6
THE TRADITIONAL BALANCE OF PAYMENTS THEORY

6.1 Balance of Payments Theory: An Introduction

In the next three chapters various alternative methods of analysing the balance of payments are presented. The different theories seek to explain different aspects of the balance of payments, so they are to a considerable extent complementary rather than competitive. The elasticities, or traditional, approach seeks to explain the balance of trade; the Keynesian theories (Chapter 6) the current balance; the monetary theory (Chapter 7) the overall balance (the meaning of the balance of payments and of these concepts is explained in sections 6.2 and 6.3). The theories are complementary in another sense. The traditional theory is a microeconomic theory of adjustment in the goods market; the Keynesian theory a macroeconoimic theory in the goods market and the monetary theory a theory of disequilibrium in the money market. Balance of payments analysis needs to comprise all these elements but it is often more convenient to have three separate tools of analysis rather than a general model incorporating all three. Of course, 'after we have reached a provisional conclusion by isolating the complicating factors one by one we then have to go back on ourselves and allow, as well as we can, for the probable interaction of the factors among themselves. This is the nature of economic thinking.' As this comment of Keynes, which was endorsed by Friedman, suggests, this is the standard approach in economic analysis to a potentially complex problem (Keynes (1936), p. 297, cited by Friedman in Gordon (1974), p. 150).

6.2: Some Concepts

The balance of payments is strictly an accounting term used to describe a record of all of the transactions between one country and the rest of the world. As in all accounting records, transactions are recorded in two ways so that (unless mistakes are made) the total calculated from each method must be the same, i.e. the account must balance. Alternatively, the total derived by one method can be subtracted from that derived by the other. The result of this subtraction must be zero. As a consequence of such accounting conventions, *any* balance of payments must balance. A balance of payments problem is, accordingly, a problem about *how* the balance of payments balances. In principle a balance of payments could be constructed for an individual, a company or an area just as easily as for a country. It is a crucial feature of any balance of payments that it is a record of cash inflows and outflows. Companies frequently produce such statements which are a key tool of modern

management. Instead of being called a balance of payments they are called either a cash flow account or a sources and uses of funds statement.

To illustrate the nature of a balance of payments, Table 6.1 shows the sources and uses of funds of an imaginary student. Version A simply lists his sources of funds and how he has used them. However, we might decide to group transactions which seem similar. Thus his sources of funds might be grouped into income and borrowing; his expenditure into that which involves the acquisition of an asset and the rest, i.e. current expenditure. One can also regard the use of funds as a negative source and so arrive at version B. This grouping is arbitrary. For example, one might have classed the purchase of books as a purchase of assets, with the car, rather than current expenditure with the alcohol, rent, etc. The choice of headings is also arbitrary, for example one might alternatively have divided sources into public sector, family and corporate sector. This arbitrariness is common to all balance of payments accounts.

One might then group some sources and some uses of funds having something in common. For example, the borrowing and car purchase might be regarded as having something in common with each other, as both are capital transactions while income and the current expenditure can be grouped as current transactions. This grouping is again arbitrary or rather should be a consequence of the purpose for which the account is to be used. No grouping is 'right' or 'wrong'. It is merely more or less useful. The balance of payments statistics used in the UK reflect the CSO's views of what is the most useful method of presentation; this view has changed several times in the last 30 years.

The final presentation has two features of considerable importance.

1. Whilst the total of the account must be zero, it is possible, indeed likely, that each section will show either a net contribution to the student's funds or a net drain on them. These are called either surpluses or deficits respectively.

Hence the student has a current transactions balance of payments deficit of £500, because his current expenditure exceeds his income.

