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THE REEMERGENCE OF THE PURCHASING

POWER PARITY DOCTRINE IN THE 1970's

Louka T. Katseli-Papaefstratiou

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"Each generation must rekill its phoenixes"

(Samuelson, 1964, p. 149)

Introduction

Two years ago, in June, 1977, the Ford Foundation in col-
laboration with the Central Bank of Greece sponsored a two-day conference
on Purchasing Power Parity (PPP). The papers presented at that symposium
were published by the Journal of International Economics in
its May 1978 issue. They cover a wide area related to exchange rates
and prices from analyses of the historical evidence in the early 20's
to the use of PPP as partial guidance of exchange rate management policies.

When it was first decided that a summary of the proceedings
should be written up, it was with the understanding that the purpose of
such endeavor would be to highlight the main conclusions reached in
Athens on the theoretical and empirical questions posed by PPP and its
usefulness as a policy tool. The conference in Athens
was the most recent round of a debate which formally started in the 1920's
and continued in the 1940's and later on in the 1960's. The resurgence of
interest in PPP in the 1970's can be mainly attributed to our recent ex-
perience with flexible exchange rates and more specifically to the highly
volatile nature of their movement. The wide and often unanticipated
fluctuations in the price of key currencies has increased uncertainty in
international financial markets and has intensified the search for those
"fundamental relationships" which determine the equilibrium value of real
exchange rates both in the short and the long-run. In such environment

the Purchasing Power Parity doctrine provides a convenient starting point for analyzing the determinants of the "true value" of exchange rates.

It was only after carefully rereading the _JIE_ volume and related papers that it became apparent that Purchasing Power Parity remains an elusive concept, defined and used differently by individual authors. While it is probably true that "under the skin of any international economist lies a deep-seated belief in some variant of the PPP theory of the exchange rate", (Dornbusch and Krugman, 1976, p. 540), the variants cover a wide range from simple truisms to more sophisticated theories of exchange rate determination.

The theoretical foundations of PPP have been further obscured by empirical tests of the parity relationship. The very nature of regression analysis, the econometric tool most often used in recent studies of PPP, often conveys the impression that PPP is essentially a causal relationship between relative price levels and the exchange rate (absolute version of PPP) or their rates of change (relative version of PPP). Within this framework, debates on either version of PPP have focused on such issues as the appropriate price vector (or index) to be used, the appropriate base year period for time-series analysis, and the presence of systematic divergencies of internal price ratios which would involve consistent biases in the computation of parities from general price levels. However important such issues might be for meaningful empirical tests of the parity doctrine, they have overshadowed a considerable number of more fundamental theoretical questions.

It is the objective of this essay to focus on and hopefully disentangle the sometimes implicit and foggy statements regarding the nature of the parity doctrine which are submerged in attempts to prove or disprove the empirical validity of the concept. In that respect, at least methodologically, this review article is an extension if not a restatement of Samuelson's 1964 paper on the subject in the sense that more emphasis is placed on the underlying theoretical structure rather than the characteristics of competing versions of PPP.[1] This approach is also in line with the spirit of recent literature (Myhrman, 1976; Isard,1978; Michaely,1978) as well as the papers that were presented in Athens.

Section I of this essay provides a survey of competing interpretations of the Purchasing Power Parity doctrine: (a) as a spatial or commodity-arbitrage relationship; (b) as a "causal" relationship usually running from relative price levels to the exchange rate but also more recently, from exchange rates to prices and finally (c) an equilibrium relationship between two endogenous variables (the relative price level and the exchange rate) both of which are determined jointly as functions of exogenous variables. Even though most recent studies espouse this latter viewpoint, there exist important differences across them regarding the kind of disturbances which are assumed to be prevalent (real vs. monetary), the process of exchange

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[1] For a comprehensive survey of the literature and the debates surrounding PPP as it has evolved historically, see Officer(1976).

rate determination and finally the time horizon pertinent to the analysis. As will be seen in Section I these give rise to different hypotheses as to the nature of the PPP relationship, its validity and its relevance as a policy tool.

Section II of the essay reviews recent empirical work on PPP both in terms of methodology and most important findings.

The concluding section evaluates the usefulness of PPP in light of recent events and in the context of a wider search for meaningful criteria of exchange rate management.

I. Purchasing Power Parity: Alternative Interpretations

Starting from the premise that exchange rates are generally kept in line with relative price levels, the Purchasing Power Parity (PPP) doctrine states that the "true" value of currencies should be intimately linked to their internal purchasing power.

In its _absolute_ version, PPP implies that the equilibrium value of the exchange rate between the currencies of any pair of countries should be equal to the ratio of the relative price levels; in its _relative_ version, that the rate of change of the exchange rate should be equal to the difference in the rates of inflation. In logarithmic terms,

$$\ln S_t = \ln \frac{P_t}{P_t^*} \quad \text{(absolute version)} \tag{1}$$

and $\Delta \ln S_t = \Delta \ln P_t - \Delta \ln P_t^*$ (relative version) $\qquad$ (1')

where,

$\qquad S_t$ = ratio of domestic to foreign currency units;

$\qquad P_t$ = domestic price index;

$\qquad P_t^*$ = foreign price index.

Thus, Purchasing Power Parity is both a positive and a normative hypothesis about the value of bilateral or effective real exchange rates which, if the theory holds, should be unity in long-run equilibrium.

The discussion in this section of the essay will be limited to the normative statement and its theoretical foundations while empirical work on the magnitude and sources of actual deviations of exchange rates from their PPP level will be reviewed in Section II.

As was suggested in the introduction, a careful review of the literature would indicate that there exist at least three different theoretical interpretations of the Purchasing Power Parity doctrine. These are taken up below.

a. <u>PPP as a Spatial Arbitrage Relationship</u>

This is the view that equates PPP with what is commonly known as the "law of one price".

At the individual commodity level and in the absence of transport costs and other trade impediments, perfect arbitrage would ensure that the price of each commodity is equalized across countries. In that case, the domestic price of foreign currency is synonymous with the ratio of the relative internal prices of the commodity in question, and the same holds true for their rates of change. In other words, for each commodity i,

$$S = \frac{P_i}{P_i^*} , \quad i = 1,2,3 \ldots \qquad \text{(2) and}$$

$$\Delta \ell n S_t = \Delta \ell n P_{it} - \Delta \ell n P_{it}^* \qquad \text{(2')}$$

where,

S_t = ratio of domestic to foreign currency units at time t;

P_i = domestic price of commodity i;

P_i^* = foreign price of commodity i.

If (2) and (2') hold for each commodity then it follows that they will hold for any equally-weighted price level or price index series. As Samuelson (1964) points out, if individual countries use different weights in computing price indexes, there would be no reason to expect the "law of one price" to hold for indexes across countries.

