TRAMES, 2001, **5**(**55/50**), 4, 345–354

https://doi.org/10.3176/tr.2001.4.05

IS THE LAT EXCHAGE RATE CORRECT?

Nicholas W. Balabkins and Frank R. Gunter

Lehigh University

Abstract. Article opens with a discussion of Cassel's purchasing power parity (PPP) analysis and the difficulties of estimating absolute PPP for developing countries. Then the PPP value of the year 2000 Lat as well as the currencies of Estonia and Lithuania are estimated using The Economist "Big Mac" Index. The Lat is found to be approximately 31% undervalued compared to the U.S. dollar. Capital flight and several other causes of the apparent undervaluation of the Lat are considered. The impact of this undervaluation on the components of the Latvian balance of payments and economic growth is discussed.

> *"As long as anything like free movement of merchandise and a somewhat comprehensive trade between the two countries takes place, the actual rate of exchange cannot deviate very much from this purchasing power parity. Even restrictions of trade will not cause the rate of exchange to move from this purchasing power parity as long as they strike the trade in both directions equally."* (Cassel, 1918, p. 413)

1. Introduction

Since its declaration of independence in August 1991, Latvia set out to revamp its former societal structure. The process aimed at creating a new social order based on multi-party democracy, a market-driven economy, privatized means of production, an independent judiciary, and certainty of the legal framework. The revamped societal structure would take the form of "welfare capitalism", the foundations of which were laid by the German "Verein für Socialpolitik" and written into the law by Bismarck's Germany in 1883, 1884, and 1889. Latvia also abolished the former Soviet ruble and introduced the new Lat currency. In sharp contrast to the experience of some "post-communist" transition economies in Eastern Europe, the Lat currency has remained remarkably stable. It stayed within a range of .54 and .59 Lats/$ between the end of 1993 through the end of 1999, before depreciating about 3% during 2000 to .61 Lats/$. (Bank of Latvia, Monthly Bulletin, December, 2000:6)

This paper examines the issue of whether the 2000 Lat value reflects its exchange rate properly and/or is consistent with the purchasing power concept, developed originally by the Swedish economist Gustav Cassel during the first two decades of the 20th century. As is well known, an exchange rate is a price in domestic currency for a unit of a foreign currency and, as such, it is one of the most crucial prices in international economics. An exchange rate is also a nexus among the economies of different countries. Exchange rates change in response to fluctuations in the debits and credits in a country's balance of payments, and these fluctuations change, in turn, the value of merchandise trade and magnitude of other components of balance of payments.

Exchange rates also impact international comparisons of two countries' per capita income. The most common method of comparison is to multiply per capita income by the nominal exchange rate. However, this method ignores differences in cost of living. When one takes account of these differences, one reports per capita income in purchasing power parity (PPP) terms. One method for making the PPP adjustment for cost of living is based on the humble hamburger. Fifteen years ago, *The London Economist* launched its Big Mac Index "as a lighthearted guide"... to check... "whether currencies are at their correct exchange rate." Such an index was supposedly created to make economic theory "more digestible". Using this "Burgonomics" method, we shall examine whether the current Latvian Lat is at its "correct" exchange rate.

2. Cassel and the Purchasing Power Parity Index

Widespread interest in the Purchasing Power Parity (PPP) hypothesis began with Gustav Cassel's study of exchange rate changes during the First World War. In its absolute form, PPP states that "… the rate of exchange between two countries will be determined by the quotient between the general levels of prices in the two countries." (1916:62) The reasoning behind absolute PPP is straightforward with respect to a single traded good. Using Ingo Walter's example (1968:232–235), assume that in December 2000, it costs $1.00 to produce a pen in the United States and .61 Lats to produce a pen of the same quality in Latvia. If the exchange rate were .61 Lats per U.S. dollar then a purchaser would be indifferent between purchasing a pen in Latvia or the U.S. Now assume that there is a large-scale flow of capital into Latvia in the form of investment, loans or transfer payments. One would expect the Lat to appreciate to, for example, .5 Lats/$. A U.S. pen would still cost $1.00, but the Latvian pen of equal quality would cost $1.24 (.62/.5) resulting in U.S. pen suppliers enjoying a significant competitive advantage.