Table 6.1: A Student's Balance of Payments

A		Sources of funds		Uses of funds
S1	Grant	£1500	U1 Rent	£1000
S2	Income from vacation jobs	£1000	U2 Food	£ 990
			U3 Books	£ 10
S3	Borrowing from bank	£1000	U4 Alcohol	£ 500
			U5 Other recurrent expenditure	£1000
S4	Borrowing from parents	£ 500	U6 Purchase of car	£1000
		£4000		£4000
B			Net source (use—)	
B1	Income		£2500 (i.e. S1+S2)	
B2	Borrowing		£1500 (i.e. S3+S4)	

B3	Current expenditure	−£3000 (i.e. U1+U2+U3+U4+U5)
B4	Purchase of asset (car)	−£1000 (i.e. U6)
		000
C	Current transactions (B1+B3)	−£ 500
	Capital transactions (B2+B4)	+£ 500
		000

2. Any balance of payments deficit means that some category of transaction has made a net contribution to the individual's funds. *An increase in one's holdings of assets is a balance of payments deficit* because it involves the use of funds. Borrowing is a surplus because it entails the acquisition of funds.

Both features are true of all balance of payments accounts. They must *balance* in the sense that the final total must be zero. However, they can be divided into components, such as current and capital, which must sum to zero. These are almost certain to show either a surplus or a deficit. These surpluses or deficits may be viewed as policy problems. In practice, current transactions deficits are often so regarded. Indeed in the UK from 1945 to 1972 they were viewed as the major problem of economic policy. Nevertheless, it is worth stressing that it is only components of the balance of payments which can show deficits or surpluses; the overall account must balance. Thus a balance of payments problem is really a problem of the composition of the balance of payments.

6.3 The UK Balance of Payments

Exports and imports are the two best-known transactions with the overseas sector and comprise those sales to foreign residents (exports) and purchases from them (imports), which are included in the national income accounts. However, the usual method of presenting the UK balance of payments both subdivides these categories and includes several others.

The UK balance of payments is divided in two main sections: the current account, which showed a surplus of £3206 million in 1980, and the capital account which showed a deficit of £2790 million (an item grouping errors and omissions, called the balancing item, ensures that the account balanced). The current account in turn is subdivided into:

Table 6.2: The UK Current Account, 1980

Visible trade			
		(£m)	
Exports		47,389	
Imports		−46,211	
Visible balance		+1,178	
Services			
	Credit	Debit	Balance
General government	397	−1,188	−791
Sea transport	3,816	−3,681	+135
Travel	2,965	−2,757	+208
Finance	n/a	n/a	+1,595

	Receipts	Payments	Balance
Other	4,826	2,180	+646
	15,809	11,621	+3,285
Interest, Profit and Dividends			
General government	943	1,598	+655
Private sector (including public corporations)	7,261	6,644	−617
Transfers			
General government	958	2,790	−1,832
Private	793	1,083	−290
Invisible: Consolidated			
Credits		25,764	
Debits		23,736	
Invisible balance		+2,028	
Current Balance		+3,206	

6.3.1 Visible Trade

This item represents trade in goods, of which £47,389 million were exported and £46,211 million imported in 1980. This was only the eighth year since the end of the Napoleonic wars when exports of goods exceeded imports, although similar surpluses were earned in 1981 and 1982 for which complete figures are not available.

6.3.2 Invisible Trade

'Invisibles' comprise three items; trade in services, interest profit and dividends and transfers.

6.3.3 Services

Of these travel is the best known and shipping and finance are the largest. A Briton taking a holiday abroad is importing in just the same way as if he/she purchases foreign goods and consumes them in the UK. A British insurance company selling a policy to an American is exporting in just the same way as a seller of aircraft. Altogether in 1980 services showed a surplus of £3285 million, most of it earned by the City.

6.3.4 Interest, Profit and Dividends

This item, which showed a small deficit in 1980, reflects income received from foreign loans and investments and income paid to foreign investors in the UK, whether holders of UK securities or real assets (such as Ford). Normally the private sector earns a large surplus but the public sector makes large payments, so the net figure is small.

6.3.5 Transfers

This item includes all those current transactions which are, in effect, gifts, since the person paying the money receives nothing in exchange (at least directly). This item showed a deficit of £2122 million in 1980. Part of this represented private transfers—gifts to relatives abroad, charitable donations and so on. However, the bulk represented government transfers of which contributions to the EEC were the largest, over £1500 million, net of refunds.

