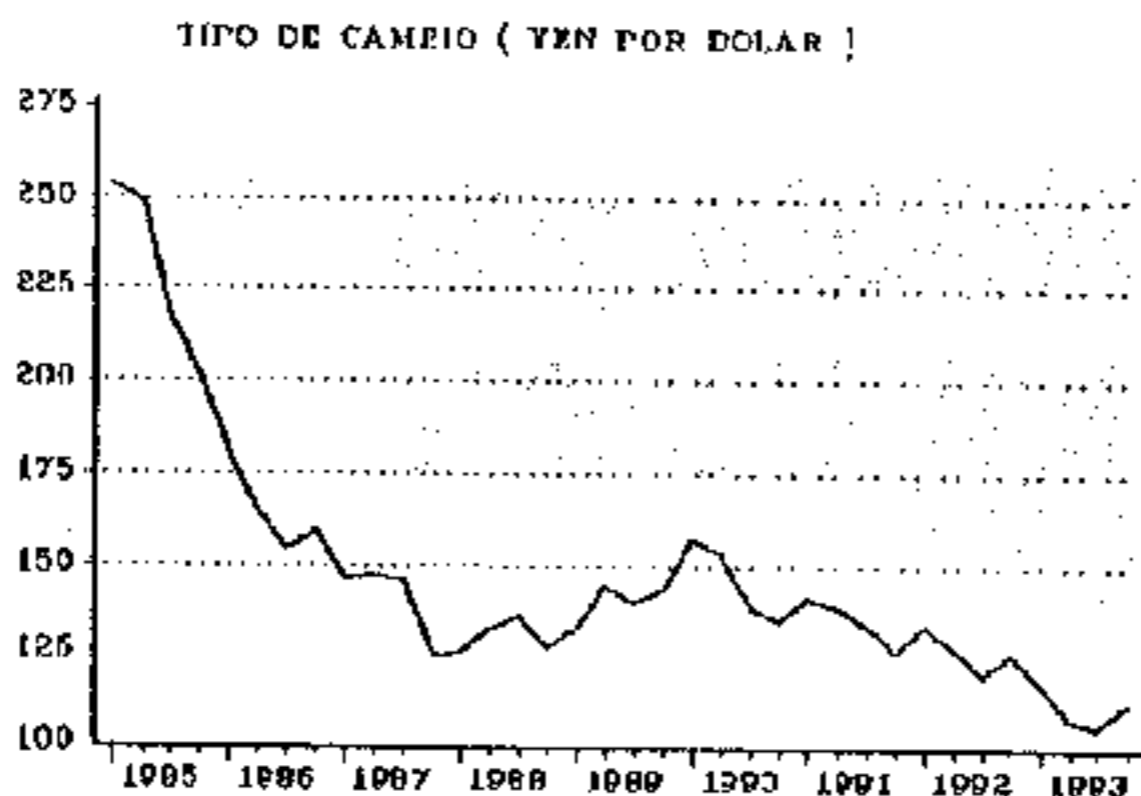


Figure 2

La alternativa de devaluar para mejorar la balanza comercial (independientemente de ajustes en los niveles de gastos e ingresos) sugiere una relación de causalidad entre el tipo de cambio y la balanza comercial: denominando DEF al déficit de EEUU vs. Japón y TDEC al precio del dólar en término de yenes, este enfoque sugiere una relación positiva entre ambas variables: al devaluarse el dólar ( menos TDEC ) cae el déficit ( menos DEF). La realidad de la última década no confirma esta hipótesis: las Figuras 1 y 2 muestran a simple vista que hay poca o ninguna relación entre el déficit EEUU-Japón y su tipo de cambio bilateral.

El análisis estadístico de los datos disponibles confirma que tipo de cambio dólar-yen está poco relacionado con el déficit comercial bilateral, y en realidad lo está de la manera opuesta a la descrita: en el corto plazo una apreciación del dólar ( un mayor TDEC) se asocia con una reducción en su déficit ( menor DEF). Los resultados de la regresión con variables trimestrales se muestran en la Tabla 1.

Tabla 1

Análisis de regresión de la relación entre el Déficit EEUU y Japón con su Tipo de Cambio

$$DEF = 17193 - 80.6 TDEC(t) + 0.12 TDEC(t-1) + 23.8 TDEC(t-2) + 26.3 TDEC(t-3)$$

$$T\text{-Value} \quad (0.3) \quad (-2.1) \quad (0.00) \quad (0.6) \quad (0.9)$$

$$R^2 = 0.44$$

$$ARIMA(1) = 0.50 (2.88)$$

Muestra: 1986.I - 1993.III

DEF: Déficit Comercial de EEUU vs. Japon en millones de dólares ( déficits son positivos).

TDEC: Yen por Dólar ( trimestrales fin de periodo)

### -Sostenibilidad de los Déficits Comerciales

En un artículo periodístico reciente manifesté a mi interlocutor que no me preocupaba que el déficit comercial argentino se extendiera por varios años si es que tenía financiamiento genuino. La entrevista se publicó con el titular: "Veinte años no es nada". En realidad, hay muchos países en la comunidad internacional que han hecho del déficit comercial un modo sostenible de vida. Un repaso del banco de datos del IMF muestra que mas que 20 años, la norma parece ser entre 30 y 40 años de déficit sostenidos para varios países que uno no asocia con desequilibrio sino mas bien como ejemplos de desarrollo sostenido y viable. La Tabla 2 muestra los países que he encontrado que han experimentado déficits comerciales significativos en las últimas cuatro décadas ( restricción impuesta por la disponibilidad de datos).

Tabla 2

## CASOS DE DEFICITS COMERCIALES SOSTENIBLES

ISRAEL: DEFICIT DESDE 1952: 42 AÑOS CONTINUOS.  
 DEF/GDP(1992)= 7.7%  
 FORMA PRINCIPAL DE FINANCIAMIENTO:  
 TRANSFERENCIAS

ESPAÑA: DEFICIT DESDE 1955: 39 AÑOS.  
 DEF/GDP(1991)= 6.2%  
 FORMA PRINCIPAL DE FINANCIAMIENTO:  
 SERVICIOS DE TURISMO

SUIZA: DEFICIT DESDE 1956: 38 AÑOS  
 FORMA PRINCIPAL DE FINANCIAMIENTO:  
 SERVICIOS FINANCIEROS Y PATENTES

INDIA: DEFICIT DESDE 1955 (SALVO TRES AÑOS): 37 AÑOS  
 FORMA PRINCIPAL DE FINANCIAMIENTO:  
 AYUDA EXTERNA

SINGAPUR: DEFICIT DESDE 1963: 30 AÑOS  
 FORMA PRINCIPAL DE FINANCIAMIENTO:  
 SERVICIOS FINANCIEROS, SEGUROS,  
 TRANSPORTES, ETC.

KOREA: DEFICIT DESDE 1952 (SALVO 4 AÑOS): 38 AÑOS.  
 DEF/GDP(1991)=2.5%  
 FORMA PRINCIPAL DE FINANCIAMIENTO:  
 INVERSION DIRECTA Y FINANCIERA

NORUEGA: DEFICIT 1955 AL 1978: 23 AÑOS  
 DEF/GDP(1977)= 11.3%  
 FORMA PRINCIPAL DE FINANCIAMIENTO:  
 INVERSION DIRECTA Y FINANCIERA

NOTA: Los déficits pueden haber comenzado antes de las fechas iniciales, las cuales son las primeras disponibles en el banco de datos.

La evidencia de la Tabla 2 muestra a las claras que déficits comerciales bien importantes son sostenibles por mucho más de 20 años y en países que son ejemplo de crecimiento y estabilidad. La clave para la sostenibilidad de los déficits está

en que exista la posibilidad de un financiamiento genuino. Dicho financiamiento sostenido ha de encontrarse en la cuenta de servicios (turismo, royalties, seguros, fletes, dividendos, intereses) o en la inversión directa.

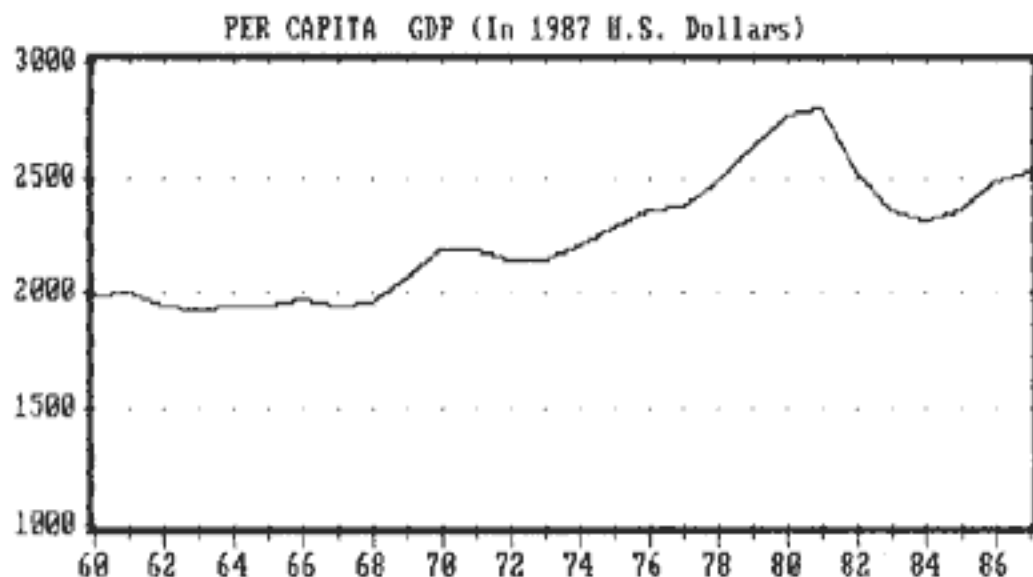
Países que son sinónimo de desarrollo y alta tecnología, tal como Suiza, presentan déficits comerciales permanentes que son financiados de manera sostenible por otros ítems de la cuenta de servicios. Debe notarse que a pesar de tener déficits comerciales hace al menos 38 años, el desempleo en Suiza es una variable casi desconocida a tal punto que no se lo mide en porcentaje sino por el número absoluto de desempleados. Otros ejemplos de crecimiento y desarrollo tales como Corea y Singapur también han sostenido déficits comerciales por décadas, sin que ello les impida clasificar en el club de los tigres asiáticos. Debe notarse que la inversión directa fue el factor sostenible que financió los déficits de Corea.

En el caso argentino, nuestra balanza de servicios es claramente deficitaria y no veo la chance de que seamos competitivos en la exportación de los mismos en un plazo razonable. Por lo tanto, la única fuente genuina y sostenible de financiamiento sería la inversión directa ya que no he encontrado ningún caso de países que se hayan financiado por largo plazo con inversión financiera de cartera. El ajuste estructural que favorezca la inversión directa es por lo tanto la alternativa más viable para la continuidad del plan de convertibilidad sin tener que adoptar medidas bruscas de ajuste.

