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INEQUALITY IN INTERNATIONAL TRADE: MEASURING COMPARATIVE DISADVANTAGE

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Whenever relative production costs of two goods differ between two countries, trade moves the joint production possibility frontier outward through specialisation. The classic Ricardian paradigm forms the starting point of the theory of international trade still today, because once understood, it is fairly evident. It settles the question of resource allocation and efficiency gains, stopping just short of their distribution. Inequality in trade, which is the question roaming behind the empirical study of the terms of trade, is abstracted from within the Ricardian framework.

Instead, the Prebisch/Singer hypothesis is the usual road through which such inequality is approached. Starting from a certain base year, for which the question is not decided, a deterioration of the terms of trade in comparison to the base year is considered an increase in inequality. Leaving aside problems of interpretation and verification that have accompanied this hypothesis, it is evident that the approach is unsuited for judging a given situation as being equal or unequal, independent of earlier or later stages. All it can say is about change of the situation in time, not the situation itself.

The statistical advance of international purchasing power measurement has now opened a third road for investigating inequality in trade. It allows measuring the value of a currency, called its purchasing power parity, in comparison to other currencies. As a consequence, productivity trends of countries can be compiled and separated from the value in exchange regulated through foreign exchange markets. It has become a stylised fact from these studies that the currencies of developing countries are undervalued in this respect. The paper investigates the question of how undervaluation of a national currency may foster inequality in international trade.

A global inter-country table of yearly flows of exports and imports is established, and revalued at purchasing power parities, applying conventional input-output methodology for maintaining consistency. The resulting „real trade balances“ are then interpreted as measures of inequality of a country’s position in international trade. A brief discussion of traditional explanations of the phenomenon, cast in terms of tradable and non-tradable goods rounds up the paper.

1. The Role of Money as a Measure of Economic Value

Money is more than a means of payment, of concern to national central banks. It is also the general measure of value within and all over a national economy, in which function it is of high concern to national statistical offices, and their national accounts departments, in particular. Business calculate their prices, government their taxes, and social organisations their income in units of national currency, implying that these units corrrrectly reflect economic status and performance at a given year in history. This second function of money as a measuring rod of value is rarely noticed, because it coincides with the first, within the limits of a national economy.

In an international context, however, the natural unity between the two functions of money breaks up. The means of payment is no longer the means of value measurement, but each goes their own way. Actually, there is no truly ubiquitious international money, just as there is no global central bank issuing and controlling it. Not counting the US-dollar, which in spite of its international usage is still a national currency, special drawing rights (SDRs) on the International Monetary Fund function as the global means of payment between national monetary authorities. But SDRs are not made to measure the value of production of countries on an international scale. Instead, a complex system of revaluation procedures has been designed and established, known as purchasing power parities, and constructing an abstract, but mutually consistent set of world prices, within which each country's GDP is made comparable to the others. There is no link, not even theoretically, between the special drawing rights employed as an international means of payment by the IMF and the purchasing power parities designed in order to measure value of production by the World Bank. The two functions of money which are so closely married nationally, are fully divorced, internationally.

The question of what the dissociation of the two functions of money means for global economic policy has not been brought to the attention of economic theory, yet. From a practical point of view, and as a first step towards theoretical analysis, perhaps, the following questions may be raised: How do monetary exchange rates affect the value of product flows leaving a country, as compared to those entering into it? Given that the value of goods determines the value of resources put up for their production, can one determine a net outflow or inflow of such resources for a country? Is there a possibility of disadvantage due to persisting imbalances in international exchange rates? Or is international trade always equal, by

definition? In short, how are the gains expected from international trade distributed among the nations participating in it?

The paper addresses these questions, albeit in a conceptual and preliminary manner only. After a brief review of the present state of beliefs in the literature, an illustrative data table presents the idea of how to compute net resource flows, which is rather simple as a method, in principle. Then the more involved problem is considered of how to interprete the results of such computation, and what meaning to assign to them in the context of standard national accounting theory. Finally a detailed table of resource flows is presented, and its methodological problems and difficulties are discussed. Given the novelty of the approach comments and criticisms are all too welcome.

2. The Concept of Inequality in International Trade Theory

Inequality in international trade is usually dubbed “unequal trade” or “unequal exchange” in trade theory. For some reason unequal trade does not stand out as a favorite topic in economics. Literature adressing it is scarce, and hardly coherent, and no standard theory or terminology exists. As a consequence, there is little guidance provided for defining and measuring such a concept in the national accounts, not to mention its envisaged application and interpretation for use in politics.

The first question coming to mind is whether equality, or its absence, are meant in terms of quantity or of quality. In quantitative terms there seems to be no difficulty, because figures measuring the size of trade of nations exist, and are being prepared on a sound conceptual basis. There is no problem about determining whether, or not, trade of one nation is equal in size to that of another one, or to its own trade at some earlier point of time, in principle. Hence unequality might be meant in terms of quality of trade. A noble is not equal to a peasant, or to put it the other way around, the claim that all men are created equal expresses a social norm and legal status hardly measurable in numbers and figures. If the norm extends to economic affairs equality can be claimed as a legal right for the partners of a trade. Trade is then equal if the partners, between whom a trading is contracted are equal, and trade is unequal if they are not.