The capital account includes real investment, or *direct* investment, in land, factories, etc. and *portfolio* investment in securities, shares, bonds, etc. Most of this investment is long term but there are also very large quantities of short-term capital transactions. Some, both official and private, are loans designed to finance the purchase of current goods and services, but large quantities of short-term deposits are made both in and by the UK only in response to the attractiveness of the deposit. This means that there are often very large movements of capital when interest rates change or when there are fears that a currency's value will fall (see p. 133 below). The capital account also includes official financing transactions such as changes in the reserves. The government holds a large stock of foreign currency which is used for various purposes, such as to influence the exchange rate (see p. 160 below). This stock is called the reserves and an addition to it—a purchase of foreign currency by the government—is a deficit, because it represents a use of funds. The official transactions are usually presented as the item needed to meet the 'balance for official settlement' or 'total currency flow'.

The current account, plus all capital transactions other than the official financing ones, is often called the *overall* balance. If the short-term capital investments described above are excluded, it is called the basic *balance*. Of course items in different sections of the balance of payments may be related. If an aeroplane is purchased from an American firm it will usually arrange a subsidised loan as part of the deal. The aircraft would appear in the current account, the loan in the capital account.

6.4 The Elasticities Model

The traditional approach to the analysis of the balance of payments is embodied in the elasticities model. This model seeks to explain the balance of trade, i.e. exports and imports, by a microeconomic approach which focuses on the choice between domestic and foreign goods. The quantity of UK imports is determined by UK residents choosing to buy foreign, rather than British, goods and services and exports by foreign residents making the opposite choice. As in all elementary (partial analytic) microeconomies, it is assumed that price is the main determinant of this choice. Thus the relative price of British and foreign goods and services will determine the quantities of each purchased; of course, this is only true when a number of other factors are held constant; when these are not constant, the defects of the theory discussed in section 6.5 arise.

Hence the theory is based on the premise that exports and imports are determined by relative prices. The relative price of British and, say, American goods is determined both by their absolute prices and by the exchange rate. To take a specific example: a china beaker costs £1 in York. Its American equivalent costs $3 in New York. The relative price of the two depends on the exchange rate. If the rate were $1.50=£1, the American beaker would

cost £2 and be more expensive. Hence, Americans would import beakers from York. On the other hand, if the exchange rate were $3, then both would cost £1 and no trade would take place. If the rate were any higher, it would pay Britons to import beakers from New York, for example if the rate were $6 the sterling price of the American beaker would be 50p. Thus the elasticities model argues that the quantity of exports and imports will depend upon domestic prices, foreign prices and the exchange rate.

Before continuing with the theory, it is worth noting that there are two alternative links between these three besides the elasticities model. One is the *purchasing power parity* theory. This argues that it is the exchange rate which adjusts, so that prices will be the same in both countries. Hence, in my example, the exchange rate will be $3 so that the £1 and the $3 it buys will both purchase the same quantity of goods, for example one beaker. A second, more modern argument is that the world price and the exchange rate determine domestic prices. In the above example, if the exchange rate were $2, then the sterling price of an American beaker would be $1.50. In this case, no UK producer has any reason to sell at any price less than £1.50, nor can he sell at any price above £1.50, so his price will be £1.50. This is an extension of the 'small country' assumption used, for example, in the tariff analysis above.

Relative prices can change either as a result of a change in the exchange rate or of a change in absolute prices, both domestic and foreign. These are often combined into an index of competitiveness. UK competitiveness will improve, in practice, if UK prices rise by less than foreign ones or if the exchange rate falls. When the exchange rate changes so that the pound buys less dollars this is called a depreciation. In some circumstances this change can be brought about by official action and is called devaluation (see p. 41 below). According to the theory, an improvement in competitiveness must lead to a rise in the *volume* of exports or a fall in the *volume* of imports (or both), i.e. demand curves slope downwards. However, one is interested in the *value* of exports, as well as the *volume*. For example, if five beakers were sold at 50p each instead of three at £1 each, then one would probably think that this was a *fall* in exports from £3 to £2.50, i.e. in value, not a rise from three to five beakers, i.e. in volume. To calculate the change in value, one needs to know the price elasticities of exports and imports; hence the name of the theory. Export revenue will rise (in pounds) if the elasticity exceeds unity, and so on as in elementary price theory.

