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**FACTORS AFFECTING THE PRICE LEVEL RATIO ACROSS
COUNTRIES WITH A FOCUS ON SMALL STATES**

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FACTORS AFFECTING THE PRICE LEVEL RATIO ACROSS COUNTRIES, WITH A FOCUS ON SMALL STATES

Nora Bianco¹

1 INTRODUCTION

The objective of this paper is to analyse the factors that affect the ratio of market exchange rate (MER) to the purchasing power exchange rate (PER) with a focus on small states.

The MER is the price of one currency in terms of another. The purchasing power exchange rate (PER) captures the number of units of a country's currency needed to purchase an identical quantity of goods and services in the corresponding country, as a US dollar would buy in the United States. If all products of a national economy are considered, the PER/MER ratio, also called the price level ratio, would represent the national price levels and would explain the price differentials across countries.

It is to be expected that the MER will be influenced by the choice of currency in the particular country, for example, the exchange rate of the US dollar for the Japanese Yen is ¥106.64, while the exchange rate of the Euro is €0.82. The PER, in a way, adjusts this exchange rate in terms of purchasing power. It is likely that highly developed countries, where the cost of living is relatively high, compared to less developed countries, register higher PER.

To attain the main objectives of the study, the following two research questions were set:

- (a) "What are the factors affecting the PER/MER ratio and to what extent?"
- (b) "Do small states exhibit special tendencies with regard to the PER/MER ratio"?

In order to respond to these research questions, a number of variables thought to influence the ratio PER/MER were utilised to explain the changes in the ratio during the period 2008-2016, across countries. The relationship between explanatory variables on the PER/MER ratio is tested using the panel regression method, which was estimated utilising data sourced from global databases.

This paper is structured as follows. Following this brief introduction, Section 2 presents a literature review, beginning with definitions of PPP and the price level ratio and theories relating to them. Section 3 gives a detailed description of the methodology used to assess the influence a number of explanatory variables on the PER/MER ratio. In this section, we also define the variables and give their sources. The results are then presented in Section 4, where the main findings are analysed and discussed. Section 5

¹ The present study is based on the results of dissertation written by the same author in partial fulfilment of the BCom (Hons) Economics degree at the University of Malta (Bianco, 2018).

concludes the paper with a summary of the paper findings and the implications that can be derived from these findings.

2 LITERATURE REVIEW

2.1 Meaning of PPP

Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amount of goods and services in the domestic market as a U.S. dollar would buy in the United States. The ratio of PPP conversion factor to market exchange rate is the result obtained by dividing the PPP conversion factor by the market exchange rate.

According to Taylor & Taylor (2004), the terminology of PPP was introduced shortly after the first World War, when the major industrialised countries were concerned about the appropriate level for nominal exchange rates. PPP has been discussed by early economists such as Alfred Marshall, John Stuart Mill and Viscount Goschen, but Cassel (1916) was the first economist to formally define the term PPP and put it into practice. Cassel proposed to calculate cumulative CPI inflation rates and then use these inflation differentials to determine the exchange rate changes needed to maintain PPP. However, in modern studies, Cassel's findings are rejected, which accept that exchange rate deviates from PPP by a large degree and that PPP is inversely related to the development level of countries (Summers and Heston, 1991). PPP theory states that the nominal exchange rate between two currencies should be equal to the ratio of aggregate price levels between the two countries (see for example; Taylor & Taylor, 2004). Hence, a unit of currency in one country will have an identical purchasing power in another country.