Cassel also developed the concept of relative PPP that states that the rate of change (appreciation or depreciation) in the exchange rate of a currency is determined by the difference in the rates of inflation of the two countries. (1916:62) For example, in 2000 the Russian inflation rate was 19%, the Latvian inflation rate was 1.8% and, if relative PPP holds, one would expect the ruble to depreciate about 17% against the Lat. (See the appendix for a mathematical treatment of absolute and relative PPP.)

Over the last eighty years, numerous attempts have been made to test statistically whether or not the PPP theory holds. The majority of the empirical studies used data from the industrial developed countries with the dollar exchange rate being the most common rate analyzed. While studies that used very long sample periods provide some support for the existence of PPP, research that focused on shorter periods of time tended to find significant disparities between relative prices and exchange rates. (See Dornbusch 1992:236–244; Breuer 1994:245–277; and Rogoff 1996:647–668 for overviews of PPP research.)

Of course, a country's exchange rate reflects not only the effect of demand and supply of traded goods and services, but also the impact of changing capital flows. An unexpected outflow of capital would tend to lead to a depreciation of the national currency. However, the important role of capital flows does not prevent the appearance of PPP if there is sufficient trade arbitrage. For example, the depreciation that results from a capital outflow will encourage exports and discourage imports. These trade effects will tend in most cases to raise costs in the exporting state while encouraging a gradual cost decline in the importing state until PPP is restored. As will be discussed below, it is possible that barriers to trade arbitrage will prevent PPP from occurring in the short run even if there is a tendency in that direction.

Further complicating any estimation of PPP is the large number of traded and non-traded goods combined with significant restrictions on trade. This raises complex issues of which goods should be included in a nation's goods "basket" and the proper weight and prices of the included goods. In addition, the Balassa-Samuelson effect, imperfectly flexible wages and prices, and the impact of real changes in the economies on the real exchange rate may all act so as to prevent the appearance of PPP.

Because of the difficulty in obtaining data on the actual prices for the same basket of goods in different countries, relatively little empirical work has been done on absolute PPP. Among the few absolute PPP studies are those of the Penn World Tables (see Summers and Heston, 1991), Crownover, Pippenger and Steigerwald (1996), the Pakko and Pollard (1996) study, and the *Economist* PPP comparison (April 29, 2000:75). The Crownover et al study uses a price index developed by the German diplomatic service to determine the cost of purchasing the market basket of the typical German household in six foreign countries. Both the Pakko and Pollard and the *Economist* studies use the Big Mac hamburger as their one commodity for estimating PPP.[1]

Despite its seeming simplicity, the use of the Big Mac hamburger has several advantages. First, the McDonald's Corporation attempts to ensure that the Big Mac is perceived to be exactly the same in both quality and quantity regardless of where it is consumed. In other words, the Big Mac is as homogeneous as is reasonably possible. Second, a Big Mac not only incorporates beef, flour, lettuce, etc. but also is prepared and served similarly in every country. The Big Mac should therefore be looked upon not as a single simple product but as a fairly inclusive market basket of products and

[1] In addition to a biannual (January and April) estimation of the degree of exchange rate under or overvaluation, the Economist has also used its Big Mac Index to examine the proper value of the euro (Dec 11, 1999) and Asian currencies (Nov 1, 1997).

services weighed according to an extremely specific recipe. Finally, since the Big Mac is available in about 120 countries, absolute PPP comparisons can be made for most countries. (Gaps in coverage exist for very poor nations and countries like India that have religious prohibitions against beef consumption.)

The biggest disadvantage of the Big Mac as a guide to PPP is that it is basically a non-traded good. Only if a foreign tourist decides to visit the Golden Arches in another country would the consumption of a Big Mac show up in the international transactions accounts. However, many of the factors used to produce the Big Mac are traded internationally and therefore one would expect some indirect arbitrage to occur.

In fact, although the Big Mac Index is based on a single good and the Penn World Tables are based on a market basket of approximately 150 goods, the correlation between the two is relatively high, 0.85. (Pakko and Pollard 1996, p. 6) In the annual *Economist* summary, the Big Mac PPP results are only published for about thirty countries. However, one can make PPP estimates for any country where the Big Mac is sold including Latvia, as well as its neighbors, Estonia and Lithuania.