These aggregation problems are often significant since countries' tastes, economic structures, and accounting practices vary widely. Furthermore, this view of PPP as essentially an arbitrage relationship between traded goods assumes perfect information and overlooks the importance of trade distortions and transportation costs. As Kravis and Lipsey (1978) show, informational imperfections and the presence and assymetries of trade impediments make the equalization of traded-good prices across countries highly improbable both on the individual and aggregate commodity levels.

In moving from equalization of individual commodity prices to equalization of traded-good prices the distinction between the actual and the equilibrium real exchange rate becomes obscure. As Samuelson points out, if trade costs and impediments were zero and accounting practices were identical, "every ruling exchange rate would turn out to be the PPP equilibrium rate" (Samuelson, 1964, p. 147). In econometric applications, the computed results turn out to be different from the PPP ones precisely because of such different weightings and the presence of transportation costs and trade impediments. Testing the law of one price thus becomes a test of the magnitude and importance of trade distortions, cross-country asymmetries and information lags.

As Frenkel (1978, p. 172) points out, those who adopt a strict view of PPP as a traded-good arbitrage relationship tend to advocate the use of traded-good prices rather than more general price vectors for meaningful tests of PPP. Emphasis on individual commodity prices however, is not synonymous with espousal of a commodity arbitrage view. For example, the following statement by Ohlin

is quoted by Frenkel (1978) as representative of the commodity arbitrage view:

> Foreign exchange rates have nothing to do
> with the wholesale commodity price level as such
> but only with individual prices...
>
> (Ohlin, 1967, p. 290)

Ohlin's point however, taken in context, is that the use of aggregate price levels does not tell you anything about the equilibrium exchange rate and that "changes in individual prices may be relevant (for exchange rate determination), even though the level of commodity prices happens to be constant" (Ohlin, 1967, p. 290).

The use of aggregate price levels or indexes such as the consumer price index (CPI) or the GNP deflator in cases where an arbitrage view of PPP is espoused, is usually justified on the ground that prices of traded and non-traded commodities move together. The extreme position, often typical of monetarist models, is that countries produce one homogeneous good whose price is equalized across countries through perfect commodity arbitrage. More frequently, non-traded goods are explicitly introduced but their price is kept in line with that of traded goods through high degrees of substitution in consumption.

The price adjustment is assumed in most cases to be instantaneous; as Dornbusch (1978, p. 5) points out, the potential limited substitutability between supply sources, the overall state of slack in the economy and the expected persistence of real price changes are usually disregarded. So is the presence of biases in the calculated parity relationship due to systematic divergencies of internal price ratios across countries. As Balassa (1961, 1964) and others have demonstrated (see Officer, 1976, for an extensive review), even if perfect commodity arbitrage ensures

the equalization of prices of traded goods, higher productivity growth in the non-traded good sector of developed countries would require a rising internal price ratio of traded to non-traded goods in the higher-income countries. Thus, high substitutability in demand among goods is not a sufficient condition for the use of general price levels to test for PPP. As Officer points out a similar shortcoming would arise in tests of the relative version of PPP if there exists a systematic "increase (decrease) over time in the advanced country's productivity advantage" (Officer,1976, p. 22). The presence of productivity or structural differences across countries which cause differences in internal relative prices is one of the most serious criticisms of the PPP relationship. As we will see below, it applies equally well to both "causal" and/or "equilibrium" views of the parity doctrine.

Despite these criticisms this approach to PPP is widely adopted in studies conerning the international transmission of inflation under a fixed exchange rate regime. According to Genberg (1978),

> Discussions of the transmission of inflation naturally start with a price increase abroad and then try to identify the channel by which domestic prices are affected. The most common such channel is probably that suggested by the arbitrage hypothesis. This hypothesis, which is also referred to as the traded goods model or the 'law of one price', simply states that the price of a homogeneous commodity must be the same in all countries provided the market for this commodity is internationally integrated
>
> (Genberg, 1978, p. 248).

Thus,

> Purchasing Power Parity under fixed exchange rates implies that inflation rates must, subject to certain reservations, be equal in all countries of an integrated world economy...
>
> (Genberg, 1978, p. 252).

A similar view of PPP under fixed exchange rates characterizes a number of other recent studies on the international transmission of price disturbances such as those by Dornbusch (1973), Connolly and Taylor (1976), Swoboda (1977), Papaefstratiou (1977). Apart from modelling differences and substantial variation as to the predicted path of adjustment of the internal price ratio following external disturbances, all of these studies share the underlying assumptions of perfectly integrated commodity markets for traded goods and high substitutability of domestic and internationally traded commodities.

The identification of PPP with a spatial commodity arbitrage relationship also applies to models of flexible exchange rates. Dornbusch and Krugman (1976) for example, in their study of short-run exchange rate determination, identify and evaluate the PPP doctrine as essentially a spatial arbitrage relationship; their criticism of PPP focuses on the unrealistic nature of such assumptions as perfect integration of commodity markets (the 'law of one price'), no transport costs or duties (pertinent to the absolute version of PPP), and constant terms of trade following external disturbances (pertinent to the relative version of PPP); these assumptions however, are not necessary, as they themselves note, in a Casselian "neutral-money" model in which Purchasing Power Parity is not at all dependent on arbitrage.

Haberler (1975) states a view similar to Dornbusch and Krugman's as to the nature of the PPP doctrine:

> The proposition that general price levels in different countries are connected through the prices of internationally traded goods is the foundation of the Purchasing Power Parity doctrine ....

> (Haberler, 1975, p. 24).

Similarly Wihlborg (1978) argues that,

> PPP between two currencies/countries, holds when all commodities have the same price in both countries ....

> (Wihlborg,1978, p. 4).

In their studies Kravis and Lipsey (1971, 1974, 1977a, 1977b, 1978) identify their tests of the 'law of one price'and the behavior of relative prices as tests of the PPP relationship and the pure monetarist approach to the balance of payments.

Thus, the identification of PPP essentially with perfect commodity arbitrage is quite common even in recent literature. Table 1 summarizes the main arguments and counter-arguments raised in reference to this view.