The Boston tea party, for example, felt intolerable unequality in the trade they were engaged with Britain, and and looking at Japan, their heirs are not free from that impression still today. „Reciprocity“ is the term used in the context of the World Trade Organisation, and

it may be a better word than equality in this qualitative sense. On this terrain, however, politics rather than statistics seems to be the fitting game, and „pacta“ rather than „data“ the corresponding outcomes. Thus at first glance, equality of trade is either trivial, if understood in quantitative terms, or unmeasurable, if qualitative differences are involved.

Other expressions come into play. Trade is sometimes called „fair“ or „unfair“, is that synonymous to equality? „Fair“ and „unfair“ are again no terms of economics, but how about about a fair value in exchange? „Value“ is definitely an economic term as well as its close relative „price“. Prices are the elements entering into what is called „terms of trade“ in international economics and these are a well studied item within the discipline. Is equality of international trade then about the prices at which trade takes place? Are equal terms of trade the measure for equality in trade? If this may be accepted as a first hypothesis, it raises the question of what are equal terms of trade. In the following the literature will be scanned with respect to what it offers in answering this question.

In textbooks on international trade we find little reference to our problem. (Bhagwati 1998), for example, neither mentions the term nor addresses the issue of unequal trade , the basic proposition of the book confessedly being that „some trade is better than no trade“, or, after some modification „free trade is better than no trade“ (p. 268). The concern of the book is then to define and discuss „distortions“ of free trade, brought about by government intervention. An interesting point comes up when the possibility of „immiserising growth“ is being discussed, an idea thought about by Hicks, implying that a gain from economic growth may be offset by a loss in terms of international trade. The observation is noteworthy because it relates international trade to domestic valuation of production and growth, but it does not lead to a definition of unequal trade. Mikic (1998) deals with terms of trade rather extensively, sparing a special page box for the issue of unequality. Referring to (Emmanuel 1972) he detects a „common fallacy about comparative advantage“. It is said that developing countries are being exploited since they give more units of labour embodied in their exports goods than they receive in return through their imports, but, he adds, unless the terms of trade coincide with autarcy prices of any one country, both countries will gain. In passing he gives a definition of „equal exchange“ which occurs if the double factorial terms of trade are equal to one between two countries. (Horvath 1999) devotes a whole chapter to „Unequal Exchange“ relating it to (Emmanuel 1972) again, whose compilation procedure he criticises, offering his own model in return. From it he derives the statement that „balanced trade in international prices means unequal exchange because international values contain less of foreign more

productive labour and more of domestic less productive labour of less developed countries. It follows that equal exchange at international prices implies exploitation of underdeveloped countries. Nevertheless trade is still beneficial for underdeveloped countries (in the absence of monopolies) because imports make possible use of less costly commodities and so net output and consumption increase“ (p. 122). Negishi (2001) speaks about exploitation (ch. 7) as well as about immiserising growth (ch. 16). Being concerned with the developments of theory, which he presents in form of lectures, he finds no room for discussing a statistical definition of these concepts. Wood (1994) deals directly with North-South trade and inequality, but only with respect to employment effects, another possible meaning of equality.

Among books titled specifically „unequal trade“ (Pomfret 1988) makes it mean „discrimination“. Observing the evolution of international trade in the second half of the 20th century, he finds it in contradiction to the principles laid down in the GATT. Equality then means the absence of preferential treatment of anyone trading partner, a typical problem of multinational trade, while international trade theory and the issue of equality show up in a bi-national framework, already. Lincoln (1990) studies „Japan’s Unequal Trade“, as the title says, implying that the bi-national trade imbalance expresses this unequality. In fact, Japan having been qualified as an „unfair trading nation“ under the US Trade Act of 1988, this unequality has reached the political arena. But Lincoln does not generalise and take up the question of whether any trade balance surplus is a sign of unfairness, in theory. (Nakajima and Izumi 1995) present a measurement of unequal trade between US, Japan, and South Korea. On the basis of national input-output tables they calculate the average labour content of each country’s exports to its partners, and the ratio of these labour inputs is taken as measure of inequality of exchange. Thus US exports to Japan contained 350 manhours/$1000 in 1960, and 64 in 1985. In contrast, Japanese exports to US contained 3030 manhours/$1000 in 1960, and 112 in 1985. The findings „confirm the existence of unequal exchange of labor among nations and show that such unequal exchange among nations decreases with economic development in the case of US, Japan and South Korea.“ (p. 92)

Raffer (1987), Amin (1981) and Emmanuel (1972) are probably the most influental writers about unequal trade, but aiming at criticising standard theory, they offer little material for defining an empirical variable within the framework of national accounts. For this reason we do not enter into details here. More empirically oriented studies have been evoked by the Prebish-Singer hypothesis that developing countries are experiencing falling terms of trade. Somehow this hypothesis has lost publicity in the profession, rermaining at a stage of being

neither corroborated nor falsified (Szirmai, A. 1997, pp 239ff, Koch 1997, pp. 16ff, 65ff). Being most closely related to the data we analyse here we will return to it at a later stage.