The essence of the theory is embodied in the famous Marshall-Lerner condition:

> an improvement in competitiveness will improve the balance of payments if and only if the sum of the price elasticities of demand for imports by residents and of exports by non-residents exceeds unity (ignoring the negative signs of the elasticities).

Improvement in the balance of payments is taken to mean a smaller (current account) deficit or a larger surplus. Usually an improvement in competitiveness is achieved by a variation in the exchange rate so the condition is often stated using depreciation or devaluation instead of change in competitiveness. The crucial feature of the condition is that it is the *sum* of the elasticities which must exceed one, not each elasticity separately. Hence it is possible for both exports and imports to be price inelastic but for the condition to be satisfied, e.g. if both elasticities are equal to (−) 0.7.

It is necessary to explain in some detail why this is so. The simplest way to do this emphasises that the balance of payments can be measured in either foreign currency or

domestic currency, hereafter dollars and pounds. An improvement in UK competitiveness, in this case a depreciation of sterling, will mean that the dollar price of exports falls and the sterling price of imports rises, whereas the sterling price of exports is unchanged and so is the foreign currency price of imports. This is because the change in the exchange rate has not affected the price measured in the relevant domestic currency but it has affected the price in the other currency.

If the balance of payments is measured in *sterling,* the following is true. The sterling price of exports is unchanged (even though foreigners pay less in their own currency) so the value of exports cannot fall; in fact it is almost certain to rise as volume will rise unless the elasticity is equal to zero. This assumption, however, will be made. If the export elasticity is zero, the value of exports will be unchanged. In this case, the change in the value of imports will determine what happens to the balance of payments, As the sterling price of imports has risen, the sterling value of imports will fall so long as their elasticity of demand exceeds one. In other words, *a depreciation,* or rather improvement in competitiveness, *will lead to an improvement in the balance of payments so long as the import elasticity exceeds one, even if the export elasticity is zero*.

If the balance of payments is measured in foreign currency, the converse argument is true. The price of imports in dollars is unchanged so their value cannot rise. (In fact, as the sterling price is higher, it is almost certain to fall.) If the import elasticity is zero, the value will be unchanged. In this case, the effect of the depreciation on the balance of payments will depend upon the effect of the lower foreign currency price of exports. It is obvious that there will be an increase in the value of exports so long as the export elasticity exceeds unity. Thus, *even if the import elasticity is zero, a depreciation will improve the balance of payments if and only if the export elasticity is greater than one*.

It is necessary to make a drastic simplifying assumption to derive the Marshall-Lerner condition from the two italicised propositions above. This is that the balance of payments is initially in balance. In this case an improvement in the balance of payments in either sterling or dollars implies an improvement in the other. Therefore, *either* an export *or* an import elasticity greater than unity is a sufficient condition for a depreciation to improve the balance of payments, even if the other is equal to zero. Moreover, if the balance of payments is in balance, i.e. exports are equal to imports, then an import elasticity of $(-)\frac{1}{2}$ will have exactly the same impact on the balance of payments as an export elasticity of $(-)\frac{1}{2}$ (as the one will reduce imports by as much as the other will increase exports). Hence if both elasticities are equal to $(-)\frac{1}{2}$, the effect will be the same as if either is equal to one and the other to zero. The same is true of any other pair of elasticities which add up to one. Hence, so long as the sum of elasticities exceeds unity, then an improvement in competitiveness will improve the balance of payments, i.e. the Marshall-Lerner condition. However, to show this a number of simplifying assumptions have been explicitly and implicitly made. The deficiencies and limitations of Marshall-Lerner are considered in the next section and all stem from these. However, the basic theory is simple: *relative prices (competitiveness) determines the balance of payments, with an improvement in competitiveness leading to an improvement in the balance of payments so long as the Marshall-Lerner condition is satisfied*.