TABLE 1:   THE 'LAW OF ONE PRICE':   A SUMMARY OF THE DEBATE

ARGUMENT	MAJOR OBJECTIONS
A. Perfect arbitrage on the individual commodity level for traded goods (i) $$S_t = \frac{P_i}{P_i^*}$$	- Imperfect information - Absence of transportation costs and trade impediments
$$\Delta \ell n S_t = \Delta \ell n P_i - \Delta \ell n P_i^*$$	- Asymmetric changes in transportation costs, and trade impediments.
B. Perfect arbitrage of traded goods $$P_T = \sum_{i=1}^{n} w_i P_i$$ $$S_t = \frac{P_T}{P_T^*}$$	- Imperfect information - Absence of transportation costs and trade impediments - Aggregation problems—differences in weights - Distinction between actual and equilibrium exchange rate.
C. Perfect arbitrage across all goods $$S_t = \frac{P}{P^*}$$ $$\Delta \ell n S_t = \Delta \ell n P - \Delta \ell n P^*$$	- Imperfect information - Absence of transportation costs and trade impediments - Aggregation problems—differences in weights - Distinction between actual and equilibrium exchange rate - Biases due to systematic differences in productivity in the non-traded good sector - Low substitutability of traded and non-traded commodities in consumption or supply. - Asymmetric changes in transportation costs and trade impediments - Biases due to systematic changes in productivity in the non-traded good sector.

b. <u>PPP as a Causal Relationship</u>

In their writings on PPP Cassel (1916, 1918) and Keynes (1923)
focused on the determination of the "true" or equilibrium value of
exchange rates.

Cassel wrote:

> The purchasing power parities represent the
> true equilibrium of the exchanges, and it is of
> great practical value to know those parities. It
> is in fact to them we have to refer when we wish to
> get an idea of the real value of currencies whose
> exchanges are subject to arbitrary and sometimes
> wild fluctuations ...
>
> (Cassel, 1921, p. 38)

In some of his earlier writings Cassel used for PPP the equivalent
term "theoretical rate of exchange". It is thus apparent that PPP, at
least for its originator,[2] was the equilibrium value of the real exchange
rate quite distinct from the ruling real exchange rate defined as the
ratio of exchange rate to the ratio of relative prices. Despite this
view, neither the separation between short-run and the long-run nor the
distinction between an equilibrium vs. a causal relationship are altogether
clear in the literature. This is mainly due to the fact that PPP was and
still is seen by many authors as an extension of the
quantity theory of money in an open economy.[3] In his insightful

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[2] Whether or not Cassel was the founder of the PPP doctrine is still
a disputable point; he is the first, however, to formalize the concept as
it is presently known and test it empirically.

[3]The evaluation of Cassel's position is harder; see Holmes (1967).

review of the early debates on exchange rate determination Johan Myhrman

(1976) stresses the similarities between the positions held by the

Cap party in 18th century Sweden or by the Bullionists in England fifty

years later.with those held in our days by the proponents of the monetary

approach to the balance of payments. According to both Ricardo (1811,

1821) and Wheatley (1803, 1807, 1819), two of the most prominent Bullion-

ists, both the price level and consequently the exchange rate were deter-

mined by the quantity of note issues; the real effects of side distur-

bances such as food shortages, changes in emmigrant remmitances, military

expenditures and the like were clearly temporary as they were fully

anticipated by private market participants.

If at some initial equilibrium position, PPP holds so that the

exchange rate is inversely proportional to the price level in the two

trading partners, the expansion in the monetary base would under full em-

ployment conditions increase the overall domestic price level without af-

fecting relative commodity prices. The same might possibly hold true as

Michaely points out (1978), in the case of some real disturbances such as

economic growth or an increase in the foreign price level, if their effects

were "neutral", i.e. succeeded to maintain the same level of excess demand

in the system for all commodities and assets. As this "neutrality" however

tends to be unlikely in the presence of real disturbances, the theory has

been traditionally cast in terms of monetary shocks.

The ensuing change in the internal price level following a monetary disturbance would then be completely offset by a change in the nominal exchange rate,

> there being no other reason for the fluctuations of exchange
> than to maintain the par of produce. . .

(Wheatley, 1819, p. 21)

Thus, PPP in this framework is intimately linked (a) to the prevalence of monetary disturbances, (b) the quantity theory of money, (c) the notion that the purchase of foreign exchange is for the purpose of securing purchasing power in some particular currency (Kalamotousakis, 1978, p. 164), and (d) the presumption that movements in the exchange rate do not in turn cause movements in relative prices within each country.

This version of PPP theory is thus consistent with a clearly established causal relationship that, as we have seen, runs

from monetary disturbances to the price level and then to exchange rates. So long as the price level is determined by the money stock, and velocity and real income are held constant, the only truly endogenous variable is the exchange rate. This line of argument is also at the core of the monetary theory of the balance of payments (Frenkel, 1976; Bilson, 1978), and is implicit in a number of econometric tests of the PPP relationship which regress the exchange rate on relative prices (see Section II for an extensive review). Given this framework, the distinction between PPP as a _causal_ vs. an _equilibrium_ relationship becomes problematic.

As it was pointed out in the Athens Conference, the issue that is raised here is analogous to that posed by interest parity, or even the

Phillips curve relationship in a closed economy framework; in all three cases there is a stipulated relationship between two variables which requires a theory behind it to become operationally meaningful; once a theory is propounded, however, and a clear line of causality is established, an equilibrium relationship cannot be distinguished from a causal one.

Even as early as the 1920's criticism of the PPP relationship as presented schematically above developed along the following distinct lines:

The operational validity of the concept was questioned in view of the inherent econometric problems posed with tests of either absolute or relative version of the PPP relationship (choice of base year period, change in trade impediments, productivity differences, etc.).

On the theoretical level most objections focused on the process of exchange rate determination. The nature and significance of the disturbances which moved the exchange rate was debated in the interwar period as vehemently as it was in earlier times (Myhrman, 1976). While proponents of PPP, and most notably Cassel, restated and refined the basic Ricardian position, there was substantial disagreement among economists as to the basic tenets that made up the theoretical framework.

In his Tract on Monetary Reform, Keynes (1923) emphasized the role of the exogenous disturbances in the reestablishment of PPP. For Keynes, if disturbances are monetary "then we may expect that purchasing power parity and exchange value will come together again before long" (Keynes, 1923, p. 95). If however disturbances are on account of movements of

capital, or reparation payments, or changes in the relative efficiency

of labour, "then the equilibrium point between purchasing power parity

and the rate of exchange may be modified permanently" (Keynes, 1923, p. 97).

This is the result of disturbances in the "equations of exchange." A

similar point was made almost twenty years later by Taussig who argued

that,

> If something happens to disturb the conditions of demand
> for export or imports; or if invisible items enter which
> disturb the barter terms of trade – then the purchasing
> power parity does not hold.
>
> (Taussig, 1941, pp. 357f)

Thus, the prevalence of monetary disturbances is crucial for the continua-

tion of PPP as an equilibrium value for the real exchange rate. Non-monetary

disturbances and real structural changes would in all probability change

relative prices internally and would cause substantial deviations of the

equilibrium real exchange rate from its PPP level (Samuelson, 1964;

Officer, 1976).

The traditional formulation of PPP was also questioned with respect

to the stipulated links between prices and exchange rates (Zolotas, 1928;

Einzig, 1935). It was argued that both government and private participants

can intervene in the foreign exchange market for portfolio allocation pur-

poses, rather than solely for the procurement of foreign exchange to meet

current account flows. Kalamotousakis' review of Zolotas' contribu-

tion to the PPP debate for example points to the latter's discussion of

"qualitative factors" behind the process of exchange rate determination.