**CAPITAL FLOWS, THE REAL EXCHANGE RATE AND ECONOMIC ACTIVITY:  
THE EXPERIENCE OF URUGUAY 1960-1990.**

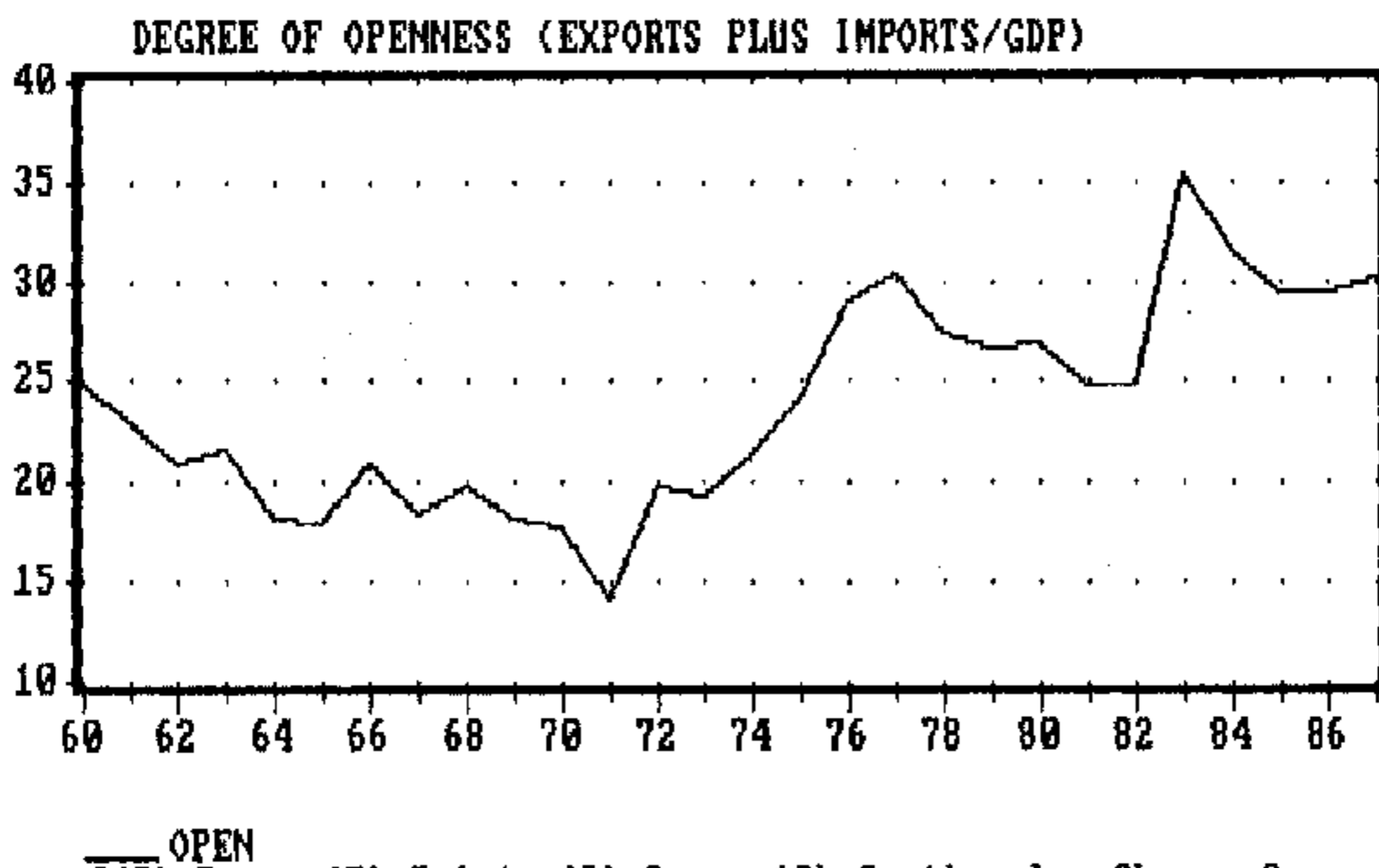
With a per-capita GDP of 2500 dollars, Uruguay has been a fairly stagnant economy in the last three decades. The compound growth rate of per-capita GDP has been a mere 0.9% annual in the 27 years ranging from 1960 through 1987. Throughout this period the country has undergone several crisis and periods of structural change. Like many other Latin-American neighbors, Uruguay experienced during the 1970's a process of Trade and Financial liberalization. While some positive aspects remain from those experiences, much of their effects were washed out by the regional crisis of 1982, signaled by the reversal in the direction of capital inflows.

FIGURE 1



The magnitude of the crisis that started in 1982 can be appreciated by the fact that GDP per-capita in 1987 is at the same level as that of 1978. The Trade and Financial liberalization efforts started in 1974 were not followed by further structural adjustment and the economy has reversed into a state of low investment and high government intervention that seriously hampers future growth prospects.

FIGURE 2



Uruguay is highly dependent on its two big neighbors, Argentina and Brazil, both for Trade and Financial flows, legal and illegal. Contrary to them, however, it has not been subject to the huge macroeconomic and social fluctuations that they experienced in the decade of the 80's. Uruguay has not been at the verge of hyperinflation or social unrest and has managed



smoothly the political transition from military to civilian government. The currency is totally convertible, the economy is highly dollarized and there is a well functioning offshore currency market that attracts the funds from the unstable neighbors. The Trade Liberalization effort started in 1974 increased significantly the level of trade as a fraction of GDP, from less than 20% in 1973 up to a maximum of 30% in 1977. Since then it has remained around the 30% level (Figure 2).

The presence of the Government in all levels of economic activity is, however, overwhelming. Financial markets are dominated by Banco de la Republica, that absorbs 43% of the peso denominated deposits, sets reference values for the exchange rate and interest rates, collects taxes on foreign trade, virtually controls the level of domestic credit and finally, runs a system of reference prices for imports that in effects acts as a system of quantity restrictions.

Congress also has traditionally intervened in economic activity. By a law of 1985, banks were forced to refinance their loans to the private sector, a factor that has seriously affected the market's credibility about the possibility of future enforcement of property rights and is blamed for contributing to the low level of domestic credit and investment in the private markets. A 1989 Law has mandated the indexation of all social security benefits that in fact implies a 20% real increase in benefits and a contribution of about 2% of GDP to the fiscal

deficit. Resources for this additional spending were not set in the Law and finding them has become a major policy issue for the new administration taking power in March 1989.

Uruguayans interviewed blame the poor economic performance of the country on uncertainty on property rights and the economic power of Labor Unions. Basically, Banks do not want to lend because they do not know if they will get their money back and entrepreneurs do not want to invest because they do not know if they will have the power to control their enterprises because of the strong Union power. Strikes are a daily issue while several of the loans refinanced in 1985 have not yet been classified by the Commission set up by Congress and have not served any interest since then.

The basic message we try to set here is that the growth of Uruguay is not as much upset by macroeconomic imbalance but rather by a still unstable and undefined social and political balance. The political system has not yet defined the structural economic model it wants and therefore the system has been subject to disturbances that have more to do with expectations of damaging intervention rather than actual macroeconomic disturbances.

The result has been a low investment ratio, that in the last decade probably has barely covered depreciation, moderately high inflation (in the order of 60 to 80% per year), an increasing level of unsatisfied social demands, emigration and reliance on

public employment and social security as principal means of survival for the middle and lower classes. Unofficial data indicate that out of a population of 3 million, there are about 600000 recipients of the Social Security System and 400000 Public Sector employees.

All of the above negative results have taken place in the context of a relatively stable macroeconomic environment, at least for Latinamerican standards. First of all, Uruguay has regularly served its foreign debt, contrary to most of its neighbors. The currency has remained freely convertible since 1974, there is not a significant level of internal debt that could generate an explosive quasifiscal problem and the exchange rate policy has been conducted so that there has been no significant swings in the Real Exchange Rate since mid 1984, period during which the Real Effective Exchange Rate oscillated between between a minimum value of 50 and a maximum of 60 (base 1982=100). Proof of the current macroeconomic stability of the economy is that the Government sells short term debt denominated in dollars at about LIBO rate (Letras de Tesoreria).

This paper deal with issues relating to the macroeconomic aspects of trade reform in Uruguay. It is concerned with the likely effects of further efforts of trade reform given the present macroeconomic environment as well as with the interrelations between openness of the economy and the investment and growth process.

TABLE 1

## URUGUAY: MACROECONOMIC DATA

	Nominal GDP	GDP Price Deflator	Real GDP	Nominal Government Consumption	Private Consumption
	=====	=====	=====	=====	=====
1960	14	0.0002	57800	1	11
1961	17	0.0003	59520	2	13
1962	19	0.0003	58144	3	14
1963	22	0.0004	58488	3	16
1964	33	0.0006	59520	5	24
1965	53	0.0009	60208	8	36
1966	100	0.0016	62272	13	69
1967	170	0.0028	59864	24	120
1968	375	0.0062	60552	49	277
1969	506	0.0079	64336	75	370
1970	601	0.0088	68493	92	448
1971	722	0.0105	68576	119	522
1972	1242	0.0184	67511	153	938
1973	2561	0.0378	67757	364	1844
1974	4546	0.0650	69887	680	3463
1975	8166	0.1104	73985	1116	6244
1976	12638	0.1643	76933	1755	9107
1977	19915	0.2559	77836	2451	15018
1978	30930	0.3775	81931	3821	22919
1979	57625	0.6625	86986	6789	43441
1980	92204	1.0000	92204	11482	70479
1981	122453	1.3033	93955	17336	91147
1982	128696	1.5117	85131	20100	94076
1983	185006	2.3083	80149	25653	137826
1984	294359	3.7270	78981	36851	216282
1985	528152	6.6672	79216	69154	394839
1986	971734	11.5073	84445	127842	720310
1987	1700559	19.1900	88617	216929	1290795

## URUGUAY: MACROECONOMIC DATA

	Nominal Savings =====	Nominal Investment =====	Exports (Mill.U\$S) =====	Imports (Mill.U\$S) =====	Exchange Rate =====
1960	2	2	129.4	187.9	0.01
1961	2	3	174.7	182.8	0.01
1962	2	3	153.5	207.6	0.01
1963	3	3	166.2	151.6	0.02
1964	4	3	183.6	168.6	0.02
1965	9	6	196.3	123.1	0.03
1966	18	11	190.3	132.2	0.07
1967	26	23	159.8	146.4	0.10
1968	49	38	179.3	135.9	0.24
1969	61	56	199.2	170.0	0.25
1970	61	68	224.1	203.1	0.25
1971	81	83	196.8	203.0	0.26
1972	151	121	281.6	178.7	0.54
1973	353	229	327.6	248.6	0.87
1974	403	465	381.4	433.6	1.20
1975	806	1090	384.9	494.1	2.25
1976	1776	1952	565.0	536.6	3.34
1977	2446	3030	611.5	686.7	4.68
1978	4190	4942	686.1	709.8	6.06
1979	7395	9311	788.1	1166.2	7.86
1980	10243	15422	1058.5	1668.2	9.10
1981	13970	19205	1229.7	1592.1	10.82
1982	14520	19382	1256.4	1038.4	13.91
1983	21527	20329	1156.4	739.7	34.54
1984	41226	27331	924.6	732.2	56.12
1985	64159	39208	853.6	675.4	101.43
1986	123582	71022	1087.8	791.0	151.99
1987	192835	144559	1189.1	1079.9	226.67