Krugman et al. (2012) define PPP as a condition where two countries' price level ratio equals the exchange rate of their currencies. In turn, the price level ratio (PER/MER) measures the differences in the price level at GDP level, where if all products are considered for a national economy, then this could be also referred to as the national price level ratio. PER/MER ratio tends to explain the differences in national price levels, contradicting the Law of One Price, in which price levels are believed to be equal across countries. This ratio tends to be small in low-income countries and it increases as the countries get richer. Also, a rise in the domestic price level would result in a depreciation of the domestic currency in the foreign exchange market, indicating a decrease in purchasing power. The reason that this price level ratio is not equal to one is due to price level differences. A market exchange rate conversion does not necessarily take into consideration the price level differences. According to Callen (2007), although MERs can reflect PPPs for traded goods, it does not reflect the non-tradables and services. The non-traded goods and services tend to be cheaper in less developed countries and if discrepancies in price levels between countries are ignored, purchasing power and real income of low-income countries will be underestimated. In fact, according to IMF (2011), GDP for emerging countries is \$25,099 billion when converted with MER, while with a PER, GDP for emerging countries is \$38,629 billion.

Empirical literature shows that national price levels are usually explained by real GDP, size and openness of a country, natural resources and human resources. In many studies, GDP per capita is the main variable which accounts for international price level differences. Rogoff (1996), Rodrik (2008) and Gelb & Diofasi (2015) found evidence that differences in income levels explain around 70 per cent of the variance in PPP price levels across countries. The price level ratio and GDP per capita are found to have a positive relationship, which is due to the relative prices of non-tradables, assuming that tradables have the same prices across countries because of international trade. Hence, price level differentials occur due to locally traded goods.

Balassa (1964) and Samuelson (1964) also argued that high income countries have higher price levels, not because of higher productivity in general, but because of higher productivity in the tradable goods, compared to the non-tradable goods. Bhagwati (1984) confirmed that high-income countries have a higher price level, but unlike Balassa and Samuelson, Bhagwati associates this price level difference to the capital-labour ratio, where poor countries have a low capital-labour ratio due to being labour intensive and can therefore produce non-tradable goods cheaper, implying a lower price.

2.2 Small States and the PER/MER ratio

A factor that is considered to affect price differentials across countries is population size which itself is likely to be related to trade openness (Briguglio, 1995). Small states depend highly on exports and imports, implying that these states are highly trade open. Furthermore, smaller and isolated countries are likely to experience relatively high prices and this affects PPP due to small production runs and small imported cargoes. They also face higher costs, such as transport costs, due to border effects and because of needing small consignments (Redding and Venables, 2004; Winters and Martins, 2004a; 2004b). The PER/MER ratio may also be affected due to competition constraints faced by small states. Briguglio (2017) argues that small states tend to be characterised by monopolies and oligopolies, due to a small domestic market. In addition, small states tend to have weakly enforced competition regulations. On the other hand, a country with a large domestic market will have less chance of monopoly operations and therefore prices could be more competitive than is the case in a small country, resulting in a lower price level.

Kravis and Lipsey (1987) consider the foreign trade to GDP ratio as an indicator of trade openness, finding that a high trade open country should have less price level difference. A high propensity of trading does not only affect price of tradables but also affect the prices of non-tradables by reducing the price of scarce factors and increasing the price for abundant factors. However, Clague (1988) opposes the findings of Kravis and Lipsey, arguing that a high foreign trade ratio does not automatically mean more free trade. Clague explained that trade openness can have positive, negative or zero effect on the price level ratio, depending on the determinant of trade openness and the models used.

Ahec-Šonje and Nestiæ (2002), found that both population size and trade openness have a negative impact on the price level ratio indicating that a highly trade open country or a high populated country have a lower price level ratio.

According to Krugman et al, (2012), the law of one price states that when expressed in a common currency, a basket of homogenous goods should have an identical price. This is under the assumption that there are no transportation costs and barriers to trade, such as tariffs, for competitive markets. There can be no elements of arbitrage, meaning that people cannot make riskless profits; buy goods from a country with a low price and sell the same good at a higher price in another country. If this is true, then PER should hold between the concerned countries. This statement only holds if transaction costs are disregarded and the goods are identical.

With regards to transaction costs, Engel and Rogers (1996) tested for differences in prices between similar goods across cities in the United States and Canada. From their studies they found that price differences were larger for longer distances between the concerned cities and further increased when cities were located in different countries, due to the border effect.