As early as 1928 Zolotas argued that under conditions of "instabil-

ity" in international financial markets the motive to secure purchasing

power assumes lesser importance and is replaced instead by "qual-

itative motives," namely (1) to place funds abroad and (2) to

hedge or even speculate against losses that may result from a potential

devaluation of the national currency (Kalamotousakis, 1978, p. 165).

This view as pointed out in the JIE volume is essentially the same as

the asset market view expounded and formalized recently by Branson (1975),

Dornbusch (1976), Kouri (1976) and others. In such a world, expectations

about future exchange rate developments are important determinants of

activity in the foreign exchange markets and can cause substantial

deviations of the real exchange rate from its PPP level.

A final set of objections to the "causal" view of PPP as was

schematically presented above concerns the specified lines of causality

from the price level to exchange rates. According to Angell (1926):

> Neither prices nor the exchanges can properly
> be regarded as having been the "cause" of the general
> movement in any specific case. Nor was the level of
> either, except in a very immediate sense, even the
> "result" of the other's fluctuations. Rather, both
> prices and exchange movements were common products
> of a common antecedent condition...

> (Angell, 1926, p. 447)

As it was discussed earlier the causal view of PPP is intimately

linked to the theoretical framework underlying it. Similar objections

could be and have been raised against recent tests of the PPP relation-

ship which basically adopt the monetary approach to the balance of pay-

ments. Even though the authors talk of PPP as a long-run equilibrium

relationship and even though "there is no statistical method", as Frenkel

notes (1978, p. 183), "that is capable of determining causality in its

conventional sense," one is still bound by a causal argument running from the money stock to the exchange rate. Recent econometric tests of the PPP relationship are usually cast as attempts to see if either the price or exchange-rate time series can be viewed as being econometrically precedent to the other (Frenkel, 1978; Brillembourg, 1976).

In his recent empirical tests of absolute Purchasing Power Parity for the February 1921-May 1925 period, Frenkel (1978) actually found that 'causality tests', as specified above, pointed to specification of 'price equations' i.e., that exchange rates should be viewed as exogenous to the price levels and thus be treated as independent variables, "causing" price level fluctuations. In a world where exchange rates are determined in asset markets, this viewpoint is consistent with the observation that asset markets typically clear faster than commodity markets. It is also theoretically consistent with a whole cluster of arguments which point to exchange rate fluctuations as a major determinant of the domestic price level fluctuations either through their effects on import prices and the whole macro-system (for a recent review, see Hooper and Lowrey, 1979), or their effects on price-setting behavior by firms (Saidi, 1977).

As a final point it should be noted that the distinction between short and long-run was at best implicit in early theoretical formulations.

The focus on the steady-state or long-run properties of the system by-passed issues concerning the short-run adjustment process and the time lag involved prior to the reestablishment of PPP. The same criticism can be applied to studies based on a monetary approach for which the short-run depends solely on the speed of adjustment of participants. The distinction between short-run and long-run becomes much clearer in models which espouse an asset market approach to the balance of payments.

c. PPP as a Long-Run Equilibrium Relationship

The causal view of PPP has been traditionally linked to a world view in which exchange rates clear commodity markets and are thus determined by current flows of goods and services across countries. Changes in the aggregate price level give rise to changes in comparative advantage and through trade flows inversely affect the price of domestic currencies. Thus, according to Cassel,

> ...our willingness to pay a certain price for a foreign money must ultimately and essentially depend on the fact that this money has a purchasing power as against commodities and services in the foreign country...

(Cassel, 1921, p. 36)

Most of the recent literature on exchange rate determination views exchange rates as being determined jointly with interest rates in asset markets. It is thus the values of the existing stocks of money, real capital, bonds and foreign assets together with the rate of flow of government purchases, the tax structure and expectations that determine short-run equilibrium values for the flow of real income, the vector of interest rates and prices and the values of nominal exchange rates. These in turn yield

values for investment, saving, the government deficit and the current
account which cause a change of the initial stock of variables that
were assumed constant in the short-run. Long-run stock equilibrium can
thus be identified as the state in which saving, investment, and the
govenment and current account deficits are all zero (Tobin, 1969; Branson,
1972, 1976; Kouri, 1976; Dornbusch, 1976).

What is the place of PPP in such a view? The asset-market view
fully recognizes and integrates in a consistent framework most of the
objections reviewed earlier against a causal view of real exchange rate
determination. It focuses on the endogenous and simultaneous determination
of exchange rates and prices; it incorporates the role of government and
private exchange market participants as portfolio holders of domestic
and foreign-denominated assets; it explicitly introduces expectations as
an important determinant of real exchange rates; it finally draws a
sharp distinction between the short-run and long-run equilibrium real
exchange rate. The long-run equilibrium real exchange rate is that real
exchange rate which is consistent with a zero current account balance.[4]
Its value will depend on all the real determinants of the current account.
There is no _a priori_ reason to expect this to be the PPP value of unity.

To clarify this point it might be helpful to think of the current
account balance (CA) as a function of the real exchange rate

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[4]Long-run equilibrium could also be identified with a zero basic balance,
i.e., to include long-run capital movements above the line.

(s), real income (y), the real value of assets $(\frac{A}{P})$, and a shift parameter (α), so that

$$CA = CA(s, y, \frac{A}{P}, \alpha) \qquad (3)$$

In long-run equilibrium the current-account balance is equal to zero. Assuming PPP to hold at some initial period and noting that the current account balance is <u>ceteris paribus</u> an increasing function of the real exchange rate, equation (3) can be diagramatically presented as follows:
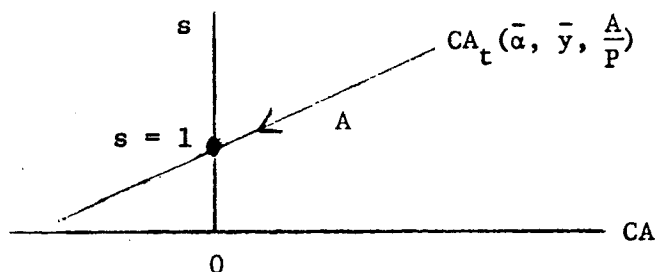
A neutral disturbance in Michaely's sense (Michaely, 1978) which causes a depreciation of the short-run real exchange rate but leaves domestic relative prices unchanged would improve the current account balance if trade elasticities are not too low (point A). In the long-run, PPP would be reestablished as the incipient current account surplus induces a net accumulation of foreign assets and causes the real exchange rate to appreciate back to its initial value. Whether or not PPP is reestablished even in the case of monetary disturbances depends critically on whether or not the current account as a function of the real exchange rate, s, has shifted in the process due to wealth effects or to interest payments on holdings of foreign

assets. If it is assumed that these are negligible or that they cancel each other out, then PPP would in fact be reestablished. If now the disturbance is identified with a change in the shift parameter (α), the value of the long-run equilibrium real exchange rate is even more unclear. In terms of the previous diagram such disturbance would have involved an upward or downward shift of the CA function. A permanent decrease in emigrant remmitances for example, will shift the CA function upwards causing a long-run depreciation of the real exchange rate. Thus even though the portfolio balance approach makes both prices and exchange rates truly endogenous, PPP's validity as an equilibrium condition critically depends once again on the nature of external disturbances.