Reflecting on what one must consider an unsatisfactory stage of trade theory on unequal exchange one wonders about its reason. Could it be that a deeper problem of concept is involved pointing to an assumption so fundamental that it is always used and never discussed in theory? What is trade for that matter? In national accounts international trade is defined as the set of all product transactions between the resident units within an economic territory and those outside. In forming their sum, and their balance, even, a fundamental assumption is that each and every unit with which the value of the transaction is being measured are equivalent, not only for each individual unit by itself, but also between individuals. It must not matter who buys but only what. The equivalence axiom is contained in the purchasing power of the money used in the transactions, as explained in the previous section. The institution establishing the equivalence is the product market, or as we now can say, the ruling of regular competitive trade. Hence we arrive at a paradox. Trade is the mechanism that establishes equivalence of product values between partners, hence it cannot be unequal, by definition. Free trade, at least, is equal, and as a consequence it is not worth looking at possible unequal trades. This may explain the lack of interest the topic has met in internationmal economics studies, and it marks the point from which our measurement attempt must start.

3. The Concept of "Real Trade Balance" in a Nutshell

As explained above some writers define unequal trade as an international trade exchanging unequal amounts of labour hours as explained above. This is unsatisfactory from an economic point of view, because labour hours are not directly comparable. Labour is a heterogeneous item, and although all labour may be counted in hours this common physical dimension is no proof of economic homogeneity. One still adds apples and pears. The appropriate road to comparison is valuation of thoses hours, and aggregation thereafter.

The economic value of factors is measured by their product, in a market economy. All goods and services created within a year are aggregated, what part of them has been used for intermediate consumption is deducted, the balance yielding the value added to the economy through the factors. The rule that the income of all factors employed (primary income) equals domestic product represents the fundamental equation of the national accounts, on which all other identities are based. Income accounts are derived from production accounts. Aggregate

productivity is thus one, by definition. Stated in more statistical terms, nominal value equals real value in the base year, or in the base country. But how to compare product and income between years or between countries?

To determine a valid standard of value comparison is one of the most noble tasks of economic statistics. For there is no such thing as a natural or absolute measure that would lend itself as a convenient and uncontroversial tool. By-passing the lengthy history and forgotten theory of the issue we may say that the last decade has witnessed a considerable advance in making the values of GDP of nations expressed in different national currencies comparable among one another. It has become general practice to establish purchasing power parities of currencies world wide, and regularly. A complex procedure of individual price observations is moulded into a general framework of transitive parities, allowing consistent bridging of values between any country members of the system.

The economic problem thus brought to light is not easy answer: why do exchange rates of national currencies determined on foreign exchange markets deviate from their purchasing power parities? Should not nominal exchange rates adjust to the conditions of foreign trade, and remain neutral in regard to its terms, in a functioning market? This is not the place for reviewing the arguments that have been advanced for explaining the limitation of the purchasing power parity theorem, - interestingly enough, they do not come from trade theorists so much as from financial experts, in general. For our purpose it is sufficient to recognise that the divergence between nominal exchange rates and real exchange rates exists, due to some market imperfection of open origin, and we ask what this fact means for the countries engaged in mutual international commodity exchange.

If the exchange rate of a national currency is being determined by factors other than trade, how does this affect the value of trade? For a national currency always performs two tasks when it functions properly, it serves as means of payment, and as a measure of value. While monetary theory and policy is concerned with the first, the second is the problem of the national accounts. Purchasing power parities are a statistical device to create a standard of value that can be applied to different national currencies, independently of their foreign exchange rates. Its development is a consequence of the insight that nominal exchange rates are no proper transformation for international value measurement. On the contrary, currencies may be overvalued or undervalued on foreign exchange markets with respect to their intrinsic purchasing power. Nominal exchange rates having been adjusted for purchasing power parity are thus called real exchange rates.

The correction for over- or undervaluation is generally performed for national aggregates such as GDP or GNE. Other subaggregates are less often compared in this way, international trade in particular. Trade flows and trade balances are normally compiled in national currency and then transformed into some international currency by means of exchange rates. This is appropriate within a balance of payment where the two economic circuits of products on the one hand (current account), and finance on the other (capital account) are opposed to each other within thw same monetary environment. But finance is only one aspect, under which international trade is to be studied. Another important aspect is production and the use of resources that is made for the purpose of trade. Therefeore, one would like to measure the benefit a country obtains in terms of resource use through its participation in the world market. This raises the question of the value a domestic product earns when traded abroad.

The value depends on two kinds of variables, the national prices at which the traded goods sell in their home countries, and the exchange rate ruling between the participating currencies. Overvaluation of currency means that a country sells dearer and buys cheaper than at home in the international markets, and vice versa. Measuring the value split throws a light on the position a country takes within the international trading network and its comparative advantage or disadvantage in this setting. In the following we define such a measurem, called real trade balance, relying on published purchasing power parities of national acurrencies.

Converting nominal values of trade flows into real values is not a difficult task, in principle, once the purchasing power parities of national currencies have been established (Reich 2000). You begin by constructing a world table of nominal flows similar to table 1.