Fenestra and Kendall (1997) found evidence that a certain significant part of the observed deviations from the Law of One Price is due to unresponsiveness of prices to exchange rate changes, because of local currency pricing. Moreover, it is usually common that certain goods are not tradable and different countries tend to produce differentiated goods rather than homogenous.

2.3 Criticisms of PPP

According to McCarthy (2013), International Comparison Program assumes that each country is similar to the benchmark country (where the benchmark country is the United States) and all countries change in the same way over time, which is not true in reality. Another persistent problem is to discover the actual prices of goods and services in each country, resulting in ICP measures which are not always reliable. It is difficult to choose which price indices to use for measuring PPP, such as wholesale price index, consumer price index or producer price index. Furthermore, these price indices can be calculated in different base years in each country, making it hard to compare PPP between countries using price indices. It is also difficult to make precise comparison between homogeneous goods in different countries. Moreover, as argued by Balassa and Samuelson (1964), certain goods and services are not tradeable in the international market. As mentioned earlier, transaction costs, such as transport costs, tariffs, duties, taxes and non-tariff barriers have an impact on price differentials and decrease the opportunity for arbitrage. All of these details weaken the validity and reliability of PPP theory

According to Zhang (2012), there are many changes in the economic structures over time and therefore the price level adjustment cannot keep up with these changes, resulting in a shock of exchange rate. Hence, in this case PPP is not an accurate indicator of real exchange rate because international movements caused by economic

structural changes have an impact on the exchange rate. A hindrance in predicting future exchange rates results from the difficulty of measuring expected future prices. Future prices cannot be predicted accurately because of such matters as policy uncertainty and statistical errors, which weaken PPP's potential to measure future exchange rate. All of the above-mentioned factors result in certain limitations for accurate and reliable PPP estimates to calculate the exchange rate.

Despite all these measurement problems and criticisms of PPP, there has been an increased availability of PPP data and the estimation of PPP rates has evolved. PPP rates are widely used for domestic and global policy discussions and international negotiations.

For example, PPP adjusted GNI per capita is used as a measure of the standard of living in the Human Development Index², where this index is used to emphasize that the development of a country is not only measured by economic growth but also by the people in that country and their capabilities.

2.4 Simpler approaches to measuring PPP

The complications of calculating PPP has led to attempts to revise measurement by using simple indexes. Two indexes intended to simplify the computation of PPP are the Big Mac Index and the Latte Index.

The Big Mac Index, developed by The Economist in 1986, is a set of data that indicates the current prices of a Big Mac hamburger in different countries. The BMI, considered as a 'basket' of its ingredients with very few changes from country to another, is another measurement of PPP. According to Pakko & Pollard (2003), most of the ingredients that are used to produce a Big Mac are individually traded on international markets, and therefore it is expected that the Law of One price would hold, at least approximately. Pakko and Pollard (1996) found that the BMI is strongly correlated with the data obtained from Penn World Tables, with the correlation being 0.85, implying that BMI is a good proxy for PPP.

The BMI is studied by economists as it raises the question of why a single product has different prices across different countries. Alessandria and Kaboski (2008) found that the Big Mac's average price is lower in relatively poor countries because labour costs are lower in low income countries. Almås (2012) found evidence that due to substitution and quality bias, incomes are overestimated in low-income countries, causing PPP bias within the food industry. However, since the production process of a hamburger is a non-tradable good, Balassa-Samuelson's (1964) idea, of how non-traded goods systematically affect the deviation from PPP, seems to be appropriate. The Balassa-Samuelson effect asserts that if there is an increase in the relative productivity of tradables in a country, this will increase relative wage, which will therefore result in the increase of relative average price (MacDonald & Ricci, 2001). Click (1996) found that the BMI follows PPP, especially when a time-series dimension is used. He also

² <http://hdr.undp.org/en/content/human-development-index-hdi>

confirmed that deviations for countries can also be explained by the Balassa-Samuelson effect.