3. "Burgonomics" Index

Although the estimate of the hamburger PPP can be performed for any pair of countries, the analysis below is limited to comparisons with the U.S. dollar. U.S. – Latvian trade is relatively small, the U.S. was Latvia's tenth most important trading partner in 1998. (IMF 1999:291–292) However, the dollar – Lat exchange rate is more important than bi-lateral trade indicates. In addition to the 11% of total Latvian exports and 8% of its imports accounted for by the U.S. and the sixteen countries that have fixed their currencies to the U.S. dollar (including Lithuania since April 1994), one must also consider the impact of international trade in homogeneous goods, such as energy, metals, agricultural products, etc. which are traditionally denominated in dollars. In addition, a significant amount of Latvian trade in heterogeneous goods and services with non-European countries is also dollar denominated. In fact, the Latvian Central Bank estimated that almost 47% of all 1998 Latvian trade was dollar denominated with the German DM in second place with a little more than 25%. Combine this with the dominance of the U.S. dollar in international capital transactions and the focus on the Lat/$ exchange rate is understandable.

To estimate the hamburger PPP for any country, Latvia for example, only three pieces of data are necessary. One needs the current local currency Big Mac price (1.04 Lats per Big Mac in Riga in 2000), the Big Mac price in the U.S. ($2.51 per Big Mac), and the exchange rate (.594 Lats per U.S.$ in April 2000). Dividing the Latvian Big Mac price by the U.S. Big Mac price gives an estimate of the Implicit PPP Exchange Rate (.41 Lats/$). The difference between this implicit rate (Column C in Table 1) and the actual exchange rate (Column D) means that the price in U.S. dollars to a tourist of a Latvian Big Mac is only $1.75 (Column B) compared to the $2.51 price in the U.S.A. Since the actual exchange rate is .594 Lats per U.S.$, this calculation leads to the

conclusion that the Lat is currently undervalued by approximately 31% ((.41–.594)/.594) = –.31) (Column E).[2]

Big Mac PPP for Northern and Eastern Europe

	A		B	C	D	E
	Price in Local Currency		Price in U.S. $	Implicit PPP Exchange R.	Actual Exchange R.	Valuation* Against $
Latvia	1.04	Lats	$1.75	0.41	0.594	–31%
Britain	1.90	£	$3.00	1.32	1.58	+20%
Czech Rep.	54.37	Koruna	$1.39	21.7	39.1	–45%
Denmark	24.75	DKr	$3.08	9.86	8.04	23%
Estonia	26.5	Krooni	$1.59	10.56	16.69	–35%
Euro Area	2.56	Euro	$2.37	0.98	0.93	–5%
France	18.5	Ffranc	$2.62	7.37	7.07	4%
Italy	1500	Lira	$2.16	1.793	2.088	–14%
Germany	4.99	DM	$2.37	1.99	2.11	–6%
Hungary	339	Forint	$1.21	135	279	–52%
Lithuania	6.55	Litai	$1.64	2.61	4	–33%
Poland	5.5	Zloty	$1.28	2.19	4.3	–49%
Russia	39.5	Ruble	$1.39	15.7	28.5	–45%
Sweden	24	SKr	$2.71	9.56	8.84	8%
Switzerland	5.90	SFr	$3.48	2.35	1.70	39%
United States	$2.51	$	$2.51			

* Undervaluation (–) or overvaluation (+).

Sources: Latvia, Estonia and Lithuania estimated by authors. All others from *The Economist*, April 29, 2000, p. 75.

It is interesting to note that this undervaluation actually increased in 2000. From 1994 through 1999, a Big Mac in Riga cost 1.07 Lats, which was consistent, in 1999, with an undervaluation of 26%. Note that the currencies of both of Latvia's Baltic neighbors, Estonia and Lithuania are also undervalued by similar percentages, 35% and 33% respectively. This is consistent with the world pattern that, with the exception of South Korea, the currencies of emerging markets tend to be undervalued while those of the developed markets of Europe, North America, and Japan tend to be overvalued.[3]

It should be noted that there is an implicit assumption in the table that the market structures of all of these countries are similar e.g. they are all reasonably competitive or all reflect roughly the same degree of oligopoly. This assumption is important because

---

[2] For a detailed discussion of the Big Mac exchange rate estimation method, see "Big MacCurrencies" *The Economist*, April 29, 2000, p. 75.