Transmission lags are also important. Even in the case of monetary or neutral disturbances the long-run equilibrium real exchange rate might deviate from its PPP path if the "balance of payments is quickly affected by monetary policy measures whereas price level influences are subject to longer lags" (Genberg, 1978, p. 262). Alternatively, the long-run equilibrium real exchange rate might be close to its PPP path even in the case of real disturbances if these are quickly transmitted across countries and affect both economies symmetrically. (Genberg, 1978, p. 262). In that case the current account balance between the relevant countries will not be affected and the CA function will not shift.

These points are not always clear in the literature. Officer

for example argues that PPP "is either the long-run equilibrium

exchange rate or the principal determinant of it" (Officer,1976,

p. 3), even though PPP might have nothing to do as we have seen

with the "true" long-run equilibrium real exchange rate. An excel-

lent summary of the asset-market view is presented by Artus (1978) who

points out the consistency of this view with the large exchange rate

fluctuations observed since 1973 (Artus,1978, p. 283). His analysis,

however, on the role of PPP in such a system is confusing:

> As to the evolution of the exchange rate in the
> longer run...the asset-market view is fully con-
> sistent with the traditional view that it is
> essentially determined by the purchasing power
> of the currency in the goods markets....
> Deviations of the exchange rate from its PPP
> value will be self-correcting in the long run
> because they will give rise to current account
> imbalances and a gradual change in the exchange
> rate...
>
> (Artus, 1978, p. 283).

And later on,

> The long-run equilibrium value of the exchange
> rate is, of course, a function not of the current
> PPP value of the currency, but of its prospective
> value. There are as many such values as sets of
> alternative monetary and fiscal policies....
>
> (Artus, 1978, p. 283).

It seems that Artus identifies here PPP with the long-run equilibrium real exchange rate, i.e. with that value of the exchange rate such that, given the domestic and foreign price levels, the current account balance is equal to zero. As we have seen, however, the PPP value of the exchange rate need not coincide with the long run equilibrium real exchange rate. Thus his statement that, "the long-run equilibrium exchange rate S* is defined as the expected purchasing power parity between the currencies of the country considered and those of the rest of the world one to two years ahead" (Artus, 1978, p. 285) will be true only if certain restrictive assumptions are made regarding the nature and subsequent effects of exogenous disturbances.

A casual idenfitication of PPP with the long-run equilibrium real exchange rate is also implicit in Vaubel's study (Vaubel, 1978) if only by its inclusion in the PPP volume when it deals exclusively with the role of real exchange rates as criteria for optimum currency area questions. While such identification is carefully avoided in the paper itself, the abstract that precedes the study confuses the issues. In stating the paper's objectives, Vaubel (1978) argues that "deviations from relative Purchasing Power Parity (real exchange-rate changes) are suggested as a comprehensive and operational criterion of the desirability of currency unification" (Vaubel, 1978, p. 319).

Despite these and similar statements regarding the nature of PPP there seems to be a consensus in the literature as to the limitations of the theory and its dependence on monetary or "neutral" disturbances. In their criticism of the PPP relationship for example, Kravis and Lipsey (1978, p. 198) argue that the theory "precludes the possibility that a country as a matter of policy maintain an (exchange-rate converted) price level that is lower than that of its rivals and thereby achieve export-led growth for any sustained period". According to these same authors this approach "tends to minimize the possibility of lasting changes in the quantity composition of exports and imports or in their price structure". Similar reservations are shared by Genberg in the conclusions of his empirical study:

> On the other hand serious problems could arise if a true bias were ignored in the design of target zones or surveillance indicators for exchange rates based on PPP. A similar difficulty, which is probably harder to handle, appears if PPP relationships, measured by commonly used indexes, tend to shift with changes in relative prices of traded goods as it appears that they do based on the preliminary estimates presented here...
>
> (Genberg, 1978, p. 273)

Finally Thygesen uses similar reasoning to express caution vis-a-vis a strict adherence to PPP rules for exchange rate management:

> The second [objection] is that the rule would hinder changes in real exchange rates, i.e. departures from PPP, which are necessary for better external equilibrium...If, indeed, real exchange-rate changes are necessary, because real disturbances are sizeable... external imbalances would be perpetuated by a rule which systematically blocked departures from PPP...
>
> (Thygesen, 1978, p. 315)

These reservations and the preceding discussion hopefully put
into theoretical perspective the empirical tests of the PPP rela-
tionship which have been numerous and often inconclusive.

II. Purchasing Power Parity: Recent Empirical Findings

Empirical studies of the PPP relationship have been used for a
variety of purposes by policy makers and academic economists alike.
Thus PPP has been used as a test of the commodity arbitrage relation-
ship, as a criterion for setting new exchange rates, as a tool for
assessing exchange rate disequilibria under both fixed and flexible
exchange rate regimes, and finally as a method of evaluating the rational-
ity of exchange rate policies of state-trading economies. Officer (1976)
has presented a comprehensive overview of the literature up until the
early 1970's. Since then there have been a number of new studies which
either apply more rigorous econometric techniques to the study of
traditional questions or apply existing methodology to the analysis of
recurrent processes such as the transmission of external disturbances
across countries and the process of real exchange rate determination.
It is not the objective of this section to review the methodology
and findings of each of those studies; it is rather to present in a
selective way examples of econometric tests and applications of the PPP
relationship in light of the theoretical foundations presented in Section I.

Empirical work on PPP is thus divided as between (a) tests of the
commodity arbitrage relationship, (b) tests of the international pro-
pagation of disturbances under fixed exchange rates, (c) "causality"
tests running from prices to exchange rates and finally, (d) tests
of real exchange rate variability.