Table 1 World Trade by Regions
(in billion U.S. dollars f.o.b., at nominal exchange rates)

	Exports to:	[1]	[2]	[3]	[4]	[5]	[6]	All exports
Exports from:								
1	Developed economies - Europe	1453	275	42	76	81	267	2194
2	Other developed economies	251	606	6	5	34	522	1424
3	Former USSR - Europe	35	8	20	13	1	27	104
4	Other eastern European economies	56	3	7	12	2	8	88
5	OPEC	53	74	3	2	10	57	199
6	Other developing economies	247	480	14	10	52	532	1335
	All imports	2095	1446	92	118	180	1413	5344
	All exports	2194	1424	104	88	199	1335	
	Nominal Trade Balance	99	-22	12	-30	19	-78	

Source: IMF (1998), and own estimates

This table is denominated in US$ where the conversion from foreign currencies has been performed on the basis of nominal exchange rates. Trade balances should thus correspond to the figures shown in the national balances of payment, in principle, showing the need for, or the surplus of, external finance. Actually the aggregation in table 1 grossly underestimates the needed finance, because it shows only the balances between groupings of countries. These are, however, fictitious, since only individual countries have trade balances, and not any of their statistical groupings, and the aggregated balances suppress the flows within each aggregate. In order to gain a correct impression of the means needed to finance international trade a flow table between all countries coining their own currency must be established. This will be done in chapter 5. Table 1 serves just as an illustration of the larger and correct exercise.[1]

If we interpret deviation of real exchange rates of national currencies from their nominal exchange rates as being caused by market imperfections we may measure these distortions by means of an analytical revaluation. This does not mean finding exchange rates that would prevail in case equilibrium between countries were installed, a question that could only be answered within a full fledged general equilibrium model. We simply assume that the average is the equilibrium, more precisely we assume that the purchasing power adjusted GDP measures the production of a country, and the real value of the resources it employs. The product includes the exports of a country so that their real value must also be measured in terms of real exchange rates. Countries of equal purchasing power parity are thus in mutual equilibrium,

[1] It also may serve as a kind of political grouping, because trade imbalances occuring between members of different groupings might be treated in a different way than imbalances within each of these groupings.

exchanging an even share of real resources. Countries of unequal purchasing power parity are not in equilibrium with each other, the purchasing power parity difference measuring the degree of disequilibrium due to market imperfection. Re-valuing all exports in this way by multiplying the rows of table 1 by the respective purchasing power parities using some gross purchasing power estimates transforms table 1 into table 2. The parities are normalised to US$ so that the second row remains unchanged, the first row increases the others decrease in value. Total world trade comes out higher than before, 7449 against 5344 billion US$.

Table 2 Resource Flows in World Trade
(in billion U.S. dollars f.o.b., at real exchange rates)

	GDP Price Level (estimated from Kravis and Lipsey 1983)	1,10	1	0,7	0,6	0,5	0,4	
	Trade in real terms (valued at purchasing power parity of national currencies)							
		Exports to:						
	Exports from:	[1]	[2]	[3]	[4]	[5]	[6]	All exports
1	Developed economies – Europe	1321	250	38	69	74	243	1995
2	Other developed economies	251	606	6	5	34	522	1424
3	Former USSR – Europe	50	11	29	19	1	39	149
4	Other eastern European economies	93	5	12	20	3	13	147
5	OPEC	106	148	6	4	20	114	398
6	Other developing economies	618	1200	35	25	130	1330	3338
	All imports	2439	2220	125	142	262	2261	7449
	All exports	1995	1424	149	147	398	3338	
	Real Trade Balance	-444	-796	23	5	136	1077	

Comparing table 2 to table 1 you find significant changes in the trade balances. The posive trade balance of developed economies in Europe (group 1) turns highly negative when converted to real exchange rates, while “other developing economies” (group 6) show a tremendous surplus. They sell under value, in the sense that market exchange rates do not reflect productivity of the domestic resources. This is not to say that nominal exchange rates are wrong, and real ones the correct exchange rates, in their place. Both together are the result of disequilibrium between production, on the one hand, and exchange, on the other, in the world economic system. The question of how to pave the way for equilibrium between production and exchange together, in world trade, is not to be answered by means of a pure accounting analysis.

4. THEORY OF DISADVANTAGE

The disparity of currency values between high and low income countries did not go unnoticed in economics, once it was discovered and established in statistics. The explanation, furnished by the discoverers (Kravis, Lipsey 1983) and taken over in international trade thinking (Krugman/Obstfeld 2000) makes use of a distinction between tradable and untradable goods. For the first the law of one price applies. Tradable goods are sufficiently homogeneous and delivered internationally, so that a world market exists enforcing the same price in every country. For untradable goods prices differ, because not trading abroad, national markets are seggregated and able to sustain different prices in different countries. The correlation between low currency value and low per capita income is then explained as a combination of productivity and wage differentiation. Low productivity in the activity of tradable goods entails low wages. The low wages in the production of tradable goods induce equally low wages in the activities not traded, even if their productivity is equal to that in high income countries. The low national wage rates result in a low national price level, and thus create the high internal purchasing power parity of the currency.

Independently of whether this explanation is true or not, it addresses the causes of the observed correlation, not its effect and implication for the country. When in a trading situation the good of one supplier is devalued at the instance it reaches the market, because it earns a foreign money of different purchasing power, this is a comparative disadvantage in trade, and must be taken into account in dealing with the economics of the situation. In order to develop and explain this line of thought we introduce a schematic input-ouput model of an economy, unrealistic in its simplicity, but suited to explain the envisioned disadavantage.