6.5 The Deficiencies of the Marshall-Lerner Condition

6.5.1 Balanced Payments Assumption

The first of the limitations of the Marshall-Lerner condition stems from the assumption that the (current account of the) balance of payments is in balance initially. Otherwise the condition is neither sufficient nor necessary for an improvement in competitiveness. This seems a very restrictive assumption as the balance of payments is very rarely in balance and, almost by definition, never so when there is a balance of payments problem. However, this is less restrictive than it seems, as in this case the Marshall-Lerner condition is replaced by the alternative sufficient condition that the *weighted* sum of the elasticities should exceed one, with the weights proportional to the value of exports and imports. In effect the simple Marshall-Lerner condition is equivalent to the proposition that an unweighted, or equally weighted, sum of the elasticities should exceed unity.

A further complication arises because it is possible for a balance of payments to improve in foreign currency but not in pounds or vice versa. For example, if the original deficit were £400 million and the exchange rate $2=£1, the deficit would be $800 million. If after a depreciation to $1=£1 the deficit were £600 million or $600 million this could be viewed as an improvement (in dollars) or a worsening (in sterling). The minimum necessary condition is slightly different according to which currency the deficit/surplus is measured in.

Nevertheless, whilst the Marshall-Lerner condition itself is no longer appropriate, there is always an amended elasticity condition which avoids the drastic balanced payments assumption.

6.5.2 Aggregation, Practical Problems and Elasticity Pessimism

The analysis in section 6.4 implicitly assumed that there was only one good exported and imported. This is clearly absurd; the UK exports and imports several hundred thousand different goods. However, even with two goods the aggregation problem would arise; in some ways it is a variant of the index number problem.

If the UK imported two goods, one with an elasticity of (–) 0.1 and one with an elasticity of (–) 0.6, what elasticity is relevant to the Marshall-Lerner or similar formulae? Clearly one needs some weighted average of 0.1 and 0.6, but there is no correct set of weights. The relative volume, or value, of imports (or consumption?) offer some possible answers but each level of income and price offers a different answer. In theory there is no solution to the aggregation problem. In practice, national income-based data are used as if they applied to a single good.

Perhaps more seriously, the plethora of goods makes it very hard indeed to estimate elasticities at either the level of the aggregate or at that of the individual good. It is virtually impossible to calculate the correct relative price. All the usual econometric problems are present (see p. 14 above). Hence it has proved difficult to estimate whether or not the Marshall-Lerner condition and its variants is satisfied. However, the evidence suggests that 'elasticity pessimism' may well be justified, that the values may be very low indeed, or at least so close to a sum of unity that it is not clear whether or not the condition is fulfilled (see Appendix).

6.5.3 Supply Side Factors

The Marshall-Lerner condition implicitly assumes that all supply elasticities are equal to infinity or, to put it less formally, that there are no supply constraints on the volume of trade. This is a serious limitation, and so a major justification for the absorption approach in which these are central (see Chapter 7). It is very unlikely that British producers could increase their output by very much in response to an increase in foreign demand. Almost certainly, they would choose to increase price as well as, or instead of, output. In addition, there is evidence that the state of the domestic market influences behaviour in the export market. In other words, whilst Marshall-Lerner implicitly assumes a perfectly elastic supply curve which is more or less stable, in the real world the supply of UK exports is neither stable nor very elastic.

There are two approaches to this problem; one is to try to expand the condition to include supply elasticities. Unfortunately the resulting conditions are horrifically complex and no two advanced textbooks seem to agree on what the condition would be.[2] Moreover, one should accept that elasticity analysis is about demand and incorporate this into a broader analysis. So many factors are left out by Marshall-Lerner, including any other impact of changed competitiveness on the domestic economy, that this seems to be the better solution. Marshall-Lerner can never provide a complete balance of payments model, but it is still of value (see section 6.6 below).