There are a number of methodological problems which are common
to most empirical studies of the PPP relationship. These are briefly
summarized below:

a. Choice of the Price Index. In the case where a broadly inclusive
measure of price changes is desirable for the assessment of the Purchas-
ing Power Parity doctrine, the choice is between the GDP deflator which
is the broadest of them all but not always available [5], the wholesale
price index which concentrates on "commodities" and thus gives a greater
weight to tradables and the consumer price index which applies only to
consumer goods (Kravis and Lipsey, 1978, p. 200; Thygesen, 1978, p. 304-305).

b. Identification of Commodities. Even in the case of physically
identical goods "differences in the terms of sale may involve such
different bundles of benefits in two purchases that the prices would
not be the same even under perfect competition" (Kravis and Lipsey, 1978, p. 203).
p. 203). Cross-country product differentiation makes the application
of the 'law of one price' even harder. Empirical work also requires
consistent and operational definitions of such subsets of commodities
as exports, imports, traded and non-traded commodities (Kravis and Lipsey
1978, p. 201).

c. The Choice of Base Year. This issue is critical for tests
of the relative version of PPP since absolute PPP is assumed to hold
during the base year. Confronted with the task of choosing a base year,

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[5] Genberg (1978) reports that only a few countries publish quarterly
series for this variable.

one can either arbitrarily pick a year of "general stability," or
let the data chose it through the introduction of a constant (Genberg,
1978, p. 264).

    d.   <u>Identification of Historical Periods</u>. This is related to
the identification of the base year. It concerns the specification of
the adjustment period from one equilibrium to the next, the choice
of the terminal year, but also the choice of criteria for identifying
appreciations or depreciations of the currency (Kravis and Lipsey, 1978,
p. 205; Thygesen, 1978, p. 306).

    e.   <u>Bilateral or Multilateral Measurements of PPP</u>. Testing
PPP bilaterally or through the use of weighted averages of foreign
prices and effective exchange rates can produce different results
in the Optica report for example, "conformity to PPP is consider-
ably closer multilaterally than bilaterally" (Thygesen, 1978, p. 306).

    f.   <u>Evaluation of Results</u>.

In econometric studies of the PPP relationship one must determine
whether or not fluctuations of price movements across countries are
similar. This is usually done through the comparison of cross-country
variations with inter-regional or inter-city variations of prices within
specific currency areas(Vaubel, 1978, p. 324). The evaluation of econ-
ometric findings also gives rise to a broader question pertaining to
mis-specification. Krugman (1978) has shown, for example, that
simple empirical tests of PPP would provide biased results if the system
of equations is indeed simultaneous. Specifically, if neither prices nor
exchange rates can properly be regarded as exogenous, one could be led
to reject PPP "in a world in which it is fact valid" (Krugman, 1978,
p. 398). This is particularly important in the case of real disturbances.

In addition to the fact that the validity of PPP in the case of real disturbances is questionable on theoretical grounds, the argument points to the deficiencies of ordinary least squares for the purposes of estimating a simultaneous system.

The above set of questions apply to all empirical studies of the PPP relationship and are at the center of the debate on the empirical validity of Purchasing Power Parity.

A. Tests of the Commodity Arbitrage Relationship

Recent empirical tests of the 'law of one price' have produced negative results. In a series of studies, Kravis and Lipsey (1971, 1974, 1978) question the perfect commodity arbitrage assumption both for individual commodities and specialized subsets of goods. They show, for example, that there exist both substantial deviations from the law of one price for traded commodities as well as explicit price discrimination on the part of sellers who often charge different prices for products depending on the final destination point (Kravis and Lipsey,1978, p. 234). Isard's (1974) comparisons of monthly Japanese, German and U.S. export prices for the period Jan. 1968 to Nov. 1973 also show significant variability in cross-country export prices pointing to low substitutability of export commodities across the major industrial countries. Neither do Bordo and Choudhry's (1977) comparisons of quarterly price indexes for eighteen industry groups in the United States and Canada give much support to the arbitrage model. The coefficient of the change in foreign prices in simple one-equation estimates is significantly different from unity, while the bilateral price-adjusted exchange rate varies substantially

over time. In a recent study involving comparisons of major commodity prices in Canada and the United States over the period 1965-1974, Richardson (1978) also shows that perfect commodity arbitrage can be rejected with 95 percent confidence for every commodity group in his sample (Richardson, 1978, p. 347).

More positive results are presented by Genberg (1975). who finds that quarterly price changes of a cluster of commodities[6] in eight different locations follow similar patterns.

Overall however, with the possible exception of goods that are traded in the major commodity exchanges, the evidence suggests that spatial commodity arbitrage is far from perfect.

B. Transmission of Foreign Price Disturbances Under Fixed Exchange Rates

As we have seen in Section I, Purchasing Power Parity under fixed exchange rates would imply that cross-country inflation rates would tend to converge. Genberg (1978) and Hooper and Lowrey (1979) present comprehensive reviews of existing empirical tests on the international transmission of price disturbances. In the simplest kind of model, relative PPP would indicate that the long-run value of the coefficients, α_1 and β_1 in equations 4 and 4' below would be equal to unity while coefficient β_0 would be equal to zero:

$$\ln P_i = \alpha_0 + \alpha_1 \ln P_i^f \tag{4}$$

$$\Delta\ln P_i = \beta_0' + \beta_1 \Delta\ln P_i^f + U_t \tag{4'}$$

Genberg (1977a) estimated these equations for ten European countries using yearly data on consumer price indexes for the time period 1955-1970.

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[6] Cocoa, copper, copra, jute, rubber and tin.

The results proved to conform to those expected.

In addition to the foreign price level, a number of recent econometric studies attempt to capture the effects of expectations and of excess demand as well as the influence of domestic policies on the domestic price level.

Dornbusch and Krugman (1976) do a number of tests for major industrial countries to determine the elasticity of domestic export and consumer prices to foreign competitors' prices during the period 1960-1972. Their results vary substantially across countries. They find that in the United States the principal determinant of unit export values for manufactured goods is unit labor costs rather than foreign prices. In Canada and France,on the other hand, there is substantial sensitivity to foreign competitors' prices with relevant elasticities of .64 and .66 for each country respectively. Their tests of the impact of import prices on domestic consumer prices during the period 1955-75 is also revealing. Whereas the effect of import prices on the CPI is not negligible, the elasticity coefficients are much below unity.[7] Other independent variables such as the GDP gap, a labor market variable and a lagged dependent variable are equally if not more significant. (Dornbusch and Krugman, 1976, p. 571).

Similar tests were conducted by Modigliani and Papademos (1975); according to their estimates for the period 1953-1971, the import price elasticity in the United States of the nonfood component of the CPI with respect to import prices was about 0.1 after one year and 0.3 in

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[7]The highest one is .33 for Switzerland; the coefficient for the United States is .14.

the long run. Similarly Spitaller's (1978) estimate for the steady-state elasticity of domestic prices with respect to import prices is about .27.