Table 3 Schematic Input-Ouput Tables of Two Trading Countries

A-land
(bill. A-marks)

Product	Branch 1	2	3	Consum-ption	Exports	Imports
1				100		100
2					100	
3				100		
Value added		100	100			

B-land
(bill. B-marks)

Product	Branch 1	2	3	Consum-ption	Exports	Imports
1					100	
2				100		100
3				100		
Value added	100		100			

Both countries are equal except that one operates in A-marks, the other in B-marks, and they specialise and trade. A-land produces good 2 for B-land, and B-land produces good 1 for A-land. Good 3 is not traded but produced and consumed nationally. The balance of trade is in equilibrium, if the exchange rate is 1, so that one A-mark exchanges for one B-mark at foreign exchange markets. Neither capital formation is considered nor intermediate consumption, for reasons of transparency.

If the pricel levels are also 1 in each country, purchasing power parity is 1, nominal and real values coincide, there is no disadavantage for either side. Now assume that the price level in country B is 0.5. This raises the purchasing power parity of B-marks to twice that of A-marks, meaning that a B-mark buys twice as many goods in B-land as an A-mark does in A-land. GDP of B-land will be counted twice that of A-land in World Bank tables. On the other hand, an A-mark when exchanged into B-marks buys twice the goods in B-land it does at home so that the real value of exports from B-land to A-land is twice that of exports in reverse. The real balance of trade is now positive for B-land, namely 200-100 = 100 A-land marks at purchasing power parity.

What is the meaning of the word „real value“ in this context? With price level at 0.5 the volume of value added and GDP of B-land rises to 200 measured in A-marks. It describes the consumption forgone in B-land in producing its exports. Real value measures the opportunity costs of applying national resources to exports instead of domestic use. For A-land these costs are only half of B-lands costs, measured in its GDP. Hence B-land exports more value of resources than it receives from abroad in exchange. The balance of trade if converted to purchasing power parity values shows the net outflow.

The situation pictured in table 3 is perfectly explicable in terms of the tradable-nontradable dichotomy. Assume that population and employment in B-land are thrice that of A-land. Productivity is thus one third in the tradable goods branch 1 compared to productivity in A-land in branch 2. Prices being equal the same value added is produced by three time the employment in B-land as compared to A-land. The wage (or wage rate, which difference does not matter here, as we consider working hours being fixed) drops to one third. This then extends to the branch of non-tradable goods, where productivity is equal to that in A-land. But prices of these goods adjust to the low wage, dropping too one third also. Thus we have an equal volume of tradable goods, and three times the volume in non-tradable goods, which in the average yield a double volume of GDP, and half the price level of A-land, for B-land.

The picture also shows the sources of disequilibium. Labor of different productivity is paid the same wage in B-land, while labor of the same productivity is paid different wages between B-land and A-land, a clear sign of labor market imperfection for whatever reason. National accounts are concerned about the existence of such disequilibria. The European System of Accounts draws a clear line of admissible price valuation when the law of one price is violated: “The existence of observed unit value differences is not to be considered an indicator of differences in quality when the following circumstances apply, namely lack of information, price discrimination reflecting limitations in the freedom of choice and the existence of parallel markets” (ESA para. 10.19). Paralell markets for the same quality of labor is what we observe in the international economy. A wage differential not explained by productivity is a transfer of income, by definition.

Taking this to its limits the exercise of accounting in real terms in contrast to nominal terms is questionable as contradicting its own premise, because neither of them are equilbrium values, evidently. But as long as equilibrium is not too far away, such procedures seem to be generally accepted. Real trade balances are not “true” trade balances in any superior sense over nominal ones, but an indicator of first approximation to measuring the existing disequilibrium.

Ricardo's theory of comparative adavantage can be accomodated within this framework, as is to be expected. On the assumption that the division of labor described in table 3 has been created in accordance with the Ricardian law, we may infer that opportunity costs of product 1 against product 2 must be higher in A-land than in B-land, else the specialisation would not have taken place. Ironically, the feature that makes the theory famous, namely that it is advantageous for the more productive country to trade with a less productive one, also holds in reverse. A less productive country may obtain benefits from more productive ones if it manages to maintain a high external value of its currency. Still one may ask why country B trades, as there is an obvious disadvantage, and again by inference we can say that autarcy would probably be worse. To produce good 2 at home would require even resources than to buy them at unfavourable terms of trade. Thus, the two countries' trade is situated within the price limits set by the Ricardian paradigm, and yet there is a disadvantage.

How does the issue of terms of trade, and the Prebish-Singer hypothesis associated with it, relate to this alanysis? Imagine that prices of product 1 are lower by 10%, while those of product 2 are by so much higher, the corresponding volumes changing complementarily so that trade values remains the same. Also assume that purchasing power parity remains constant, which implies that other prices must have moved in the opposite directions, of course but with view to products 1 and 2 the nominal and the real balances remain untouched. As long as the law of one price holds, i.e. as long as domestic prices are equal to foreign prices no real trade balance effect occurs. It is only when the law is out of force and the economy of the two countries in disequilibrium that the real trade balance shifts away from its nominal counterpart. Under this aspect the pure study of terms of trade changes is not very relevant, indeed, and the Prebish-Singer hypothesis inconvincing for lack of sufficient value theoretic foundation. If you want to define a distributive disadvantage you cannot account for the value of trade without paying attention to the monetary rod with which the value is being measured. Changing commodity terms of trade are a normal phenomenon in a dynamic economy, as well as between them, and a sign of flexibility towards equilibrium rather than of a structural advantage or disadvantage to anyone party involved – the computer industry being just one conspicuous example.