## URUGUAY : MACROECONOMIC DATA

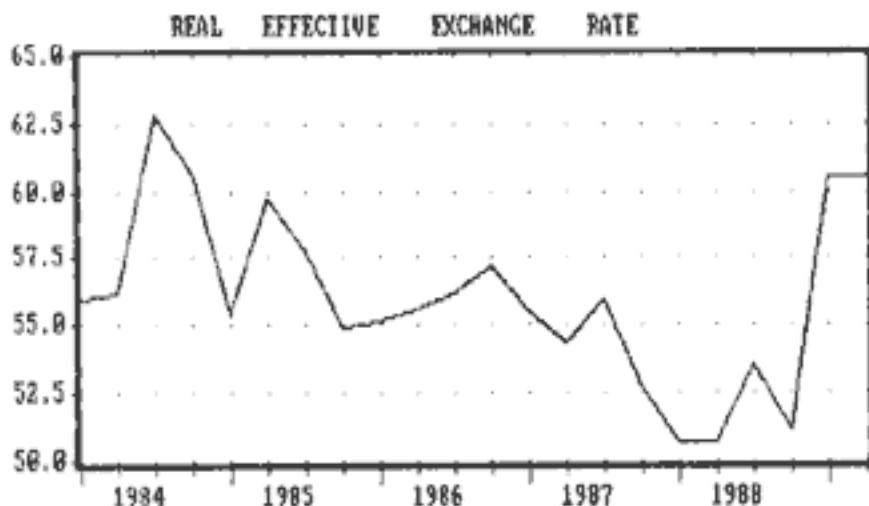
	Real Exch. Rate of Urug. =====	Real Exch. Rate of Arg. =====	Fiscal Def. (% of GDP) =====	Population (Millions) =====	Trade Bal. Def/ GDP (FS) =====
1960	117.8	96.7	N.A.	2.54	4.60
1961	100.7	86.0	N.A.	2.58	0.52
1962	89.2	93.6	N.A.	2.61	3.13
1963	106.4	92.0	N.A.	2.65	-1.00
1964	83.2	85.6	N.A.	2.68	-0.77
1965	93.9	106.8	3.77	2.71	-4.14
1966	115.0	82.1	0.00	2.75	-3.78
1967	104.8	91.7	2.94	2.69	-0.80
1968	114.8	84.6	1.07	2.7	-2.72
1969	101.4	82.9	2.37	2.71	-1.44
1970	96.3	85.2	1.33	2.73	-0.87
1971	85.3	101.5	5.82	2.74	0.22
1972	106.0	129.1	2.50	2.75	-4.44
1973	88.6	85.4	1.21	2.76	-2.67
1974	78.9	105.3	3.83	2.77	1.37
1975	95.6	176.4	4.40	2.83	3.01
1976	100.6	142.7	2.07	2.85	-0.75
1977	96.4	79.9	1.33	2.86	1.77
1978	91.1	61.1	0.91	2.88	0.46
1979	74.9	43.1	0.00	2.89	5.16
1980	65.2	33.8	-0.03	2.91	6.02
1981	65.7	53.9	1.50	2.93	3.20
1982	77.3	127.0	9.06	2.95	-2.36
1983	129.7	136.5	3.93	2.97	-7.78
1984	136.1	122.8	5.20	2.99	-3.67
1985	142.4	123.2	2.21	2.93	-3.42
1986	126.0	99.7	0.64	2.98	-4.64
1987	116.8	114.2	1.38	3.06	-1.46

SOURCE : IFS

## I- Financial and Exchange Rate Policies

Since 1974 Uruguay has a convertible currency. The value of the peso is determined in terms of the U.S. dollar. Actual intervention is done by the state owned Banco de la Republica, following directions from the Central Bank. In practice, authorities follow a crawling peg rule aiming at keeping the real parity of the peso against a currency basket.

figure 3



Authorities have been wise in avoiding adjusting the exchange rate in response to the frequent changes in the exchange rates of the neighbors Argentina and Brazil, particularly in their black market parities that are relevant for the widespread frontier smuggling and tourist flows.

The fact is, however, that the country may not be completely isolated from fluctuations in Real Exchange Rates in neighbor countries. The Argentine Real Exchange Rate( in the black market) is widely accepted to have some influence in the Uruguay RER a fact we will try to ascertain in the following econometric analysis.

We view the Real Exchange Rate as the price that equilibrates the market between demands for Traded and Non-Traded goods. As such, it depends on the level of excess demand for goods of the economy that is captured by the Trade Balance Deficit. A higher level of excess demand implies that some of it falls on Non-Traded goods and therefore its price must raise( the RER must fall) to equilibrate the market. Therefore, the higher the Trade Balance deficit, the lower should be the real Exchange Rate. In order to allow for slow market adjustment, we assume that the RER depends on the current and lagged values of the Trade Balance. It is also possible that the price of Non-Traded goods depends on additional demand derived from smuggling from neighbor countries. This possibility suggests that the RER of Uruguay should be positively correlated with the RER of Argentina in particular. Since smuggling is done using the black currency markets, we use the Argentine RER computed using the black market price of the Austral.



Regression (R1) shows the correlation of the RER of Uruguay (vis-a-vis the dollar using the U.S. CPI) and the RER of Argentina using also the black market rate for the Austral. The results seem to suggest that the Argentine RER causes the Uruguayan RER. Current RER of Uruguay is explained by a Polynomial Distributed lag structure of the Argentine RER. The current and up to two years lagged RER of Argentina are shown to affect the Uruguayan RER. The sum of the coefficients is 0.56 indicating that a 10% increase in the RER of Argentina results in a 5.6% increase in the RER of Uruguay (both rates have an average value of 100). The fact of the matter is, however, that Regression (1) is not properly specified since we have omitted another important determining variable which is the current and lagged values of the Trade Balance Surplus of Uruguay.

The regression including a PDL structure of the Trade Balance Surplus is R2 and there the significance of the RER of Argentina diminishes substantially in relation to the results of R1. The Trade Balance Surplus affects positively the RER with coefficients significant up to two year lags. The sum of coefficients of the RER of Argentina is reduced to 0.23 and the joint significativity is less than in R1.

## DEPENDENT VARIABLE: REAL EXCHANGE RATE OF URUGUAY

	R1 =====	R2 =====	R3 =====
CONSTANT	44.46 (3.3)	70.84 (6.1)	80.11 (8.8)
D74	-----	-----	17.16 (4.4)
RERARG(t)	0.249 (4.1)	0.09 (1.6)	0.03 (0.67)
RERARG(t-1)	0.177 (4.7)	0.07 (2.1)	0.01 (0.49)
RERARG(t-2)	0.106 (2.8)	0.05 (1.5)	-0.00 (-0.0)
RERARG(t-3)	0.034 (0.5)	0.03 (0.5)	-0.01 (-0.4)
TBGDP(t)	-----	2.66 (4.9)	3.33 (7.4)
TBGDP(t-1)	-----	1.84 (5.7)	2.46 (8.5)
TBGDP(t-2)	-----	1.02 (3.11)	1.60 (5.6)
TBGDP(t-3)	-----	0.20 (0.3)	0.74 (1.6)
MA(1)	0.58 (2.6)	0.398 (1.66)	0.13 (0.52)
=====			
SUM of RERARG Coefficients	0.566 (4.2)	0.239 (1.96)	0.026 (0.25)
SUM of TBGDP Coefficients	-----	5.729 (4.99)	8.143 (7.84)
ADJ.R2 =	0.55	0.76	0.86
D-W.Stat.=	1.76	1.86	1.96
Period=	1964-87	1964-87	1964-87

An additional factor not taken into consideration in the above two regressions is that in 1974 took place a significant structural change in the economy given by the installation of free convertibility and a Trade Reform. We have therefore included a Dummy taking the values of one for the years 1974-87 and zero elsewhere to incorporate the possibility that the structural change that took place since 1974 affected the shape of the relation determining the equilibrium RER.

Regression R3 shows that the structural change variable is highly significant and that it worked toward a higher equilibrium level of the RER (the Dummy variable has a coefficient of 17, meaning that a 17% increase in the RER was due to the Trade and Currency reform) and surprisingly the Argentine RER drops out as insignificant. In conclusion, the results of this last regression indicate that the Uruguayan RER depends basically on the domestic excess demand for goods( as measured by the official Trade Balance) and not on the RER of Argentina.

It is a fact widely accepted in Uruguay that the RER of Argentina does affect the RER of Uruguay. This may be the case in the very short run but it is not apparently true on an annual basis. Since the empirical results depend very much on the specific structure of the regression chosen, we suggest that further research be conducted on this very relevant issue. Nevertheless, our prior results seem to indicate that the RER of Uruguay is not significantly affected by the Argentine RER, at least on an annual basis.

An important issue that follows from our analysis is that the Trade Reform of 1974 raised the equilibrium Real Exchange Rate. This is a well recognized issue in theoretical analysis that is not often put into practice. Lowering tariffs per se does not provide an incentive for exports to expand. For the export sector to be able to absorb the resources that will be freed by the import competing sector, a price incentive in the form of a higher Real Exchange Rate is necessary. Otherwise, the lower tariffs will result in higher imports and an eventual Balance of Payments crisis. This is exactly what happened in the Trade Reform of Argentina that started in 1979 and was done in the context of a nominal exchange rate policy aimed at reducing inflation. The resulting fall in the Real Exchange Rate in the next two years resulted in unprecedented Trade Balance deficits and the eventual abandonment of the liberalization effort.

The above issue is very much relevant for Uruguay if further Trade Liberalization is planned, either in the form of further tariff reductions or reduction in the system of preventive QR's instrumented through the reference prices for imports. This is so because it seems that the monetary authorities run the nominal exchange rate policy aiming at a relatively stable level of the Real Exchange Rate. We suggest that the target level of the Real Exchange Rate followed by the nominal crawl must be raised in some proportion of the increased import demand made possible by the reductions in trade impediments.

We view the Trade Balance of Uruguay as being mainly determined by Capital Flows and External Debt service and therefore would consider it as an exogenous variable. This issue is of course debatable, the exogeneity of capital inflows may vary from time to time. It is likely that in the late 70's and early 80's the Uruguayans could spend more than their income and find voluntary financing abroad. It is also likely that such voluntary financing was cut in 1982 and that most of the external financing at present is limited to multilateral organizations and the financial and construction investments of the Argentines.

The fact of the matter is that most macroeconomic variables of Uruguay appear to be highly affected by the rate of capital inflows, as measured by the Trade Balance deficit. Not only is the Real Exchange Rate explained by current and lagged values of the Trade Balance but also the short term fluctuations in GDP and the rate of Gross Investment.