[3] The only exception being Israel which was 36% overvalued at the end of 2000 but 43% undervalued April 2000. See Economist, 2001, p. 110; Economist, 2000, p. 75; and Pakko and Pollard, 1996, p. 13.

price parity is really an equality of marginal revenues. If markets in developing countries were oligopolistic while those in developed countries were more competitive, this may partially explain the pattern of undervaluation in developing countries.

4. Causes and Policy Implications

If the 26% undervaluation of the Lat is roughly accurate, three questions become important. First, what caused Latvia to have an undervalued exchange rate? Second, will Latvia begin to move towards its PPP exchange rate? And finally, if Latvia moves towards its PPP exchange rate value then what will be the impact of a fairly large appreciation of the Lat?

The question of the causes of the Lat's undervaluation must begin with the balance of payments. If Latvia were experiencing a long-term capital outflow then this would depress the exchange rate leading to apparent undervaluation. In order to shift their assets to another country, portfolio holders must sell Lats for another currency such as the U.S. dollar. This would have the effect of leading to a depreciation of the Lat with respect to the dollar. The official statistics (Bank of Latvia, Balance of Payments, 2000) reveal some evidence to support the potential for large-scale capital outflows. While direct investment by Latvians in other countries seems to be relatively unchanged, portfolio investment in other countries has increased sharply from a positive $58 million in 1999 (the positive value represents a net inflow of funds) to a negative $346 million in 2000. The “Other Investment, Assets” category reveals a similar pattern with a $214 million outflow in 1999 increasing to $340 million outflow in the following year.

In addition, it is possible that the official data may disguise the apparent scale of capital outflows in Latvia. Balabkins and Gunter in their 1997 study used counterpart data from twenty-two industrial nations to estimate the degree of mis-invoicing in the official Latvian trade numbers. They found that while there was evidence of under-invoicing of both exports and imports, the net effect showed that trade situation was approximately $300 million better than reported in official statistics. (Balabkins and Gunter, 1997:251, Table 3) In several years, this adjustment converted an officially reported trade deficit into a trade surplus. Attempts to accurately measure Latvia's current account balance are also complicated by its large dependency on the international service trade, mostly transportation of products to and from Russia. In fact, in 1998, Latvia earned 22% of its total goods and services export receipts from such transportation services. This is the highest ratio of dependency on international transportation services of any small developing country in the world. (World Development Indicators 2000)

If the current account balance of Latvia is actually better than the Official Statistics report because of mis-invoicing of merchandise trade and the failure to accurately capture the earnings of the service trade then capital outflow has been understated. In other words, since the international payments accounts must balance by definition, a

more favorable current account situation must be offset by less favorable capital accounts situation. Taking into account, of course, changes in international reserves.

An undervalued Lat can be expected to have a continuing serious impact on Latvian foreign trade, foreign debt, and real growth. With respect to foreign trade, a weak Lat increases the competitiveness of Latvian exports and tends to decrease the competitiveness in the Latvian market for foreign imports. However, whether a weak Lat benefits the whole economy, depends on the elasticity of demand for Latvian exports and imports. If demand for both exports and imports is relatively inelastic, a fall in the value of the Lat may result in a deterioration of the current account balance. Foreigners will buy approximately the same volume of Latvian products, but at a lower price while Latvians will purchase about the same volume of foreign products but at a higher price.

How likely is it that a weak Lat will lead to current account deterioration? As mentioned above, Latvia is very dependent on the earnings from transporting Russian products. Since Russia appears to lack convenient alternative routes for this trade and yet the current cost of transit accounts for a relatively small proportion of the final cost of the products, Russian demand would appear to be relatively inelastic. To the extent that Latvian imports are dominated by necessities rather than luxuries, Latvia may also show an inelastic demand for imports. Although a weak Lat increases the cost of these imports, the decline in the volume of these imports may be quite small.