6.5.4. Income Effects

The major factor missing in the elasticities analysis is income effects; they are implicitly assumed away (i.e. it is partial analysis). So the Marshall-Lerner condition assumes that the income elasticity of demand for *all* goods is zero. This is so implausible that it has led to the development of the alternative macroeconomic models of the balance of payments, discussed in Chapters 7 and 8. The sort of mechanism ignored by Marshall-Lerner includes such processes as:

1. a change in relative prices increase exports,
2. the increase in exports generates an increase in income;
3. the higher level of income leads to more imports.

This latter increase in imports can be such that there is no improvement in the balance of payments despite the rise in exports.

The following example, using the elementary multiplier-accelerator model of 'A' level and first-year macroeconomics courses, illustrates the potential impact of income effects. In a simple economy:

$$X=100 \qquad M=0.2Y$$
$$I=100+0.3Y \qquad T=0.1Y$$
$$G=100 \qquad S=0.1Y \text{ (where X=exports, etc.)}$$

As can be easily calculated, the equilibrium level of income is 3000. As imports will, therefore, be 600, there will be a balance of payments deficit of 500.

For simplicity it will be assumed that the price elasticity of demand for imports is 0, but that a 5 per cent devaluation, or other improvement in competitiveness, will lead to a 500 per cent increase in the level of exports. In other words, the Marshall-Lerner condition is satisfied many times over (the sum of elasticities is over 30). After the devaluation

$$X = 600 \text{ (and all the other variables as above)}$$

The new equilibrium level of income is 8000. Imports are now 1600, so the balance of payments deficit is 1000. In other words, although the Marshall-Lerner condition is satisfied, an improvement in competitiveness has led to a doubling of the deficit.

The above example suggests that one needs to look at two distinct influences on the balance of payments:

1. the impact of a change in competitiveness on the balance of payments if income were held constant. This change (hereafter B) is given by the elasticities model: this was the increase in exports (500) in the above examples but could also include a fall in the average propensity to import.

2. the rise in imports generated by the higher level of income. The second of these is equal to the marginal propensity to import (m) multiplied by the change in income. Hence one must calculate the change in income. This is equal to the multiplier times the increase in injections, as in any Keynesian system. This increase in injections is B (the change in the balance of payments holding income constant). This can be checked by re-examining the example above, where it can be seen that the increase in exports is the injection which raises income from 3000 to 8000. Hence, to set it out more formally, the total effect of a change in competitiveness is equal to

$$= B - B.m.k$$

where k is the multiplier (Bmk gives the generated rise in imports)

$$= B (1 - mk).$$

As B will be positive for an improvement in competitiveness so long as the modified Marshall-Lerner condition is satisfied, then additional conditions can be derived. If $mk > 1$, then the generated effect on imports outweighs the change implied by the Marshall-Lerner condition. However, so long as $mk < 1$, then an improvement in competiveness will lead to an improvement in the balance of payments. This consideration of income effects produces two conclusions; the additional condition to complement Marshall-Lerner and the idea that changes in competitiveness influence income. The latter will be considered further in the next section and in Chapter 10.

Table 6.3: Effect on Balance of Payments of Exchange Rate Changes

	Change in balance of payments	Change in exchange rate (%)
USA (1977–9)	+ $ 16 bn	−11.3
Japan (1977–9)	− $ 9 bn	+15.9
Germany (1977–9)	− $ 6 bn	+13.3

Italy (1974–8)	+ $ 6½ bn	−31.2
UK (1974–7)	+ $ 21½ bn	−25.8
UK (1977–9)	− $ 5 bn	+9.1

Source: Allen, W.A. 'Exchange Rates and Balance of Payments Adjustment—General Principles and Some Recent Experiences', *BIS Working Paper No. 3*.