5. Detailed Real Trade Flow World Table

Constructing a detailed world table of international trade flows, simple as it is in theory, is not an easy task, in practice. Data about international trade relationships are far from being complete, so that extrapolations must fill in figures where data are not available. And even where there are data their reliablity is difficult to assess due to the need of applying averaged exchange rates of currencies that may be highly volatile. There is the well-known fact that registered world total of exports and of imports do not coincide. More severely, trade flows between countries, may differ depending on whether sender or receiver are collecting the figures. Thus what is represented in the annex as a world table of real trade flows is a first trial useful for estimating orders of magnitude of revaluation effects, but not the final version of a project. Tables 5 and 6 summarise the findings by comparing real trade balances of major trading countries with their nominal trade balances.

Compilation has proceeded as follows. A data set from HWWA has served as the basis, providing figures on exports and imports between 22 OECD countries as well as six non-OECD countries for trade in goods. In addition 25 other countries are being reported on by the named countries as either senders or recipients of trade in goods flows. A figure for total trade is also given. These were the raw data for the flow table.

Different compilation problems arose responding to different data situations. For those countries that reported and were reported two figures exist that do not coincide usually, one reason being that exports are reported fob, and imports cif. In the absence of any additional information the average of figures has been entered into the flow table. Some countries in the data set show import into themselves or exports to themselves, the meaning of which is not clear and could not be explained by the producers on demand. Assuming that it has to do with the difference between general trade and special trade these self-routed flows have been distributed in proportion of the known flows and added to them. This completed the interflow table for the the 28 reporting countries. As a result of the averaging the sum of these flows deviated from those reported in the data. Assuming that the total of exports and imports is more reliable than the country repartition, the difference has been distributed proportionately to the trade with those 25 countries that were being reported without reporting themselves. In the absence of any pertinent information no flows were entered for trade between these countries. All the non-accounted trade is thus registered with the residuals of the rest of the world. All in all one may say that under the constraint of given resources internal consistency has been accorded priority over external fidelity in constructing the world table, which then must be read as conveying an idea rather than representing a data set at its present stage.

Once the nominal trade matrix has been established, its transformation into real values is straight forward, applying given purchasing power parities from (World Bank 2002) as explained in section 4. For each country the row of its exports is multiplied by the corresponding index of purchasing power parity compared to the US-dollar. It is customary to remain at the stage where the currency of one specific country serves as the numeraire. At second thought, however, this practice is neither politically correct, nor theoretically reasonable. Although in terms of pure measurement and ranking the choice of a speccific national currency is irrelevant, of course, it is not so when it comes to international politics, where such choice provokes a connotation of asymmetry that is unwarranted and deliberately avoided in this field. On theoretical grounds, choosing the US-dollar as numeraire raises the value of real world GDP from 31,315 $billion to 44,459 $billion (World Bank 2002). As said above it is the fundamental axiom of national accounts that value can be created and added only through production. Revaluation is not production. Hence world GDP in real terms must not be larger than it is in nominal terms, this being the actually transacted value figure. Renormalising the compiled real values in this way makes the US dollar worth 31,315/44,459 = 0.7 international dollars.

Table 5
Trade flows of major trading nations in nominal terms
(trade in goods, year 2000, billion US-dollars at current exchange rates)

Country	GDP	Exports	Imports	Trade Balance	
				absolute	in percent of GDP
Australia	388	64	68	-4	-1
Austria	205	62	67	-5	-3
Belgium	252	185	172	13	5
Canada	650	278	240	38	6
Denmark	172	50	44	5	3
Finland	130	46	34	12	9
France	1.438	296	304	-8	-1
Germany	2.064	550	501	49	2
Greece	126	11	30	-19	-15
Ireland	86	76	51	26	30
Italy	1.163	239	237	2	0
Japan	4.519	479	380	100	2
Netherlands	398	180	175	5	1
New Zealand	50	13	14	-1	-2
Norway	155	60	34	26	16
Portugal	111	24	40	-16	-14
Spain	595	113	153	-40	-7
Sweden	241	87	73	14	6
Switzerland	274	80	83	-2	-1
Turkey	202	28	55	-27	-13
United Kingdom	1.460	285	340	-56	-4
United States	9.602	782	1.218	-436	-5
China	1.063	249	225	24	2
Czech Rep	54	29	32	-3	-6
Hungary	47	28	32	-4	-8
Korea Rep	421	172	160	12	3
Mexico	497	165	171	-6	-1
Poland	162	32	49	-17	-11
Algeria	48	16	8	8	17
Argentina	276	11	12	-1	0
Bangladesh	48	6	3	3	7
Brazil	610	44	36	8	1
Chile	70	16	9	7	10
Colombia	85	11	7	4	5
Egypt	95	5	13	-8	-9
India	455	32	24	9	2
Indonesia	120	54	20	34	29
Iran Islm.R	107	19	9	10	10
Israel	104	28	28	0	0
Malaysia	79	76	37	40	51
Nigeria	33	18	5	13	41
Pakistan	61	7	4	3	4
Peru	53	5	3	2	3
Philippines	79	35	26	9	12
Romania	37	10	10	-1	-2
Russian Fed	241	73	26	47	20
Saudi Arabia	150	59	23	36	24

Singapore	99	59	61	-3	-3
South Africa	129	25	18	7	6
Thailand	122	54	29	24	20
Ukraine	35	7	5	1	4
Venezuela	104	24	10	14	14
Viet Nam	30	11	6	5	17
Rest of the world	1.521	506	462	44	3
Total	31.315	5.875	5.875	0	--

Source: HWWA WORLD MATRIX of Sectoral Economic Data, http://www.hwwa.de/wmatrix, and own calculations.