#### Output Fluctuations and Capital Flows

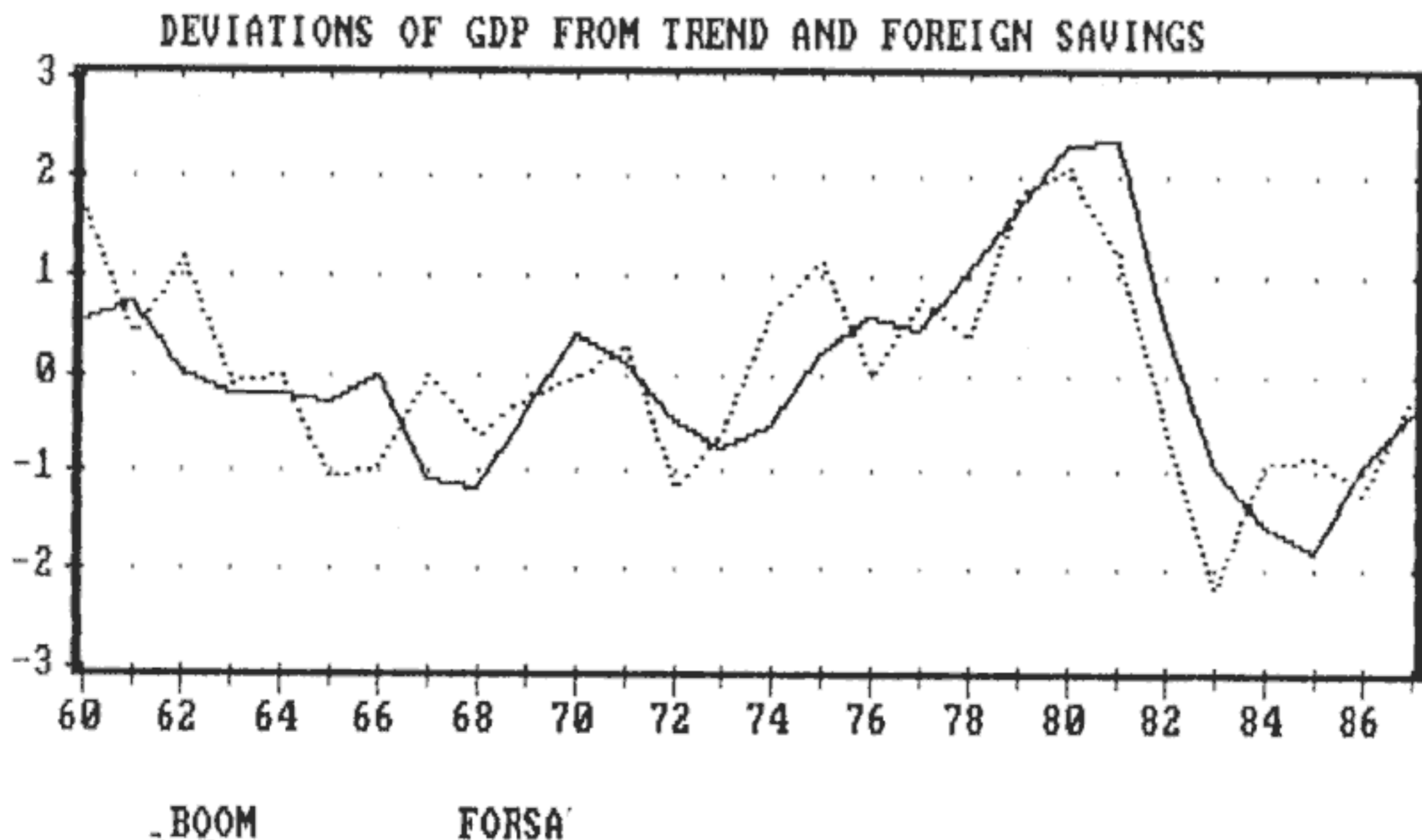
The lack of series of capital stock and effective labor force precludes us from explaining the determination of capacity GDP. In order to study cyclical fluctuations we have followed the shortcut of estimating trend output with a simple time trend as reported in Regression 4. In the next section an attempt will be made to estimate capacity GDP using an estimated series of the capital stock and the population variable; the results there are

obscured by fact that these two last series may have serious problems of measurement. Using the simple time trend methodology, the variable BOOM is constructed as the percentage difference between trend and actual GDP:

$$\text{BOOM} = (\text{GDP} - \text{trend GDP}) / \text{GDP}.$$

The BOOM variable so defined is clearly related to the current and lagged value of the Trade Deficit to GDP ratio as it can be seen in Figure 4 (where both variables are normalized by their means so that they can be shown in the same scale). Regression 5 shows that a rate of 1% of Foreign Savings is associated with a positive deviation of GDP from trend of 2% and that Foreign Savings (measured by the Trade Deficit to GDP ratio) affect output significantly with up to two years lag.

FIGURE 4





=====  
 Regression 4  
 =====

Trend Output:  
 =====

$$\text{Log(Trend Output)} = 10.91816 + 0.01778 * \text{TIME}$$

(465)                      (12.6)

R2 = 0.85

D-W = 0.43

Sample Period= 1960-1987

Method of Estimation : OLS.

Deviation of Output from Trend  
 =====

$$\text{BOOM} = 100 * (\text{GDP} - \text{Trend Output}) / \text{GDP}$$

Regression 5  
 =====

Relation Between BOOM and Foreign Saving  
 =====

$$\text{BOOM} = 1.41 + 0.98 \text{ FS} + 0.68 \text{ FS}(-1) + 0.38 \text{ FS}(-2) + 0.08 \text{ FS}(-3)$$

(2.6)    (8.7)            (10.4)            (6.0)            (0.7)

Sum of FS coefficients = 2.12 ( T=9.49)

R2 Adj.= 0.82

MA(1) = 0.31 (T=1.4)

D-W=1.92

Sample Period= 1963-1987

Method of Estimation: OLS with a linear Polynomial Distributed lag structure on FS.

=====

From the above we conclude that the cyclical fluctuations of the Uruguayan economy are highly dependent form capital inflows. It could be argued that since we are measuring capital inflows by the Trade Balance deficit, the causality relation could be just the opposite: increases in output could induce trade balance

deficits through the standard Keynesian mechanisms. Obviously one cannot rule out some simultaneous interactions between both variables, particularly if the country makes use of foreign exchange reserves in order to finance the imports increase. The fact, however, is that lagged values of the Trade Balance deficit still explain the current BOOM while the reverse hypothesis is not as valid as the results of Regression 6 show. In this Regression we have tried the reverse hypothesis that current and lagged values of BOOM explain the current Trade Deficit. As shown, there is a positive correlation from current and one lag trade deficit to the current BOOM. It is clear, however, that those positive correlations are much less significant than the reverse ones shown in Regression 5 and that the overall performance of the equation in R6 is significantly less than that of R5.

=====

Regression 6: Does BOOM induce Trade Deficits?

=====

TDGDP = 0.776 - .25 BOOM - .12 BOOM(-1) + .01 BOOM(-2) + .15 BOOM(-3)  
 (1.7) (-4.7) (-4.2) (.53) (2.7)

Sum of BOOM coefficients = 0.21 (T=2.19)

MA(1) = 0.23 (T=1.03)

R2 Adj. = 0.52

D-W. = 1.99

TDGDP: Trade Deficit to GDP ratio (equal to minus FS in R%)

Method of Estimation: OLS with a linear PDL on BOOM.

=====



## Investment and Growth

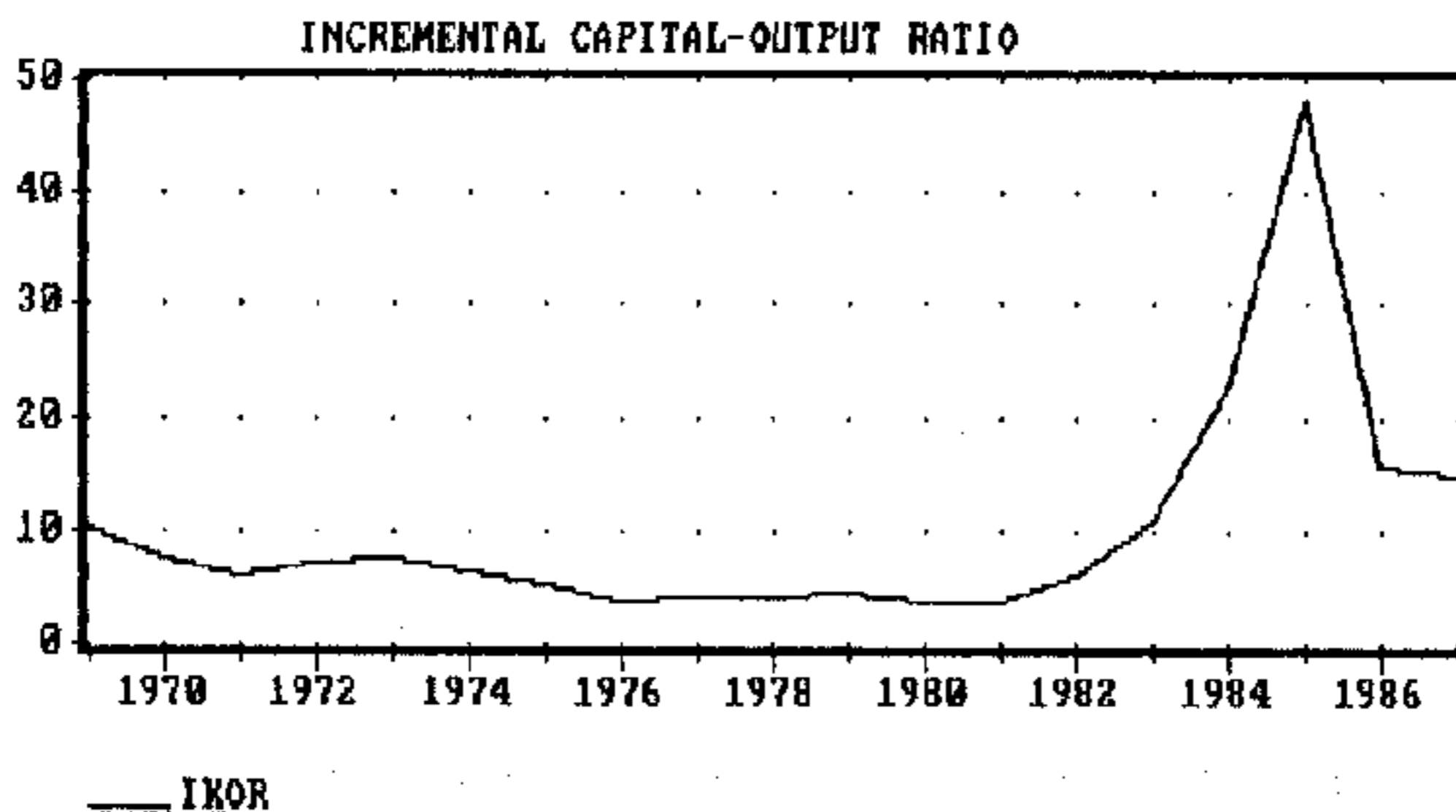
It is a well known fact among students of Uruguayan economy that it is very difficult to ascertain the empirical relation between investment and economic growth in Uruguay. While part of the problem may be due to measurement problems, we feel that an important part is due to the strong cyclical fluctuation in real output that we have identified as being originated in the rate of capital inflows.

The instability of the incremental capital-output ratio has been mentioned by Ramon Diaz in his paper "El Crecimiento Erratico de Uruguay" (in *El Crecimiento Economico del Mundo*, ed. by A. Harberger, Fondo de Cultura Economica, 1988). We have reconstructed the series of Diaz using data for the period 1960-1987 using his definition:

$$IKOR = \{I(t-1) + \dots + I(t-9)\} / \{GDP(t) - GDP(t-9)\}$$

Figure 5 shows the IKOR for the period 1969-1987.

FIGURE 5



It follows from Figure 5 that the IKOR shows a relatively stable behavior between the years 1969-1982 when it ranges between values of 10 and 5. Since then it starts a steep raise that takes it to a maximum value of 24 in 1984 and then it falls back to a level of around 15. We feel this abnormal behavior is exclusively due to a cyclical fall in output that was due to the reversal in the direction of capital flows that takes place since 1982. The IKOR raises since 1984 not because the productivity of capital falls but because output fell well below potential output as a consequence of the recession generated by the reversal of capital inflows.