These findings are consistent with those of other authors (Krause and Salant, 1977) who in general report low elasticities of the CPI with respect to import prices for a number of OECD countries. One of the most significant explanatory variables in most one-equation regression estimates seems to be the excess demand variable. This could be interpreted, as Genberg points out (Genberg, 1978, p. 255), as evidence that even under fixed exchange rates there is substantial scope for inflation rates to diverge. It is important however to note that if cycles in economic activity tend to be synchronized internationally then "excess demand in any particluar economy is merely a reflection of generalized excess demand the world over" (Genberg, 1978, p. 255). If that is indeed the case, the presence of multicollinearity between the foreign price and excess demand variable might substantially lower the relevant coefficients.

There are a few models which estimate a whole system of simultaneous equations. The focus of the so-called Scandinavian model (Aukrust, 1972; Edgren G. and Faxén K. and Odhner C., 1973) and more recent work in this same tradition (Calmfors ,1977) links foreign prices directly to the price of traded goods in the economy; the effect of foreign prices is then transmitted to the non-traded goods sector via the wage level which is determined in the traded good sector. The coefficient for changes in world market prices in the traded-good price equation is not significantly different from one (.78) on the 5 per cent level, while price changes for nontradables seem to be determined exclusively by unit labor costs and

expected price increases. (Calmfors, 1977, pp. 507-509).

Price equations are also included in most macroeconomic models of the major industrial countries.[8] It can be generally concluded that the impact or long-run effect of foreign prices on the domestic price level is quite low and significantly lower than unity.

C. "Causality" Tests of the PPP Relationship

The early tests of the PPP relationship under floating exchange rates involved time series comparisons of PPP with the actual exchange rate. The methodology and findings of these early studies which included articles by Cassel (1916), Keynes (1923), Angell (1926), Heckscher (1930) and others has been reviewed thoroughly by Officer (1976); while there seems to be enough disagreement among authors, Officer concludes that the PPP doctrine seems on average to hold quite well.

Recent empirical studies have increasingly used regression analysis as the major methodological tool. While in the early studies "causality" was implicit in the conduct of empirical tests, the use of independent variables in regression analysis by necessity underlines the exogeneity or predetermination of some variables at least in a statistical if not theoretical way.

Frenkel (1978) uses monthly data on exchange rates (S_t), domestic (P_t) and foreign (P_t^*) price indexes for the period February 1922-May 1925 to estimate the following equations:

$$\ln S_t = \alpha + b \ln P_t - b^* \ln P_t^* \qquad (5)$$

and
$$\Delta \ln S_t = b \Delta \ln P_t - b^* \Delta \ln P_t^* \qquad (5')$$

---

[8] For a good overview see Genberg, 1978, p. 258.

Adopting the hypotheses that $b = b^*$ and that $b = b^* = 1$, he then compares the obtained results with the hypothetical values using a standard F-test. Three different kind of price indexes are used in the process, namely the wholesale, material and food price index. The evidence is uneven for both the absolute and relative versions of PPP with some bilateral exchange rates following closely PPP while others not. Frenke argues that overall the results seem to be positive. (Frenkel, 1978, p. 180).

In early tests of the PPP relationship no distinction was drawn between short and long run. In emphasizing this distinction, Frenkel (1978) assumes a long-run PPP relationship given by

$$\ln S_t^* = \alpha + b \ln (P_t/P_t^*) \qquad (6)$$

and then a short-run partial adjustment process according to which the percentage rate of change of the exchange rate is proportional to the (logarithm of the) ratio of the long-run value to the actual exchange rate. (Frenkel, 1978, p. 181).

Thus,

$$\ln S_t - \ln S_{t-1} = \gamma(\ln S_t^* - \ln S_{t-1}). \qquad (7)$$

Combining (6) and (7) he then estimates equation (8) below:

$$\ln S_t = \alpha\gamma + b\gamma\ln (P_t/P_t^*) + (1 - \gamma) \ln S_{t-1}. \qquad (8)$$

The long-run elasticity (b) turns out in fact to be close to unity.

In evaluating the results obtained by an earlier but similar study by Frenkel (1976) and Bilson (1978), Krugman (1978) argues that favorable results are obtained for those countries which in the 1920's experienced rapid if not hyper inflation and which pursued expansionary monetary policies. Results however from equivalent tests in the 1970's, when the major disturbances have been real, are not as supportive of the PPP hypothesis as Frenkel's conclusions would lead one to expect (Krugman, 1978, p. 400).

There are a number of recent studies which explicitly test the monetary approach to exchange rate determination (Bilson, 1978a, 1978b; Hodrick, 1978). Their analysis incorporates the quantity theory of money and a strict PPP relationship between domestic and foreign price levels.[9] The equations estimated by Hodrick (1978) on monthly data for Germany (4/73–9/75) and the United Kingdom (7/72-6/75) are based on the following formulation:

$$e_t = c_o + c_1 m_t + c_1^* m_t^* + \alpha_1 \ln (1 + i_t) +$$

$$\alpha_1^* \ln (1 + i_t^*) + \alpha_2 y_t + \alpha_2^* y_t^* + V_t . \qquad (9)$$

In equation (9), the logarithm of the exchange rate is regressed against the logarithms of the domestic and foreign money stocks (m and m^*), the logarithms of domestic and foreign interest rates (i_t and i_t^*) and finally the logarithms of real per capita permanent incomes. Ac-

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[9] For an excellent review see Dornbusch (1978).

cording to the monetary theory the coefficients c_1 and c_1^* are expected to be plus and minus unity. The coefficients of the domestic interest rates and foreign income level are expected to be positive while the coefficients of foreign interest rates and domestic income are expected to be negative.[10]

Even though estimates have the right sign the results are mixed for both countries. Some coefficients are not significant while there are also high estimates of serial correlation.

More importantly in a similar study Bilson (1978b) compared his results, based on a version of equation (9), with those derived from a strict PPP relationship and those from a random-walk model. The following was concluded:

> Although .[the "monetary approach" equation] appears to fit the data more closely than the Purchasing-Power Parity equation, it is noticeably inferior to the random-walk model in terms of R-squared, standard error, and the extent of the autocorrelation of the residuals. Consequently, although the monetary model does explain over 90 percent of the variation in the exchange rate, these results lead to the rejection of the monetary model as a complete description of the determination of the exchange rate.

> (Bilson, 1978, p. 89)

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[10]An increase in the domestic interest rate is assumed to lead to a depreciation of the currency rather than an appreciation for the following reason: the increase in i_t will reduce demand for real money balances which will induce an increase in the price level to maintain equilibrium in the money markets. With prices getting out of line internationally, a depreciation is required to restore PPP (Dornbusch, 1978, p. 8).

D. Variability of Real Exchange Rates

Tests of the long-run variability of real exchange rates have served as a convenient method for accessing departures from Purchasing Power Parity.