Table 6
Trade flows of major trading nations in real terms
(trade in goods, year 2000, billion international dollars at current purchasing power parities)

Country	GDP	Exports	Imports	Trade Balance	
				absolute	in percent of GDP
Australia	337	55	84	-29	-9
Austria	151	46	65	-19	-12
Belgium	199	146	174	-28	-14
Canada	589	252	210	42	7
Denmark	102	29	43	-13	-13
Finland	89	31	38	-6	-7
France	1.013	208	299	-91	-9
Germany	1.442	384	556	-172	-12
Greece	125	11	33	-22	-18
Ireland	68	61	43	18	26
Italy	954	196	266	-70	-7
Japan	2.420	257	620	-364	-15
Netherlands	290	131	167	-35	-12
New Zealand	50	13	15	-3	-5
Norway	94	36	33	3	3
Portugal	120	26	38	-12	-10
Spain	535	102	158	-56	-10
Sweden	150	54	66	-11	-7
Switzerland	154	45	75	-29	-19
Turkey	323	44	72	-27	-8
United Kingdom	991	193	343	-150	-15
United States	6.763	551	1.534	-984	-15
China	3.487	818	291	527	15
Czech Rep	100	54	36	18	18
Hungary	85	50	39	11	14
Korea Rep	576	236	210	25	4
Mexico	606	202	143	59	10
Poland	245	48	62	-14	-6
Algeria	108	36	6	30	28
Argentina	314	13	10	3	1
Bangladesh	147	19	3	15	10
Brazil	876	63	29	34	4
Chile	97	22	8	14	15
Colombia	180	24	5	18	10
Egypt	166	8	11	-3	-2

India	1.673	119	20	99	6
Indonesia	420	190	20	171	41
Iran Islm.R	265	47	8	39	15
Israel	85	23	22	0	1
Malaysia	137	133	30	103	75
Nigeria	72	40	5	36	50
Pakistan	181	20	4	16	9
Peru	85	8	3	5	6
Philippines	225	100	21	79	35
Romania	101	26	9	17	16
Russian Fed	821	249	24	225	27
Saudi Arabia	166	66	19	47	28
Singapore	70	42	52	-11	-15
South Africa	276	54	14	39	14
Thailand	270	119	23	96	36
Ukraine	129	25	5	20	16
Venezuela	98	23	8	15	15
Viet Nam	111	41	7	34	31
Rest of the world	2.185	726	436	291	13
Total	31.315	6.515	6.515	0	--

Source: HWWA WORLD MATRIX of Sectoral Economic Data, http://www.hwwa.de/wmatrix, and own calculations.

Having stressed before that these tables are too inexact not be used for politics they may nevertheless be interesting for theory. Assume the figures were true what conclusions would one draw from them?

At first glance the impression gained from the back-of-an envelope tables 1 and 2 is being confirmed. If exports are valued in terms of the opportunity costs of domestic resource uses, e.g. domestic consumption foregone, the trade balances of OECD countries decrease while those of the others increase. In other words the economic principle of "buy cheap and sell dear" is well observed by the first group, and less so by the second.

Looking at specific countries the three biggest traders US, Japan, and Germany, form an interesting triade. The US trade deficit increases from -4.5 to –14.5 percent of its GNI, importing 984 billion $ of world resources, while owing only for 436 billion $[2]. Japan, the second largest economy, while appearing as a creditor from its nominal trade balance, +2.2 percent of GNI, also becomes a heavy importer of world resources, -15 pecent of GNI, and so does Germany with a move from +2.4 to –11.9 percent of GNI. The three countries together consume a real value of 5116 $billion dollars of world resources more than they produce.

[2] In this comparison a dollar, whether US or international, represents 1/ 33 billionth of workd GDP, either nominal or real.

Major net resource exporters are Indonesia, the Russian Federation and above all China with 527 billion dollars producing more than its consumes, 15.1 percent of its GNI. The amount supplied by the Russian Federation of 225 billion $ is only half of that, but stands for a quarter of GNI (27.4 percent). For Indonesia its net real export of 171 Bbillion $ makeas up even 40.7 percent of GNI. Exports are goods produced, but not consumed domestically. Their real value is the domestic use foregone in producing them. Through the mechanism of divided labour markets explained before these exports are undervalued when they reach the international market, and revaluation in terms of national purchasing power parity shows the distortion.

There are also countries which take a neutral position in this international economic power game. As defined above, trade is equal when nominal and real trade balance coincide, because in that case the value of the resosurces transferred abroad corresponds to that of the financial claims created with it. Examples are Ireland, Argentina, and Israel, the first running a heavy trade surplus (29.8 and 26.1 percent of GNI respectively), the second and third having their trade fully equilibrated (-0.3 and +0.9 percent of GNI respectively for Argentina, and 0.0 and 0.6 percent of GNI for Israel). One could infer that for these currencies their foreign exchange value is determined by their use for trade only.