In order to ascertain the effects of investment on output we have tried to construct a capital stock series and then relating this series to GDP. To do this one needs to assume an initial value for the capital output ratio and a rate of real depreciation of the stock. We have tried with several assumptions and the one yielding the best results assumes a 1960 value for the capital-output ratio of 2 and an annual rate of depreciation of 0.05. Nominal investment was deflated by the global GDP deflator in order to get real investment. The formula used to compute the capital stock was=

$$K(t) = 0.95 * K(t-1) + I_{real}(t-1)$$

Per-capita capital stock was constructed using the population series published in IFS. We are aware of the problems involved in using population as a proxy for labor force but the later series are not available for Uruguay. Our results here should only be

considered as a tentative way around the much simpler time trend assumed in the previous section for the determination of cyclical output.

We postulate a Cobb-Douglas type relationship where per-capita output (in Logs) is a linear function of the Log of the per-capita capital stock. In addition we include a PDL in Foreign Savings as a fraction of GDP to capture the possibility of cycles due to exogenous capital flows.

The econometric results are not totally satisfactory regarding the standard Cobb-Douglas formulation. The standard logarithmic regression on capital and population (the only proxy available for labor force) yields exceedingly high degree of returns to scale, an insignificant coefficient for capital and a high degree of first and second order of serial correlation of residuals. We have restricted returns to scale to unity by running the regression in per-capita terms and in this case the results were a bit more satisfactory as reported in Regression 7 where the autocorrelation of residuals was corrected using an ARMA(1,1). The coefficient on the capital stock per-capita is 0.81.

The econometric results change when we assume that foreign savings may produce cyclical fluctuations in GDP. To test for that hypothesis we include a PDL in FS with up to six year lags. The results in Regression 8 show that Foreign Savings

strongly influence GDP and that the overall cycle may last up to six years. While we have strong doubts about the quality of the data being used, we feel the strength of the coefficients on Foreign Savings indicating that this variable influences cyclical fluctuations in output deserves mentioning and possibly further research.

=====  
 Regression 7  
 =====

$$\text{Log(GDP/POP)} = 1.38 + 0.811 \text{ Log(K/POP)}$$

(0.6)    (3.9)

$$\text{AR}(1) = 0.62 \quad (T=5.76)$$

$$\text{MA}(1) = 0.97 \quad (T=3.58)$$

Method of Estimation: OLS with an ARMA(1,1)

Period: 1964-1987

R2 Adj.=0.91

Regression 8  
 =====

$$\begin{aligned} \text{Log(GDP/POP)} = & -1.03 + 1.03 \text{ Log(K/POP)} + 0.00826 \text{ FS}(t) \\ & \quad (-0.8) \quad (8.8) \quad \quad \quad (7.4) \\ & + 0.0055 \text{ FS}(t-1) + 0.0028 \text{ FS}(t-2) + 0.0001 \text{ FS}(t-3) \\ & \quad (6.17) \quad \quad \quad (3.39) \quad \quad \quad (0.1) \\ & - 0.0026 \text{ FS}(t-4) - 0.0053 \text{ FS}(t-5) - 0.008 \text{ FS}(t-6) \\ & \quad (-2.2) \quad \quad \quad (-3.5) \quad \quad \quad (-4.4) \end{aligned}$$

$$\text{MA}(1) = 0.70 \quad (T=2.92)$$

R2 Adj.=0.88

Sum of Coefficients on FS= 0.0007 (T = 0.1)

Method of Estimation: OLS with a MA(1)

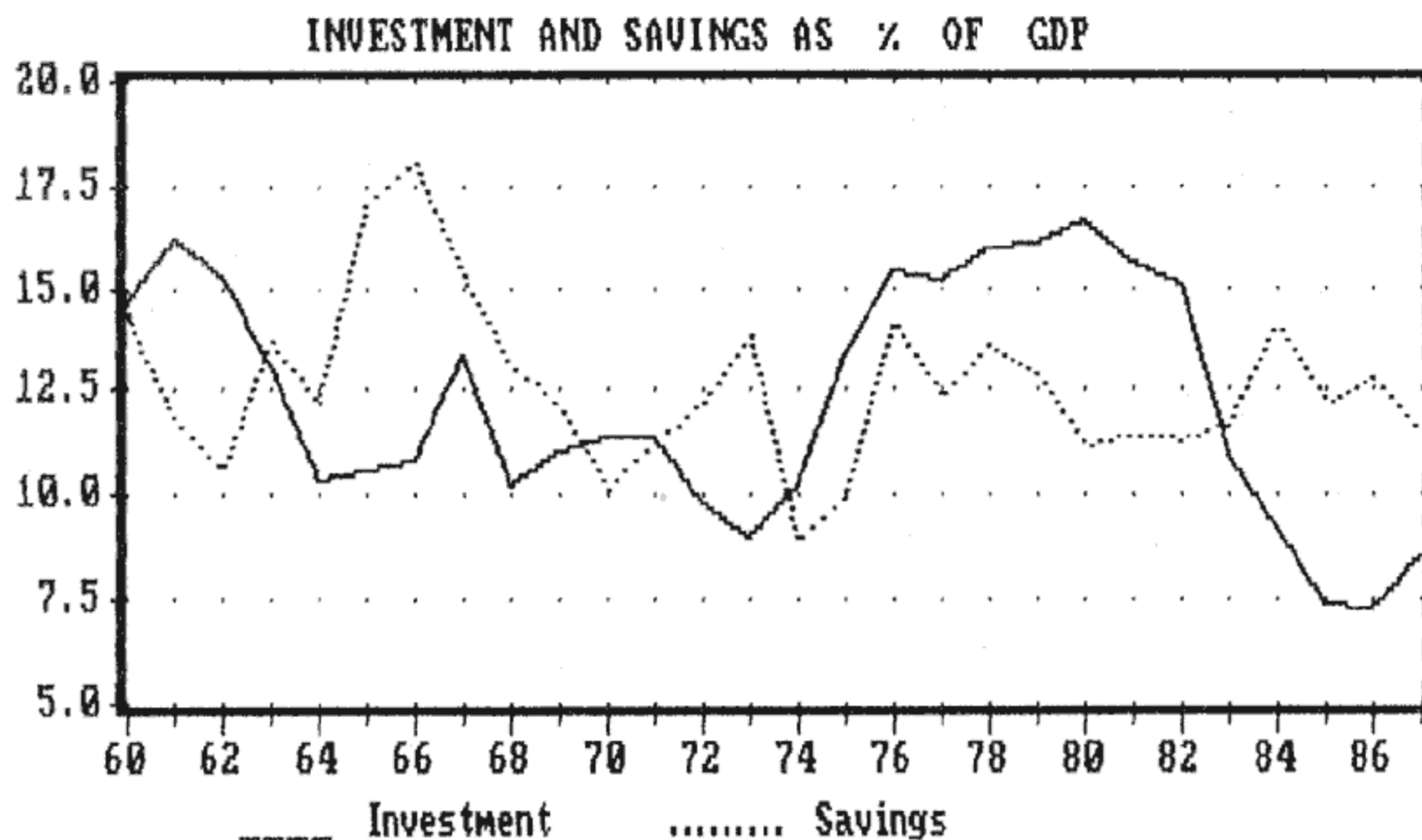
Sample Period=1966-1987  
 =====

The results of Regression 8 indicate that a permanent rate of capital inflow of 1% of GDP will produce a six year cycle: during the first three years GDP will raise by up to 1.6% and then fall back to the original level after the sixth year. Unfortunately, the coefficient of the capital per capita variable, 1.03 does not approximate what could be considered an acceptable value for the share of capital in GDP and we feel there may be measurement problems with both the capital and labor force proxies we have used. Nevertheless, the coefficient is positive and highly significant, a fact that yields some evidence in favor of a positive productivity of investment (as measured) in Uruguay.

#### The Determinants of Investment

Figure 6 shows Gross Investment and Savings, as percentages of GDP, during the period 1960-1987. The difference between Investment and Savings was covered by Foreign Savings. It is clear from the Figure 6 that we can identify four subperiods depending on whether foreign savings was positive or negative. Foreign Savings contributed positively to finance Investment in excess of domestic Savings in the periods 1960-62 and 1974-82. On the other hand, we have two periods where Savings exceeded Investment, periods of positive Trade Balance that cover 1963-73 and 1983-87.

FIGURE 6



Investment peaked in the latest period of capital inflows, 1974-82, following the adoption of measures of Trade and Financial liberalization that started in 1974. The process ends with the crisis that starts in mid-1982, year in which the investment/GDP ratio reached 15%. Since then it falls steadily up to 1986 when it reaches a low of 7.5% and then recovers slightly in 1987 up to a level of 8.5%.

Table 2 shows data on investment classified as Public and Private, both for Construction and Machinery, in all cases as percentages of GDP. It is clear from all series that starting in 1983, investment takes a significant fall that does not show clear signs of reversing. Compared with a maximum value of 16.1%, in 1980, the investment/GDP ratio reaches only 8.5% as of 1987.

This later value compares poorly with the average ratio of 13.1% for the period 1960-82. Average values during 1960-82 for private and public investment ratios were 9.3% and 3.8%. These values exceed significantly the levels of 5.4% and 3.1% reached by the same ratios in 1987.

TABLE

INVESTMENT GDP RATIOS

	Gross Investment	Construct.	Machines	Public Invest.	Private Invest. (1980 pesos)	GDP
1960	14.6	9.8	4.8	2.3	12.3	57800
1961	16.2	9.5	6.7	3.2	13.0	59520
1962	15.3	8.0	7.3	3.1	12.3	58144
1963	13.1	7.7	5.4	3.5	9.6	58488
1964	10.4	6.7	3.6	2.0	8.4	59520
1965	10.7	7.4	3.3	1.7	9.0	60208
1966	10.9	8.2	2.7	2.4	8.5	62272
1967	13.4	9.0	4.4	2.6	10.8	59864
1968	10.2	7.7	2.5	2.1	8.1	60552
1969	11.1	6.6	4.5	2.2	8.8	64336
1970	11.4	6.7	4.7	3.0	8.4	68493
1971	11.5	7.9	3.5	3.1	8.4	68576
1972	9.8	7.6	2.1	2.3	7.5	67511
1973	9.0	7.2	1.7	1.9	7.1	67757
1974	10.2	8.3	1.9	2.6	7.7	69887
1975	13.3	9.4	3.9	4.6	8.7	73985
1976	15.4	9.4	6.1	6.5	9.0	76933
1977	15.2	8.8	6.5	7.0	8.2	77836
1978	16.0	10.4	5.6	8.0	8.0	81931
1979	16.2	10.7	5.5	6.5	9.7	86986
1980	16.7	11.4	5.3	5.3	11.4	92204
1981	15.7	11.5	4.2	5.0	10.7	93955
1982	15.1	11.7	3.3	7.2	7.9	85131
1983	11.0	8.0	3.0	4.1	6.9	80149
1984	9.3	7.2	2.1	4.1	5.2	78981
1985	7.4	5.1	2.3	3.0	4.5	79216
1986	7.3	4.7	2.6	2.9	4.4	84445
1987	8.5	5.2	3.3	3.1	5.4	88617

SOURCE: Banco Central de la Republica Oriental del Uruguay.



There is a clear relation between Investment and our measure of Foreign Savings that captures the net resource transfer from abroad (the Trade Balance). This relation can be best appreciated from the data in Table 3.