Existence of inelasticities may have contributed to Latvia's continuing current account deficit. In 2000, the current account deficit of Latvia was equal to almost 9% of GDP (IMF International Financial Statistics, July 2001) This is a small improvement on the 1999 deficit but it will become increasingly difficult to finance deficits of this size in the future.

After reaching $521 million in 1997, foreign direct investment (FDI) into Latvia fell sharply in 1998 and 1999 before partially recovering to $407 million in 2000. And in view of the continued stagnation of the Latvian economy, FDI is not expected to increase significantly in the foreseeable future even though Latvia has begun accession negotiations with the EU. As a result, any future deterioration in the current account balance must be financed through some combination of foreign aid, foreign debt or by running down the nation's international reserves. Considering the priorities of aid donors, the recent rapid growth of Latvian debt and the scale of international reserve holdings, all of these must be viewed as limited short-term solutions to a serious long-term problem.

Of course, if the continued undervaluation of the Lat threatens to lead to an unsustainable current account deficit then Latvia could adopt the Keynesian solution of deliberately slowing the economy. Slower or negative real growth would reduce import demand and, by reducing domestic demand, increase the productive capacity available to meet export demand. Politically, this is not an acceptable option in view of the years of slow or negative real growth since independence. According to the probably very optimistic official figures, the unemployment rate reached 7.8% in December 2000. But the actual unemployment rate is believed to be much greater.

Will the Lat begin to appreciate towards its PPP rate? Or, from a different perspective, why hasn't trade arbitrage already closed the gap between market and PPP exchange rates? There are several possible explanations. Almost half of Latvian foreign trade is with countries that have an even greater degree of undervaluation. Against these countries, the currency of Latvia is relatively overvalued. These countries include Russia (whose currency is undervalued by an estimated 45% according to the Big Mac PPP index shown in Table 1 and accounts for about 19% of Latvia's foreign trade), Lithuania (33% undervaluation and 11% of trade), Estonia (35% undervaluation and 9% of trade), Poland (49% undervaluation and 5% of trade), the Czech Republic (45% undervaluation and 2% of trade), and Hungary (52% undervaluation and 1% of trade). Trade arbitrage between these countries and Latvia would tend to offset the tendency towards an appreciation of the Lat as a result of trade arbitrage with Latvia's other trade partners.

Another possible explanation is based on the "narrow bridge" constraint. The price of wheat may be higher on one side of the river but if the bridge is very narrow then not enough tons of wheat can cross the bridge in a day to eliminate the price gap. While an undervalued Lat would encourage trade arbitrage that should eventually lead to the PPP rate, there may be physical or institutional constraints that prevent a sufficient volume of trade necessary to arbitrage exchange rates.

Latvia's total foreign goods and services trade volume (exports plus imports) is about equal to its GDP. This is approximately the same level of foreign trade activity as Lithuania although much lower than that of Estonia where total foreign trade in goods and services is equal to almost twice its GDP. However, adjusting for Latvia's extremely high dependence on service exports especially with respect to shipping of commodities to and from Russia, Latvia appears to engage in less goods trade then one would expect from its geographic advantages.

While most observers are aware of the infrastructure bottlenecks that constrain Latvian international trade especially in the areas of communication and transportation facilities, the country's reputation for corruption may also have a serious impact on foreign trade. As globalization progresses, dependability has become as important as low prices. To the extent that a country has a reputation for corruption, it is perceived to be a less trustworthy global partner. According to Transparency International (2001 CPI Index), Latvia generally has a much worse reputation for corruption than its Baltic neighbors. Finland ranks number one in the world for honesty, followed by Denmark (ranked second), Sweden (6th), Norway (10th), Germany (20th), Estonia (28th), Lithuania (38th), and Poland (44th). Latvia is tied with Ghana for 59th place. Among the Baltic nations, only Russia (79th) has a worse reputation.

If these barriers to trade arbitrage can be overcome and the Lat appreciates what will be the impact on the Latvian economy? If Latvia faces a significant rise in its undervalued exchange rate, then the only long-term solution is to increase the productivity of the Latvian economy. An increase in the total factor productivity of Latvian manufacturing, agriculture and service industries would promote real growth with stable prices even in the face of a significant revaluation of the Lat. However,

while this may be the only successful policy in the long run, it is the most difficult since it requires substantial institutional and, possibly, cultural change in Latvia.