6.6 The Value of Marshall-Lerner

Opinion is divided about the relevance of Marshall-Lerner, or competitiveness, to the balance of payments. On the one hand, some economists believe that competitiveness is a major determinant of the balance of payments; for example Allen's estimates shown in Table 6.3. On the other hand, the doyen of British economics, Johnson, could write:

> It should be emphasised that the analysis of the effects of a devaluation is *completely* independent of *any* critical magnitude condition applying to the elasticities of international demand. The relevant stability condition is…monetary theoretic' (Johnson, in Frenkel and Johnson, p. 275)

> The familiar elasticity condition (sum-of-the-elasticities-of-demand-greater-than-unity)… is completely irrelevant. (*Ibid.,* p. 281)

However, it is clear, that the elasticities approach in general, and modified Marshall-Lerner in particular, can be relevant to the analysis of inflation and unemployment. The full argument is developed below, p. 138, but both 'competitiveness' and 'exchange rate' are regarded as having their major impact, possibly their only impact, on the level of domestic income. Thus a depreciation is seen as a way of reducing unemployment and an appreciation of reducing inflation. Hence the income effect, whose size does depend in part on Marshall-Lerner analysis, is not an unwelcome by-product but the object of the policy. In November 1982, the Labour Party's Shadow Chancellor, Peter Shore, advocated a 30 per cent depreciation of sterling as a means of reducing unemployment. Similarly, exogenous changes in competitiveness have also been sought, e.g. by incomes policy, as a means to reduce unemployment. In some models, e.g. the Bank of England one (Bank (1979)), such effects are of crucial importance.

Appendix A: Price and International Competitiveness

Most presentations of international trade theory implicitly assume that price is the major influence on potential purchasers and that trade theory should therefore concentrate on showing why prices might differ between different countries, to establish the existence or optimality of trade. Similarly, balance of payments theories concentrated on the impact of price on volume. Strictly, these analyses need not imply that the price elasticities of international trade are high but most writers and students assumed they were until the 1950s when efforts to estimate them commenced. These results were alleged to show 'elasticity pessimism' in that the elasticities were smaller than anticipated—about 1.5 to 2. In the ensuing 30 years estimates of elasticities have become ever lower, so the current consensus is that elasticities are unitary or less.

There are a large number of major problems that must be surmounted before elasticities can be estimated. The first is the poor quality of the data. It is symptomatic of the poor quality of the data that measured world exports are 5 per cent less than world imports, even though one would expect the bias to be to underestimate imports since smuggled goods often appear in export statistics but never in import data, by definition. Moreover, it is very hard to calculate which price is relevant to which goods especially when aggregate data is used. Even where reliable data is available researchers have faced virtually all known econometric problems in their work. Technicalities aside, the major problem has been to isolate the effect of price changes from those of the other factors at work. Usually estimation of price elasticities has been by regression analysis using time series data.

A particular problem facing international economists has been the estimation of lagged relationships. It is usually argued that past as well as present prices should influence trade flows. This is partly because of *contractual commitments*. If someone agreed to buy x tons of coal per year from the UK for ten years in 1977, they would be influenced by 1977 prices (and their expectations) but deliveries will continue until 1987. Hence UK coal exports today would depend in part upon 1977 prices as well as today's. Another reason is *delivery lags*. There is often a substantial gap between the placing of an order and the delivery of a good. The observed flow is of deliveries but presumably the relevant price which influenced the decision was the one prevailing when the order was placed.

The techniques needed to estimate such lagged relationships are complicated, but the crucial problem is that one can estimate a short lag with a low elasticity or a higher elasticity but one which takes years to work through. Statistical methodology cannot satisfactorily determine which is right. The UK Treasury model of exports at one time had a high elasticity (of—1.6) but a 26 quarter lag. Critics argued that this strained plausibility. In brief, empirical estimation of the effects of trade flows has been successful in showing that elasticities are not high but not successful in establishing how low.

Appendix B: Marshall-Lerner and Income Effects—a Diagrammatic Presentation

A demand curve shows the relationship between price and the desired quantity purchased. The change in total revenue in equilibrium when price changes depends upon the elasticity of the demand curve. It is, however, possible to use instead the concept of an expenditure function—i.e. price times quantity7—and to show how this changes when price changes. This is shown in Figure 6.1 (a). When elasticity is greater than unity this slopes downwards and vice versa. The same can be done for the balance of payments which represents expenditure on imports net of exports. This can be negative, i.e. there can be a surplus. Hence, Figure 6.1 (b) shows the effect of changes in the relative price of imports on net expenditure on imports, i.e. on the balance of payments, when GDP is constant. So long as the (modified) Marshall-Lerner condition is satisfied, this will slope downwards from left to right—and this is the relevance of the condition.