=====  
Table 3  
=====

RELATION OF INVESTMENT AND FOREIGN SAVINGS  
=====

	Gross Investment =====	Construct.	Machines =====	Public Invest. =====	Private Invest. =====	FS ==
1960-62	15.4	9.1	6.3	2.8	12.5	2.8
1963-73	11.0	7.5	3.5	2.4	8.6	-2.0
1974-81	15.5	10.2	5.3	6.1	9.4	2.7
1982-87	8.7	6.0	2.7	3.4	5.3	-4.2

=====  
Between 1960-62 and 1963-73, Foreign Savings changed by 4.8% of GDP and the Gross Investment Ratio fell by 4.4% of GDP. Notice that most of the reduction in investment took place in the private sector, as public investment was reduced by only 0.4%. In the next period, 1974-81, Foreign Savings change sign again and increase by 4.7% in relation to the previous period. Investment increases again by 4.5% of GDP and this time the increase is reflected mostly in the public sector investment that raises by 3.7% of GDP. In these two experiences we find that public investment was cut little when FS fell and was increased a lot when FS rose. With the crisis of 1982, FS decreases drastically falling by 6.9% of GDP in relation to the previous period. In

this case total Investment falls by an almost identical amount, 6.8% of GDP. In this case, both private and public investment share equally in the burden of the adjustment.

It is clear from the above that the burden of the generation of a Trade Balance Surplus since 1982, resulting from the reversal of capital inflows plus the need to pay for the service of the external debt, fell exclusively on Investment, from where we conclude there was no change in the domestic Savings ratio, a fact that can be appreciated in Figure 6 . The Savings ratio in Uruguay has remained practically stable following a steep raise after the 1974 reforms. Even after this increase it has remained at a level of about 12% of GDP, a level not consistent with steady capital accumulation for a country that lacks inflows of foreign capital and has to serve a significant level of foreign debt.

It seems to us that the main problem with the low investment level in Uruguay is related to the lack of financing, i.e. low domestic savings and lack of foreign investors. The uncertainty about property rights mentioned in the introduction may be a relevant factor for the apparent unwillingness of residents and foreigners to finance productive investment in Uruguay. There is an important amount of foreign funds invested in the financial market, mainly by Argentines, but this funds are mostly in foreign banks and are actually intermediated offshore and not



In order to further check whether there is really a causality relation going from FS to investment we have filtered both time series and redone the regressions testing for causality going from the lagged residual of one regression on the residual of the other. Regressions 10 and 11 show the AR(1)-AR(2) filters used to obtain the residuals on FS and Investment/GDP ratio. We then run a regression of the residuals of the Investment/gdp ratio(RIGDP) being explained by the lagged residual from the FS regression(RFS). The results are shown in Regression 12. While the explanatory power of the regression is of course reduced in comparison to R9, the relationship is still positive and statistically significant. The reverse causality hypothesis is not valid, however: lagged residuals of the IGDP ratio do not explain the current value of the residuals of the FS variable, as shown in Regression 13. We conclude that there is a strong causality relation going from Foreign Savings to domestic investment.

Regression 10

=====

Filter for the IGDP ratio

=====

Constant= 11.711 (T=9.87)

AR(1) = 1.1257 (T=6.06)

AR(2) = -0.4027 (T=-2.04)

-----

R2 Adj.=0.70

D-W.Stat.=2.2

=====

=====  
 Regression 11  
 =====

Filter for the FS series  
 =====

Constant = -0.8713 (T= 0.764)

AR(1) = 0.605 (T= 2.91)

AR(2) = -0.094 (T=-0.46)

-----  
 R2 Adj.=0.25

D-W Stat.= 1.88

Regression 12

=====  
 Causality from RFS to RIGDP  
 =====

RIGDP = 0.117 + 0.3249 RFS(-1)  
           (0.39) (2.346)

MA(1) = -0.492 (T= -1.83)

-----  
 R2.Adj.=0.143

D-W.Stat.=1.98

Regression 13

=====  
 Causality from RIGDP to RFS  
 =====

RFS = -0.04 + 0.0186 RIGDP(-1)  
       (-0.08) (0.04)

MA(1) 0.079 (T=0.31)

-----  
 R2 Adj.=-0.08

D-W Stat= 1.97

=====

In the previous analysis we have been working with the ratio of total gross investment to GDP. We can break up the investment series between Private and Public sector investments and analyze the controversial issue of the crowding out. Basically, the crowding out hypothesis stated that with a fixed supply of total savings (domestic plus foreign), any increase in public investment will crowd out an equal amount of private investment. This is an empirical issue and there is, of course, no need of a total crowding out for the issue to be relevant for policy discussion. Regression 14 relates the private investment to GDP ratio (IPRIV) to the public investment to GDP ratio (IPUB) and the same PDL structure on the other basic determinant of total investment, Foreign Savings. The results confirm the hypothesis of a partial crowding out. The coefficient of IPUB is negative and statistically significant, taking a value of  $-0.45$  that means that every additional dollar of public investment crowds out 45 cents of private investment.

Regression 14

=====

Crowding Out of Private Investment by Public Investment

=====

IPRIV = 10.45 - 0.45 IPUB + 0.29 FS + 0.22 FS + 0.16 FS(-2) + 0.1 FS(-3)  
 (15) (-3) (5.6) (6.6) (4.9) (2.0)

MA(1) = 0.493 (T=2.1)

-----

SUM of FS Coefficients = 0.788 (T=6.27)

R2.Adj.=0.68

D-W Stat.= 1.86

Method of Estimation: OLS with a linear PDL on FS and a MA(1) on Residuals.

Sample Period : 1964-1987

=====

## CONCLUSIONS

The macroeconomic balance of Uruguay is highly dependent on the foreign sector, particularly with regards to the direction and magnitude of capital flows. Investment and output fluctuations, as well as the level of the Real Exchange rate are found to be crucially determined by the resource transfer from abroad, that we measure by the deficit in the Trade Balance Account.

Since 1982 there has been a clear reversal in the direction of capital inflows and the country has started service on its foreign debt that reaches a level of about 61% of GDP. All of this resulted in the need to generate a positive resource transfer to the rest of the world that resulted in an almost



identical fall in the level of domestic investment and a substantial reduction in the level of economic activity. The economy has remained practically stagnant since 1982 and the investment ratio is not believed to cover depreciation of the existing capital stock.

Uruguay has regularly serviced her domestic debt in spite of which capital inflows have practically ceased and there are unofficial reports that uruguayans are channeling funds abroad. There is therefore an apparent lack of funds for the financing of new investment projects. It is also the case that there are no projects being generated because of a global picture of uncertainty about property rights, union strikes and discretionary protection in the traded sector.

There are still several undefined issues in the basic structure of the Uruguayan economy. Among them we have the validity of the system of property rights, particularly with regards to financial investments due to the use of discretionary mandatory refinancing of bank loans in 1985 and a slow and inefficient legal system for the settlement of disputes. Strikes are a daily issue and seriously affect the willingness to invest in the private sector. In particular, we should mention the permanent state of labor unrest that prevails in the state owned port of Montevideo through which most of the country international trade takes place. Port activity is highly inefficient and subject to continuous paralizaciones because of labor unrest. This affects seriously the possibility of developing an efficient

export industry and therefore is a serious obstacle to the efficient implementation of a serious Trade Liberalization effort.

Overall, we see a basic problem for the success of a substantial reallocation of resources in the framework of any further trade liberalization. This problem is related to the lack of a political and legal infrastructure within which the resources freed from the import competing sector will be able to move to the more efficient export activities. High labor taxes and union power, plus the competition of government as a dominant employer prevent the required fluidity in the labor market. Similarly, uncertainty about the enforcement of property rights prevents capital to be reallocated to its more efficient uses. In this context, we feel that efforts should be devoted at improving the functioning of factor markets as a precondition for a successful trade liberalization effort.

## NOTES ON THE DYNAMICS OF PORTFOLIO BALANCE UNDER FIXED EXCHANGE RATES

All goods produced in the country are also produced abroad and their price in terms of foreign exchange is fixed since the country is small and cannot affect world prices by its own actions. We can thus group all goods into a single composite good called  $y$  whose price in terms of foreign exchange is unity by assumption. Given full employment at home, the output of  $y$  is fixed and equal to the domestic income of the country,  $\bar{y}$ . For simplicity we assume investment is zero at all times. The domestic price of the composite good is  $P$ . Because of perfect arbitrage in goods markets, the domestic currency price of the good must equal the foreign currency price times the exchange rate,  $E$ , so  $P = E$  (assuming the foreign price is unity).

Domestic consumption is assumed to depend on domestic income (which is a constant) and the real value of assets. Domestic residents hold domestic cash balances ( $M$ ) and foreign securities (savings accounts at foreign banks which are denominated in terms of the foreign currency) which yield a fixed interest,  $r$ , per unit of time. The total value in terms of foreign exchange of foreign securities held is denoted  $D$ . Since the foreign price of goods is unity,  $D$  also measures the real value of the stock of foreign securities in terms of goods. The real value of domestic money holdings is  $m = M/P = M/E$  since  $P = E$ . The total real value of assets held is then:  $a = M/P + D$  and consumption is an increasing function of  $a$ :  $c = c(a)$ . If consumption falls below the domestic output of goods the remaining is net exports abroad, the trade balance surplus denoted  $b_T$ . Notice that  $b_T$  can be negative if consumption exceeds domestic output. We do not need a foreign demand for domestic goods since they are the same as abroad and the country is so small that the rest of

the world will act as a residual buyer or seller provided only that the purchasing power relation,  $P = E$ , holds. The disposition of domestic output is then:

$$(1) \quad \bar{y} = c(a) + b_T$$

The total income available for spending to households equals domestic income (equal to the value of domestic output) plus net interest payments from abroad,  $r.D$ . Consumers can use this income for three purposes: consumption expenditures, acquisition of cash balances or acquisition of foreign securities.

Thus, the following relationship must hold:

$$(2) \quad \bar{y} + r.D = c(a) + \dot{m} + \dot{D}$$

where  $\dot{m}$  is the rate of acquisition of real cash balances and  $\dot{D}$  is the rate of acquisition of foreign securities. This relation can be transformed into a balance of payments equilibrium condition by noticing that under fixed exchange rates  $\dot{m}$  equals the rate of Central Bank purchases of foreign exchange (the balance of payments surplus, denoted by  $B$ ),  $r.D$  is the service account surplus (denoted by  $b_S$ ) and  $-\dot{D}$  is the country's capital account surplus (denoted by  $b_C$ ). Substituting (1) into (2) and using the three definitions given above, (2) implies:

$$B = b_T + b_S + b_C, \text{ a well-known relation.}$$

We postulate that at any moment the public has a desired portfolio composition ratio between real money holdings and foreign securities holdings. This ratio is assumed to depend negatively on the rate of interest paid by foreign securities:

$$(3) \quad m/D = z(r)$$

Since  $r$  is constant so is  $z(r)$  and thus the public will always have a constant ratio between money and securities holdings. Portfolio equilibrium is always

assured to the extent the Central Bank has enough foreign exchange reserves and exchanges domestic for foreign money at the fixed exchange rate. For example, if the public wants less money and more foreign securities they take the money to the Central Bank and obtain foreign exchange with which they buy the securities from foreigners. A foreign exchange crisis may take place if the public wants to obtain more foreign exchange than what the Central Bank has. In that case restrictions on foreign exchange purchases could be imposed (capital controls) or the currency may be devalued thus reducing the purchasing power of domestic money in terms of foreign exchange and at the same time reducing the real value of cash balances because of the higher price level.