Over all countries together, the correlation between nominal and real trade balances is 74%, confirming the interdependence discovered by the PPP researchers (Summers, R., Kravis, I.B., Heston, A. 1980), and indicating a general, loose rule of purchasing power parity over foreign exchange markets. Our example thus leads to the typical dialectical situation in economics: from the tables 5 and 6 you may infer that foreign exchange markets perform fairly well in creating economic equilibrium, but you may also arrive at the opposite opinion namely that they allow for, and perhaps even generate, systematic asymmetries and disequilibria.

6. CRITIQUE

The inequality pointed out in this paper between nominal value and real value, value in exchange if you will and value in resources, of international trade is a statistics index of disequilibrium between conditions of the market and those of production in the world economic system. Although the figures provided are value type figures they represent no equilibrium values themselves. Thus they have no direct implication for judging the welfare or the efficiency of a nation operating within the system, or designing an equilibrium that may be

erected in its place. In particular, they do not provide direct arguments either for or against the politics and economics of globalisation.

They may, however, work as a challenge to international trade theory. The traditional division into a discipline of real economics, on the one hand, and financial economics, on the other is inappropriate when it comes to measuring the values involved in either, since money provides the measuring rod for both. Purchasing power parities establish a non-monetary consistent measuring rod over the production of the world economy that can be held against the values determined on foreign exchange markets, and are determined by the needs of foreign trade only partially. (Klein 2003) offers a suggestion of how to link the two areas within an input-output framework.

A subtile accounting problem may be raised in that the trade balance forms part of GDP of a nation, and it enters into the determination of purchasing power parity, therefore. The link between real trade balances as have been constructed here, using existing parities, and the method of how the same balance is incorporated in those parities (Summers, R., Kravis, I.B., Heston, A. 1980, p. 23) has not beeen touched upon in this paper, but must be clarified, eventually.

Also the method of compiling world trade tables needs to be much more refined. Perhaps the apparent detour of introducing a third dimension of product classes besides exporter and importer might lead to more reliable constructions, in the way make and use matrices are employed within the national accounting framework.

Finally, the whole compilation exercise is based on the concept of one global world economy, meaning that nations are comparable in their economic performance, and products are international. As a consequence its use can only be recommended as farg as this basic assumption of statistical comparability is deemed to hold.

References

Amin, S. (1973), L’échange inégal et la lois de la valeur, Paris.

Bhagwati, J. (1998), Lectures on International Trade, MIT Press, Cambridge, Mass.

Emmanuel, A. (1972), Unequal Exchange. Astudy of Imperialism of Trade, New York, London.

ESA 1995, European System of Accounts, European Communities, Luxembourg 1996.

Horvat, B. (1999), The Theory of International Trade: an Alternative Approach, Macmillan, Basingstoke.

HWWA WORLD MATRIX of Sectoral Economic Data: http://www.hwwa.de/wmatrix.

IMF (1998), International Monetary Fund, Distribution of Trade Statistics Yearbook, Washington D.C.

Klein, L.R. (2003), Some Potential Linkages for Input-Output-Analysis with Flow-of-Funds, Economic Systems Research 15 (3), pp. 269-278.

Koch, E. (1997), Internationale Wirtschaftsbeziehungen, Bd.1, Internationaler Handel, Franz Vahlen, Munich.

Kravis, I. B. and Lipsey, R. E. (1983), Toward an Explanation of National Price Levels, Princeton UP, Princeton. N. J.

Krugman, P. O. and Obstfeld, M. (2000), International Economics. Theory and Policy, Addison-Wesley, Reading, Mass.

Lincoln, E. (1990), Japan's Unequal Trade, Brookings Institution, Washington D.C.

Mikic, M. (1998), International Trade, St. Martin's Press, New York.

Nakajima, A. and Izumi, H. (1995), Economic Development and Unequal Exchange among Nations: Analysis of the U.S., Japan, and South Korea, Review of Radical Political Economics 27(3)86-94.

Negishi, T. (2001), Developments of International Trade Theory, Kluwer, Bosten, Dordrecht.

Pomfret, R. (1988), Unequal Trade. The Economics of Discriminatory International Trade Policies,Blackwell, Oxford.

Raffer, K. (1987), Unequal Exchange and the Evolution of the World System, Macmillan, Basingstoke, England.

Reich, U. P. (2000)), Inequality of Value in International Trade. An Input-Output Approach, Szigma XXXI, 107-119.

Summers, R., Kravis, I.B., Heston, A. (1980), International Comparison of Real Product and its Composition: 1950-77, Review of Income and Wealth 26(1), pp.19-66.

Szirmai, A. (1997), Economic and Social Development. Trends, Problems, Policies, Prentics Hall, London.

Winters, L. A. (1991), International Economics, fourth edition, HarperCollinsAcademic, London, UK.

Wood, A. (1994), North-South Trade, Employment and Inequality. Changing Fortunes in a Skill-Driven World, Clarendon Press, Oxford.

World Bank (2002), World Development Indicators, Washington D.C.