If income were constant, a rise in the relative price of imports would improve the balance of payments, e.g. a depreciation that raised the relative price of imports from p_1 to p_2 would improve the balance of payments by AB. However, AB is an injection which necessarily increases income and so shifts the expenditure function from E_1 to E_2, as more is demanded at each level of income and price so expenditure rises. The shift may be such that the total

effect on the balance of payments is negative, positive or zero. The shift is AB. MPM. multiplier (k) as on p. 82 above, so it is easy to see that there will be an improvement only if MPM.k <1. (NB when there are no income effects MPM=0, so MPM. k equals zero.)

Notes

1. The use of the word 'traditional' is open to the question 'What tradition?', especially in view of the alternative tradition cited by Frenkel and Johnson (1976, Chapter 1). Nevertheless, the word traditional is a useful description of the mainstream textbook orthodoxy of the 1950s and 1960s.
2. The most comprehensive incorporation of supply elasticities was by Stern (1973). His formula required that for a depreciation to improve the balance of payments where

Figure 6.1: Marshall-Lerner

a) Expenditure functions

b) Marshall - Lerner satisfied

c) Income effects
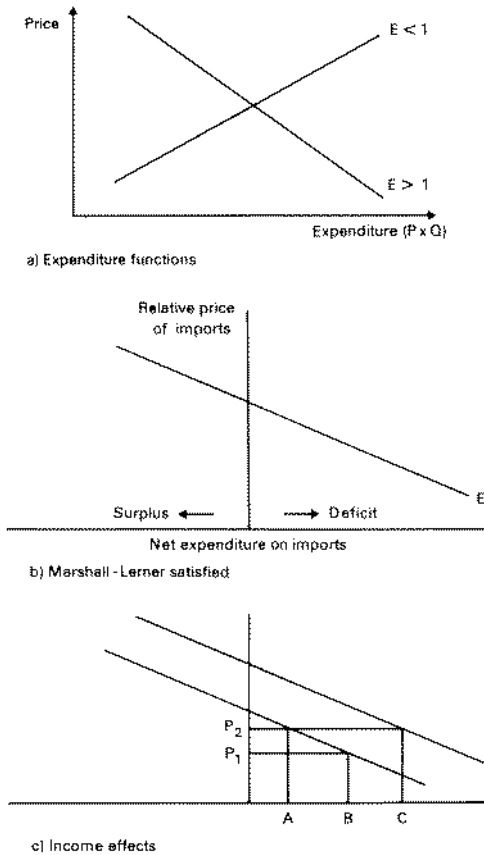
$$X \; \frac{\Sigma x - 1}{1 + \frac{\Sigma x}{Sx}} \;\; + M \;\; \frac{\Sigma m \left(1 + \frac{1}{Sm}\right)}{\frac{\Sigma m}{S m} + 1} \;\; > 0$$

X and M are the initial values of exports and imports, Sx and Sm the supply elasticities and Σx and Σm the demand elasticities of exports and imports respectively.

Table 6.4 summarises his results.

Table 6.4: Stern's Results

	Demand elasticities		Supply elasticities	Effect on:	
				Terms of trade	Balance of trade
1	Both high and sum	1	Both high	Moderate worsening or improvement[a]	Improvement
2	Both high and sum	1	Both low	Improvement[b]	Improvement
3	Both low and sum	1	Both high	Worsening	Worsening
4	Both low and sum	1	Both low	Improvement[a]	Improvement[b]

Notes: (a) depends on whether the product of the supply elasticities is greater or less than the product of the demand elasticities; (b) if supply elasticities are sufficiently small in relation to the demand elasticities.