The Latte Index, which was developed by the *Wall Street Journal*³, compares the cost of a tall Starbucks latte coffee, considered to be an identical good in different countries, to estimate which currencies are over or undervalued. The prices of this product in many cities around the world, were collected and then converted to US dollars to be compared to the benchmark price, which was a tall Starbucks latte in New York City. In 2017, a latte in Toronto, Canada cost US\$2.94, which is about 15% under the benchmark NYC price. This was interpreted to mean that the Canadian dollar was undervalued by approximately 10%. Hence, it is argued, using the relative cost of a tall Starbucks latte might be a good proxy to measure PPP.

Results from this Latte Index were in line with prediction by expert organisations such as the Council of Foreign Relations, the Bank of International Settlements, the OECD, and the IMF.

3 METHODOLOGY OF THE REGRESSION ANALYSIS

To analyse the relationship between PER/MER ratio and a number of explanatory variables, this study uses regression analysis. A panel data analysis is used, to simultaneously deal with both cross-sectional and time-series data. This enables to observe the behaviour of the variables for all countries across time. By using this approach, the researcher can make a fuller use of the data compared to when one makes use of pure time-series or pure-cross-sectional data on their own.

Furthermore, the power of the test can increase when linking cross-section and time-series data, as the number of degrees of freedom is higher and multicollinearity problem can also be reduced. Furthermore, this section outlines the assumptions and limitations, if any, of this paper.

3.1 The data

The data covers 174 countries, of which 37 were small countries⁴ using annual data over the period 2008 to 2016. Although, the period 2008 to 2016 was chosen, other time periods were selected with similar results.

The data was sourced from global databases including IMF, World Bank and UNCTAD. In 8 countries, data on one of the explanatory variables, namely availability of credit, was not available and these were left out of the regression.⁵ In addition, there were two countries which were clearly outliers, and these were excluded from the sample.⁶

³ (<https://www.weforum.org/agenda/2017/12/this-index-uses-the-price-of-a-coffee-to-measure-the-value-of-currency>)

⁴ Defined as those with a population of about 1.5 million or less

⁵ No data for Kiribati, Marshall Islands, Palau, Taiwan, Turkmenistan, Tuvalu, Uzbekistan and Zimbabwe.

⁶ Afghanistan and Venezuela were left out due to being markedly outliers.

3.2 The Model

In order to estimate our model, using data from global databases, the software program EViews was used. As mentioned earlier, the study's analysis is based on panel data regression.

The following regression model will be used:

$$\ln Y_{it} = \alpha + \beta_1 \ln GDPPC_{it} + \beta_2 \ln ACRDT_{it} + \beta_3 \ln POPTN_{it} + \varepsilon$$

Where:

<i>Y</i> stands for	PER/MER
<i>GDPPC</i> stands for	GDP per capita
<i>ACRDT</i> stands for	Availability of credit
<i>POPTN</i> stands for	Population

ε is the error term.

The coefficients β_1 , β_2 , β_3 represent elasticities, given, that variables are measured in logs. Hence, if there is one percentage increase in one of the explanatory variables, the PER/MER will rise, in percentage terms, by the value of the respective coefficient (β).

In this regression test, the subscript t represents the years of the observations which ranges from 2008 to 2016, whereas subscript i represents the country of which there are 174 countries.

3.3 The Variables

The PER/MER ratio

The MER is the national currency of countries expressed as a ratio of the US dollar. In other words, MER is the rate at which one nation's currency can be exchanged for that of another. The implied PPP conversion rate is the ratio of GDP per capita in national currency as a ratio GDP per capita in PPP international dollars (Source: IMF) Implied PPP reflects the bundle of goods and services that can be purchased by a dollar in the country concerned. The ratio of PER/MER therefore is influenced by the cost of living and it seems more appropriate to explain both PER and MER at the same time, rather than explaining the factors affecting them individually. In general, we expect that low-income countries, where the cost of living is relatively low, will register a low PER.