In cases where exchange-rate changes have been shown to conform to inflation differentials so that the value of real exchange rates has remained constant, a PPP-based intervention rule has been proposed as the main criterion for managing exchange rates (Thygesen, 1978). Test of the long-run variability of real exchange rates have also been used by some authors (Vaubel, 1978) as comprehensive and operation-al criteria of the comparative costs and benefits of monetary unifica-tion. This latter type of study is outside the realm of PPP and therefore beyond the scope of this essay.

Genberg (1978) has investigated the relationship between exchange rates and their corresponding Purchasing Power Parity levels with the aim of determining (a) the bias in PPP when measured by the CPI's, (b) the speed of adjustment towards PPP following a disturbance and (c) the potential shifts in the PPP relationship due to intercountry differences in index construction (Genberg, 1978, p. 265). He has estimated the following equations for fourteen industrialized countries for the whole period 1957-1972:

$$\log (e_{i,t}^{eff} \cdot P_{i,t}^{eff}/P_{i,t}') = \alpha + bt + u \qquad (10)$$

In estimating equation (10) effective exchange rates and price levels are used; the constant α is included so that the data can determine the appropriate base year while the time trend is a proxy for factors that may produce a bias in PPP calculation.

The error term of equation (10) serves as an indicator of departures from PPP. Genberg finds that the average absolute percentage deviation from PPP increased from 1.3% in 1957-1966 to 2.2% in 1967-1972 and finally to 4.1% in 1973-1976. This increase can be largely attributed to the move towards flexible exchange rates and the prevalence of real-side disturbances during the 70's.

Genberg also finds a lengthening of the time lag between the original disturbance and the reestablishment of PPP under flexible exchange rates as compared to fixed exchange rate periods as well as systematic biases in PPP when measured by the CPI; he attributes those to a higher than unity income elasticity of demand for nontraded goods and a higher share of government vs private expenditures in total consumption expenditures on home commodities (Genberg, 1978, p. 267).

Overall his results point to "a marked inferiority of the Purchasing Power Parity relationship during the flexible exchange rate years as compared to the earlier years of fixed or adjustable exchange rates" (Genberg, 1978, p. 268).

In contrast to the above, the Optica report written for the Commission of the European Communities seems to adopt the view that PPP can be used as an objective criterion for exchange rate adjustments. This conclusion is based on a cross-section study of effective exchange rate changes for 18 countries during the 1963-75 period.

The study, which opted for the Wholesale Price Index as the main index to be used, indicated that conformity to PPP was considerably closer multilaterally than bilaterally and about as close in a wide group of 16 industrial countries as it is among the EC. (see Thygesen, 1978, pp. 306-7). This conclusion which suggests that "the mechanisms which align national inflation rates measured in a common numeraire in a floating rate system have worked more efficiently than the mechanisms which align national inflation rates...when exchange rates are largely fixed" (Thygesen, 1978, p. 307), is in sharp contrast with the earlier results obtained by Genberg (1978).

In an effort to evaluate PPP, Dornbusch (1978) has looked at the real exchange rate for the United States and Germany, using the CPI index as the appropriate price index. He found that the real exchange rate showed substantial deviations which were systematically associated with movements in the exchange rate contrary to what a strict adherence to PPP would indicate (Dornbusch, 1978, p. 24). Furthermore deviations from PPP were found to last for a considerable period of time. Dornbusch attributes these deviations to sectoral changes in relative prices over time, different pricing strategies and finally differences in price and wage rigidities across countries.

Finally, in an interesting study which computes Turkey's "equilibrium" exchange rates under specific levels of borrowing and net capital inflows by assuming different exogenous shocks and domestic responses, Dervis and Robinson conclude that "differential inflation, while an important explanation of the

underlying change, only explains about a third of the change in the

equilibrium exchange rate...." (Dervis and Robinson, 1978, p. 57).

Changes in workers' remittances, changes in the investment rate and

residual factors turn out to be important determinants of the

equilibrium exchange rate; their share in the total change in the

equilibrium exchange rate exceeds 50 percent. These are the typical

kind of disturbances that semi-industrialized countries face. One

would thus expect PPP to hold even less for those countries which

in the process of development undergo structural changes and are

subjected to real as well as monetary disturbances.

III Conclusions

One of the most important questions that emerges from the analysis

of theoretical and empirical studies on PPP is the nature and significance

of disturbances in the international monetary system. This question

divided economists as early as the 18th century; in the 1930's it was

the focus of the debate between Keynes (1929) and Ohlin (1929) in

relation to the German reparation payments; it is also the central

issue that distinguishes the different approaches to the balance

of payments. In addressing himself to this question, Tobin stresses

what he views as the prevalence of real side disturbances in recent

economic history:

> .... In the twenties, the disturbances had to do with
> reparations and war debts, the transfer problem, pro-
> tectionism in the United States, and such matters.
> They had monetary consequences, but they were not mone-
> tary in origin. Then came the Great Depression, for
> which a model that assumes real output and employment
> to be constant in every country at full employment

levels is not particularly helpful. My mind jumped
to the dollar shortage of the 1950s, and I tried to think
how that was monetarily determined.

Next was the structural disequilibrium between
the United States and Europe and Japan, which characterized
the late fifties and early sixties, the dollar glut
following the dollar shortage. The dollar glut produced
virtually no inflation, even in the United States. The
"monetary" model did not seem to illuminate this balance
of payments disequilibrium any better than it did pre-
vious disturbances. The inflation set off by the finan-
cing of the Vietnam War seems at least equally the result
of bad fiscal policy as of monetary policy.

Finally, there are the oil and food crises. At a
1974 conference on monetarism--domestic monetarism--some-
body asked how I knew that the quadrupling of oil prices
by the Organization of Petroleum Exporting Countries was
not a response to increases in the world money supply.
I suppose I do not!

(Tobin, 1977, p. 57).

Such views would be in sharp contrast with views held by the monetarist

school.

The nature of disturbances is intimately linked to the validity

of the Purchasing Power Parity doctrine. As we have seen,

the argument that the equilibrium exchange rate will tend in the long run to

equal its PPP level can be made only in the case of monetary disturbances

and even then under restrictive assumptions regarding interest payments and

wealth effects. Deviations from PPP on the other hand could be large in the

case of real shocks and even more substantial in the short run independently

of the source of disturbance.

These theoretical shortcomings and questions tend to be overlooked in

empirical tests which often involve a circular reasoning: if the obtained

results are favorable to PPP then one uses them to support the contention

that disturbances are mainly monetary; if the results are not favorable,
and assuming that people can agree about that, then one is apt to
emphasize real and structural disturbances as the important shocks
in the system. Thus, the evaluation of the empirical work on PPP can
become both difficult and misleading.

In conclusion, I am afraid there is an important element of truth in
Paul Samuelson's (1964) statement that, "unless very sophisticated indeed,
PPP is a misleading, pretentious doctrine, promising us what is rare
in economics, detailed numerical predictions..."

(Samuelson, 1964, p. 153).

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