To the extent that the public is on portfolio balance so (3) holds, the rates of acquisition of both assets must also be proportional to  $z(r)$ ; thus

$$(4) \quad \dot{m} = z(r) \dot{D}$$

Using (4) into (2) we obtain:

$$(5) \quad \dot{D} = [\bar{y} - c(m+D) + rD] / (1+z(r))$$

Since  $m = z \cdot D$ , (5) describes the rate of acquisition of foreign securities as a function only of the existing stock of foreign securities (and the other parameters, namely  $\bar{y}$  and  $r$  which are constant throughout the analysis). We assume that there is some value of  $D$  such that there will be no new acquisition ( $\dot{D} = 0$ ) and thus the economy will be at rest with constant stocks of  $D$  and  $m$  provided no new shocks take place. Such a steady state will be stable provided that if for any reason the public's holdings of  $D$  are suddenly increased then the rate of acquisition of  $D$  becomes negative (that is, the public gets rid of the extra addition of  $D$  and returns to the original holdings, although this process will take some time). We will assume the steady state equilibrium is stable and thus that there is some value of  $D$ ,  $D^*$ , such that if  $D$  is larger

(smaller) than  $D^*$  there will be net sales (purchases) of foreign securities. Such  $D^*$  is depicted in Figure 1 as the vertical line in the  $(m, D)$  plane. The straight line through the origin represents the desired composition ratio between money and securities and since this ratio is always attained the economy must travel along this line in the direction indicated by the arrows. At point  $\underline{a}$ , for example, the public will be holding  $m_a$  and  $D_a$  of money and securities and since  $D_a$  is less than  $D^*$ ,  $D$  is growing and so is  $m$ ; thus both  $m$  and  $D$  tend to move northeast along the portfolio balance locus. In the transition from point  $\underline{a}$  and the steady state equilibrium (point  $a^*$ ), the economy accumulates cash balances (so there is a surplus in the balance of payments) and accumulates foreign securities (a capital account deficit). Thus, the stock of real assets is increasing and so is consumption. In the steady state both capital flows and accumulation of cash balances cease and thus the balance of payments is in equilibrium ( $B = 0$ ) and the capital account is balanced ( $b_C = 0$ ). It follows that in the steady state the trade balance has to equal the service account deficit or, in our case where the country is a net creditor to the rest of the world, the long run trade deficit equals the long run service account surplus. This long run equilibrium trade deficit does not imply any deterioration of the economic position of the country but simply reflects that the economy is receiving interest payments from abroad and thus can afford to spend permanently in excess of its income. While at point  $a^*$  the trade account must be in deficit (always assuming that  $D^*$  is positive, otherwise there should be a trade surplus) at the short run equilibrium position at point  $\underline{a}$  the trade account may be in surplus or deficit. There are two ways to see this: at  $\underline{a}$  assets are below their long run value and thus consumption is below its long run level; the long run trade deficit is long run consumption minus  $\bar{y}$  and it is positive; however, at  $\underline{a}$  consumption is below long run consumption and thus the trade deficit is smaller than its long run level and maybe even negative. What is sure is that as time

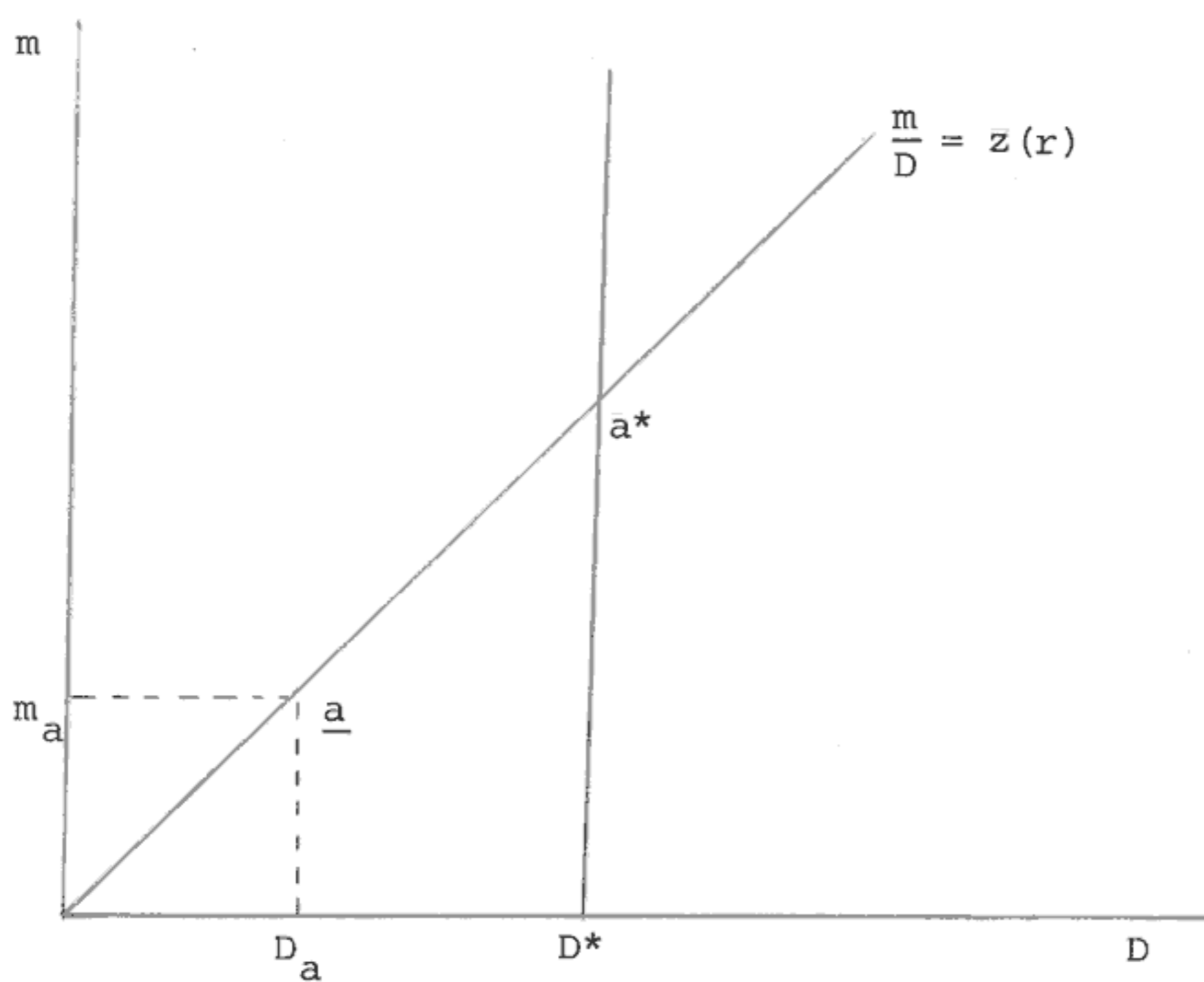


Figure 1.

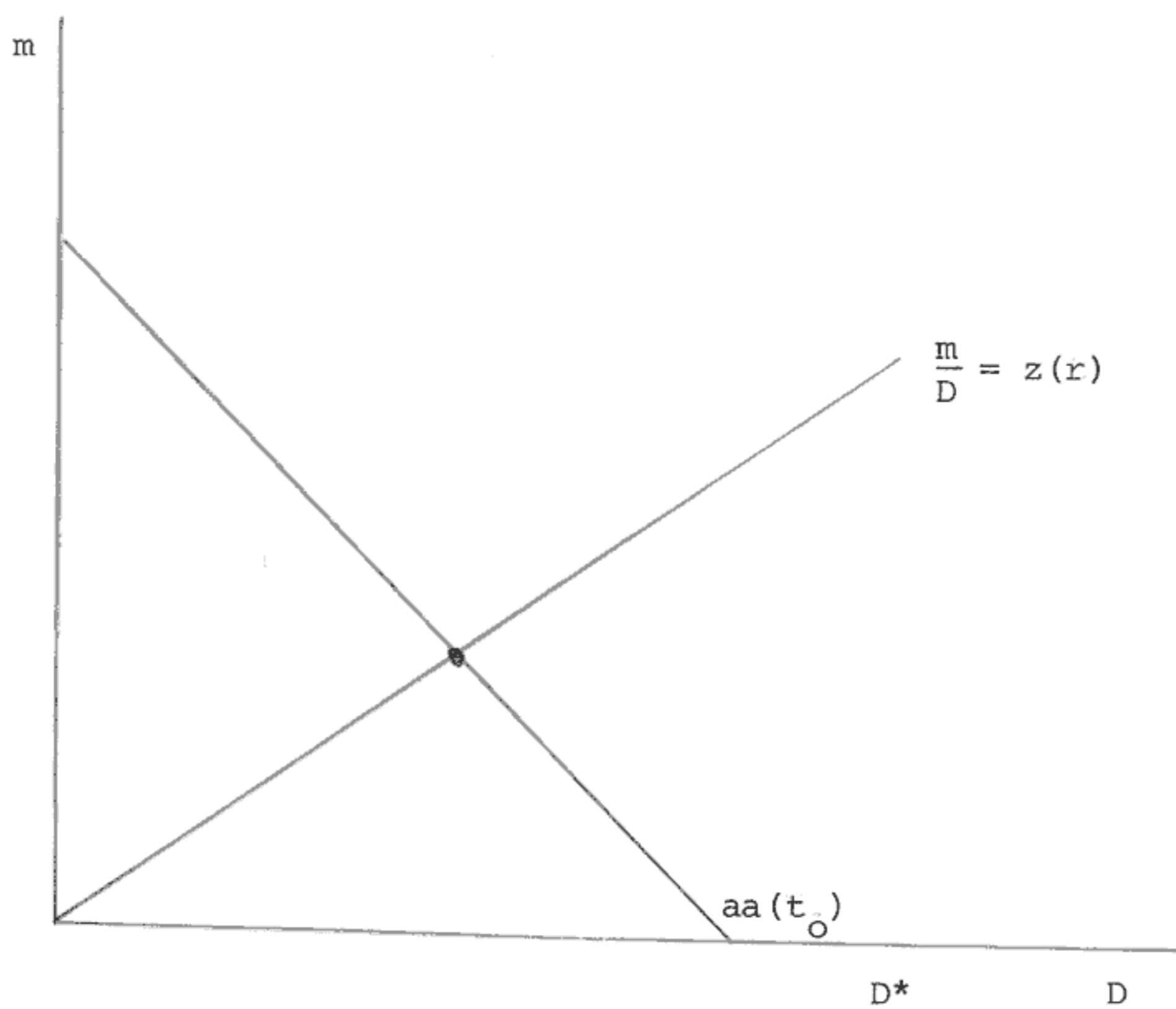


Figure 2.



passes the trade position deteriorates as assets and thus consumption increase; thus if there is a trade surplus at  $a$ , as assets grow the surplus will be reduced, become zero eventually and then turn into deficit until the long run deficit is attained at  $a^*$ .

What determines where the economy will be at any instant along the portfolio equilibrium line? The crucial variable is the total holdings of real assets households have at any instant. Notice that while households can adjust the composition of their portfolio instantaneously, they can alter the size of it only through time by spending less than their income. Thus, at any instant the stock of assets is given as a result of past savings decisions and the choices open to households are two: the composition of their portfolio and how much of their income to consume, the remaining becoming the net addition to their stock of assets (which can be negative if they decide to consume in excess of their income).