In this model, three variables were used to explain PER/MER, namely, GDP per capita, availability of credit and population.

GDP per capita

GDP per capita is the gross domestic product divided by midyear population. The data is in measured in current US dollars. Causa et al. (2014) find a positive correlation

between household income and the levels of GDP. Hence, it is assumed that a higher the GDP per capita represents higher income and living standard and therefore the higher the PER/MER. GDP per capita, which also captures productivity and therefore wages, can partially explain the difference in prices across countries and that is why it is relevant to include this measure as one of the explanatory variables for this research. Thus, a positive relationship between GDP per capita and PER/MER is expected, *ceteris paribus*.

Availability of credit

Availability of credit is measured by the domestic credit to private sector by banks, as a percentage of GDP. This represents the willingness of financial institutions to lend money to their customers, mainly consumers and businesses, affecting their purchasing power. *Ceteris paribus*, it is expected that PER/MER and availability of credit have a positive relationship, since if people have more available credit to spend, this increases their purchasing power and therefore increasing PER/MER.

Population size⁷

Population size can be one measure of country size. Smaller and more remote countries, such as island states, are likely to be relatively costly because they face higher unit transport costs due to their insularity and higher transaction costs due to small consignments. In addition, in small states, domestic competition tends to be constrained. Hence, keeping all other things constant, smaller states are likely to have a high price level ratio, expecting a negative relationship between population size and the price level ratio.

3.4 Diagnostic Tests

Diagnostic tests are carried out on the model to ensure that the regression model is correctly specified. These include tests for autocorrelation, multicollinearity, and stationarity.

Since panel data will be used for this study, it is necessary to see whether the Random Effects Model or the Fixed Effects Model should be used. The Hausman Test was used to test whether the fixed effects model (FEM) or the random effects model (REM) should be used.

Unit Root Tests

It is important to ensure a stationary series, in which properties remain constant over time. Using non-stationary data can lead to spurious regressions and therefore variables

⁷ We also used the variable Trade-openness, measured by $[(Exports+Imports)/2]/GDP$ instead of population size. Trade openness is likely to be related to country size and in this study; either population size or trade openness will be used but not both as they are highly correlated. It is expected that a highly trade open country tends to have a high price level ratio, *Ceteris paribus*.

must be stationary as it can strongly influence the variables' behaviour and properties. For this paper, the unit root test was used to test for stationarity, using the Levin-Lin-Chu test.

Testing for Multicollinearity and Autocorrelation

Multicollinearity occurs when one explanatory variable can be linearly predicted from other explanatory variables with a certain degree of accuracy. To test for the presence of multicollinearity, the correlation analysis and the Variance Inflation Factors test were used.

Autocorrelation occurs when there is correlation between the members of the observations ordered in time. Autocorrelation was tested for using the Durbin-Watson statistic.

3.5 Limitations of the model

A major limitation in the model is the missing observations in the data, which may lead to less efficient estimations. Another is that the estimates of the PPP are approximation and therefore the results may not be accurate. These limitations were discussed in more detail in the literature review section.

4 ESTIMATION RESULTS

4.2 Simple correlation exercises

The figures hereunder show the simple correlations between the dependent variable (PER/MER) and the explanatory variables, using the averages of over a period of the nine years (2008-2016) for each country and for each variable. This is intended to give a preliminary test of the possible relationships between the dependent and the explanatory variables.