5. Appendix

Let the domestic price index be expressed as:

(1) $$P = ((\sum p_{ti}q_{0i})/(\sum p_{0i}q_{0i}))*K$$

The character p_{ti} represents the price at time "t" of each of the "I" goods in the domestic economy. Therefore, the denominator represents the cost of the market basket of a country in time "0". K is some positive number that converts the index into a value with which it is easy to work, usually 100. Without a loss of generality, one can choose K such that $K/(\sum p_{0i}q_{0i})$ is equal to one. In this case the domestic price index can be rewritten as:

(2) $$P = (\sum p_{ti}q_{0i})$$

Thus P represents the market basket from some base period at the prices in time "t". The real exchange rate R can be presented as:

(3) $$R = EP'/P = (E*(\sum p'_{ti}q'_{0i}))/(\sum p_{ti}q_{0i})$$

where E is the nominal exchange rate given in the number of units of the domestic money per unit of foreign money. Note that the symbol " ' " indicates the foreign country.

(4) $$E = RP/P' = (R*(\sum p_{ti}q_{0i}))/(\sum p'_{ti}q'_{0i})$$

A pair of countries experiences absolute PPP when R = 1. If equation (4) is rewritten in terms of the rate of change of each variable over time, than we have equation (5):

(5) $$dE/dt = dR/dt + dP/dt - dP'/dt$$

A pair of countries experiences relative PPP when dR/dt = 0.

Address:
Nicholas W. Balabkins
Frank R. Gunter
Lehigh University
Economics Department
621 Taylor Street
Bethlehem, Pennsylvania 18015
(610) 758-4540
E-mail:nib2@lehigh.edu
frg2@lehigh.edu

References

Balabkins, Nicholas W. and Frank R. Gunter (1997) "The Miracle of the Latvian Lat: Its Fragile Foundations". In *On Political Economy of Transformation: Country Studies*. Jürgen C. Backhaus and Günter Krause, eds. 241–258, Marburg: Metropolis-Verlag.

Breuer, Janice Boucher (1994) "An Assessment of the Evidence on Purchasing Power Parity". In *Estimating Equilibrium Exchange Rates.* John Williamson, ed. 245–277, Washington, D.C.: Institute for International Economics.

Bank of Latvia (2000) *Monthly Bulletin*, December.

Bank of Latvia (2000) *Review of the Balance of Payments*, Fourth Quarter.

Cassel, Gustav (1916) The Present Situation of the Foreign Exchanges. *Economic Journal* 26, 62–65.

Cassel, Gustav (1918) Abnormal Deviations in International Exchanges. *Economic Journal* 28, 413–415.

Crownover, C., J. Pippenger and D. Steigerwald (1996) "Testing for Absolute Purchasing Power Parity". *Journal of International Money and Finance* 15, 783–796.

Dornbusch, Rudiger (1992) "Purchasing Power Parity". In *The New Palgrave Dictionary of Money and Finance.* Peter Newman, Murray Milgate and John Eatwell, eds. Vol. 3, 236–244, New York: The Stockton Press.

Economist (2001) Burgernomics. January 13, 110.

Economist (2000) Big MacCurrencies. April 29, 75.

Economist (1999) The Big Mac Index and the Euro. December 11, 113.

Economist (1997) Our Asian Big Mac Index. November 1, 115.

International Monetary Fund (2001) *Direction of Trade Statistics*. 293–294.

International Monetary Fund (2001) *International Financial Statistics.* 502–505

Pakko, M. R. and P. S. Pollard (1996) "For Here or To Go? – Purchasing Power Parity and the Big Mac". *Federal Reserve Bank of St. Louis Review* 78, 1, 3–21.

Rogoff, Kenneth (1996) "The Purchasing Power Parity Puzzle". *Journal of Economic Literature* 34, 647–668.

Summers, Robert and Alan Heston (1991) "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–1988". *The Quarterly Journal of Economics* 327–368.

Transparency International (2001) Corruption Perceptions Index 2001, Internet, www.transparency.org.

Walter, Ingo (1968) *International Economics*. New York: Ronald Press Company.

World Bank (2000) *World Bank Indicators*. Washington D.C.: World Bank.