In figure 2, the portfolio composition decision implies that  $m$  and  $D$  must be on the  $m = z(r)D$  line while the asset constraint implies that the sum of  $m$  plus  $D$  must equal to the prevailing value of assets at that moment. Thus the line  $aa(t_0)$  shows all the feasible combinations of money and securities open to households given the value of assets  $a(t_0)$ . Portfolio equilibrium is then obtained with the combination of a  $m$  and  $D$  at the intersection of both schedules. Since at that equilibrium the stock of foreign exchange is shown to be less than  $D^*$  we know that households will be spending on goods by less than their income and thus that the stock of assets will be growing. As assets grow the  $aa$  line shifts to the right and the equilibrium point moves northeast along the  $m = zD$  schedule. Since during the transition  $D$  raises, the service account surplus increases continuously. A typical path for all balance of payments accounts and total assets is shown in figure 3.

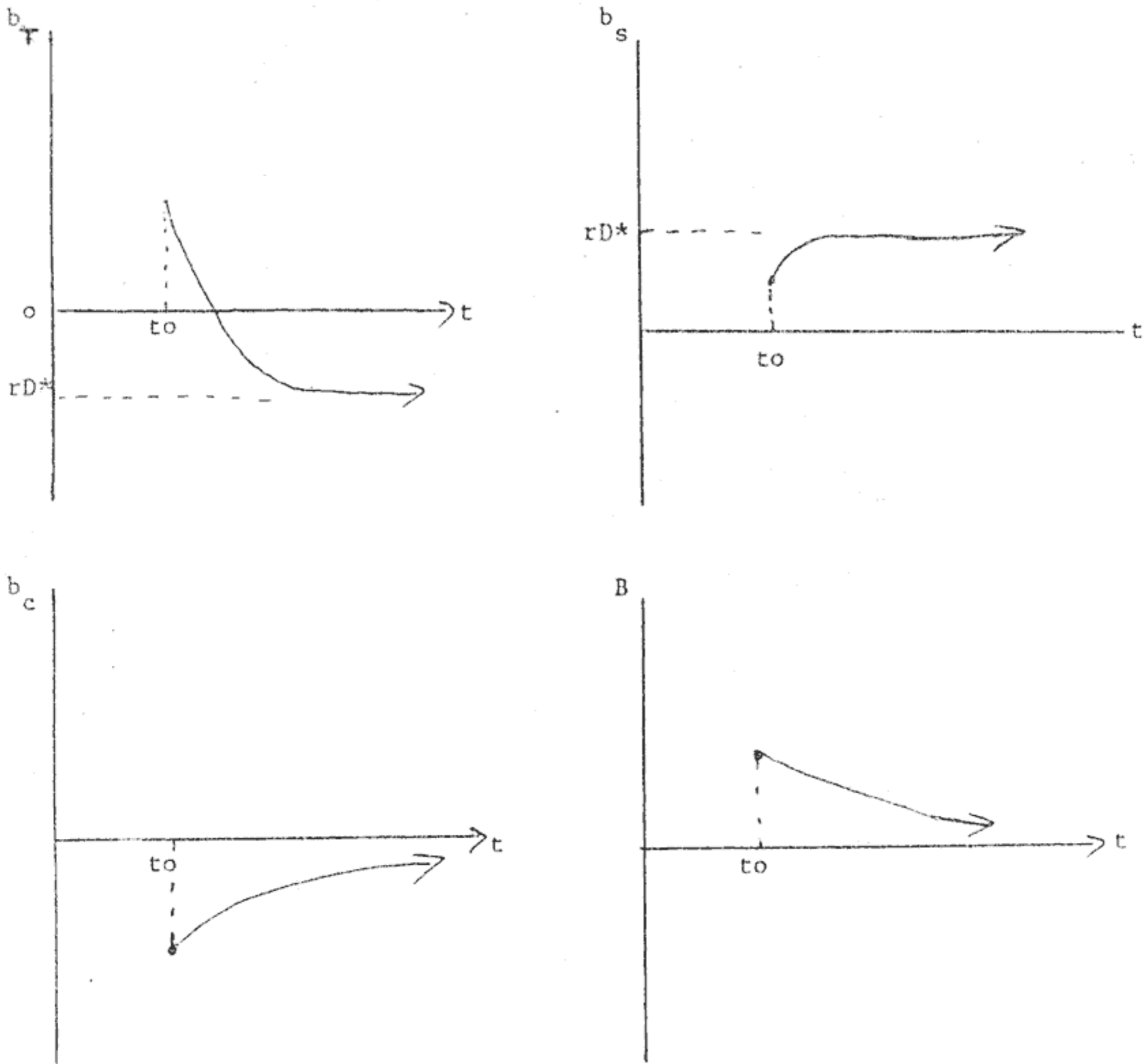


Figure 3

### Monetary Policy

So far the Central Bank has played the passive role of exchange domestic money and foreign exchange at the fixed exchange rate. The Central Bank is free, however, to print domestic currency and put it in circulation by means other than foreign exchange purchases. Assume, for example, that the government decides to print, say, 10 per cent more nominal cash balances at one instant of time and distribute it among the public as a once and for all transfer. The value of real assets of

individuals is then at that same instant increased by the amount of the real value of the newly issued cash balances. Notice that this is an instantaneous jump in the value of real assets as opposed to the continuous rate of change derived previously which was due to differences between the rates of income and absorption of goods (in fact the instantaneous gift of money to the public may be treated as if their income rate were infinity for an instant and all of it is accumulated in assets). Note that all of the increase in the value of real assets came in the form of domestic money and thus, if individuals were before in portfolio balance, now they will be holding a larger money/foreign securities ratio than desired. As a consequence, individuals will try to restore portfolio balance by selling some of their excess domestic money back to the Central Bank in order to get foreign exchange with which to buy foreign securities. Thus, after the increase in the quantity of domestic money, some of it is sold back to the Central Bank and there is a reserve loss and an instantaneous acquisition of foreign securities. After these initial transactions designed to restore portfolio balance for the new higher value of real assets, other transactions will continue to take place through time: assuming initially the economy was at the steady state equilibrium, now assets exceed their long run value. The economy will slowly decumulate those excess assets through time and during this transition since assets exceed their long run value consumption will also; thus, the trade account deficit is larger during the transition. As consumption (absorption) exceeds national income during this period, both money and foreign securities fall as the current account is in deficit; thus, the public sells back the foreign securities purchased originally and gives back to the Central Bank the remaining domestic money which they had kept after the initial increase. With the proceeds of the sales of foreign securities abroad and money to the Central Bank, the public gets the foreign exchange with which to finance

the higher rate of purchases of goods from abroad. Eventually assets are restored to their original long run value, the stock held of foreign securities and money is the same as before the increase in money. However, during all the transition the rate of consumption has been higher than before; what was given in exchange, or was it a free lunch? The answer is that the higher consumption rate during the transition was financed with the reserve losses of the Central Bank as the public exchanged the excess money in order to buy foreign goods. Thus, the expansion in money supply allowed this economy to consume in excess of its income but at the expense of the Central Bank's stock of foreign exchange reserves; this, of course, is a situation which cannot be repeated indefinitely since at some moment the stock of foreign exchange will be depleted.

In terms of figure 4, the initial position before the monetary increase was at point  $a^*$ . After the monetary increase the asset constraint shifts to the right by the value of the increased money holdings (equal to  $a^*b$ ). Since the public is now out of portfolio balance, an instantaneous sale of  $eb$  of domestic money for  $ed$  of foreign exchange (which is used to buy an equal amount of foreign securities) takes place and portfolio equilibrium is restored at point  $d$ . At  $d$ , however, holdings of foreign securities exceed their long run level  $D^*$  and  $m$  and  $D$  fall through time along the  $m = zD$  line towards point  $a^*$ .

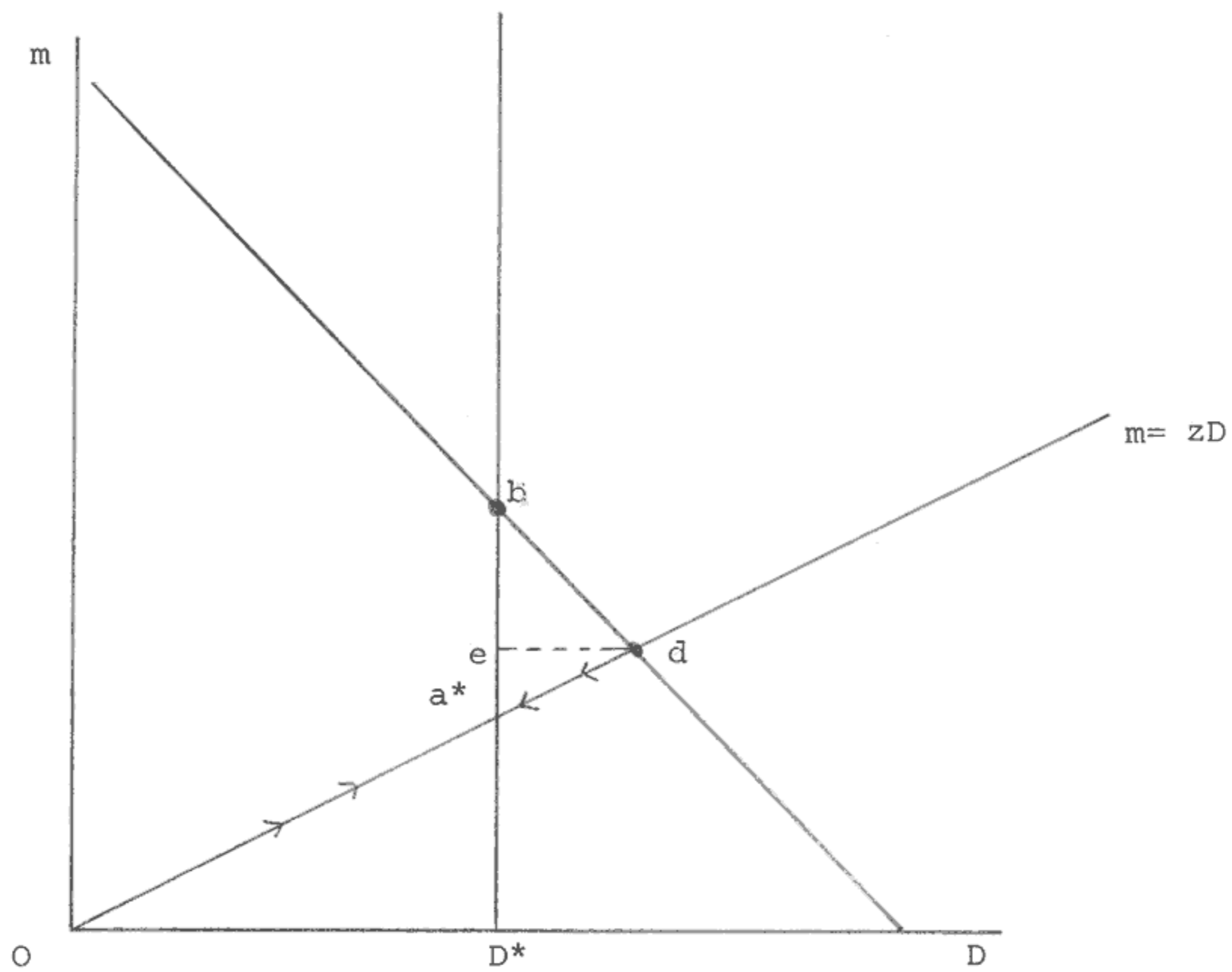


Figure 4.