Figure 4.1: GDP per capita vs PER/MER ratio

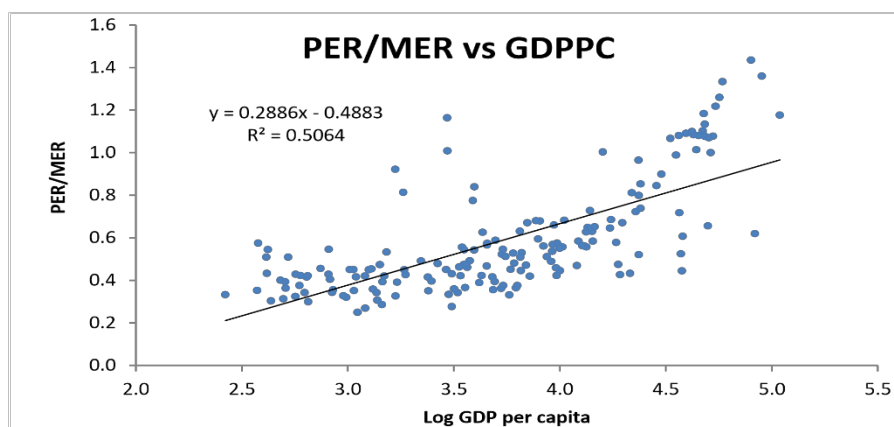


Figure 4.1 shows a positive relationship between GDP per capita and PER/MER, where the former is expressed in logarithmic form. This corresponds to the a-priori expectation, indicating that the richer the country, the more dollars are needed to buy a dollar's worth of goods in that country, as compared to the United States. The relationship seems quite strong which corresponds to studies by Gelb and Diofasi (2015), who found that GDP per capita explains around 60 per cent of the variance in PPP. Furthermore, this is also in line with Ahec-Šonje and Nestiæ (2002) study where GDP per capita explained over 80 per cent of variations in national price levels.

Figure 4.2: Availability of credit vs PER/MER ratio

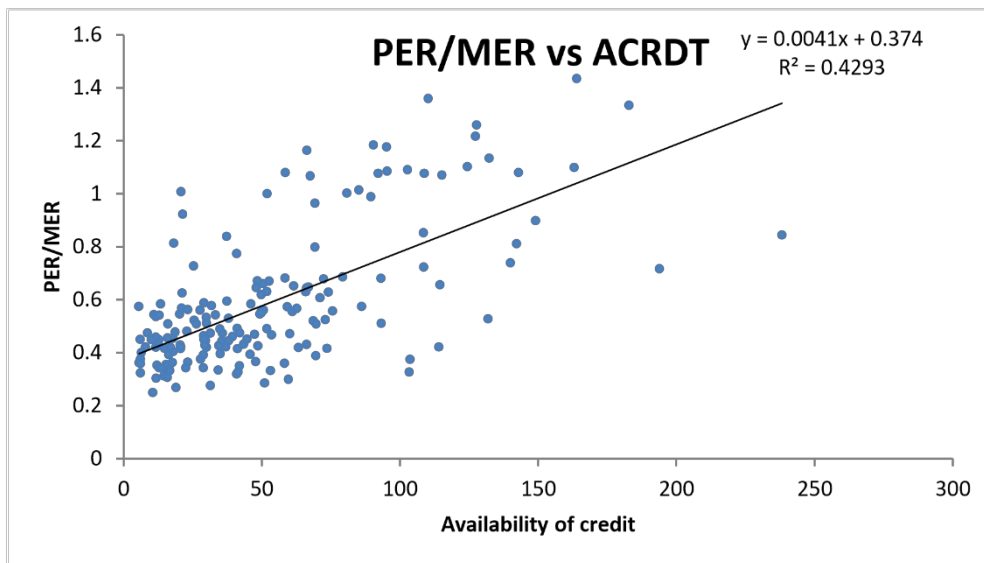


Figure 4.2 shows a positive relationship between the price level ratio and availability of credit. Availability of credit is expected to influence the PPP, rather than the price level ratio, because the higher the willingness of banks to lend money to their customers, the higher the total purchasing power in that country. With more availability of credit, residents can spend more than they really own, hence boosting their present purchasing power. Furthermore, the lender earns revenue from interest payments, which also results in being able to spend more money in the respective country. A positive relationship between PPP and availability of credit also results in a positive relationship between availability of credit and the price level ratio, as expected a-priori.

Figure 4.3: Population vs PER/MER ratio

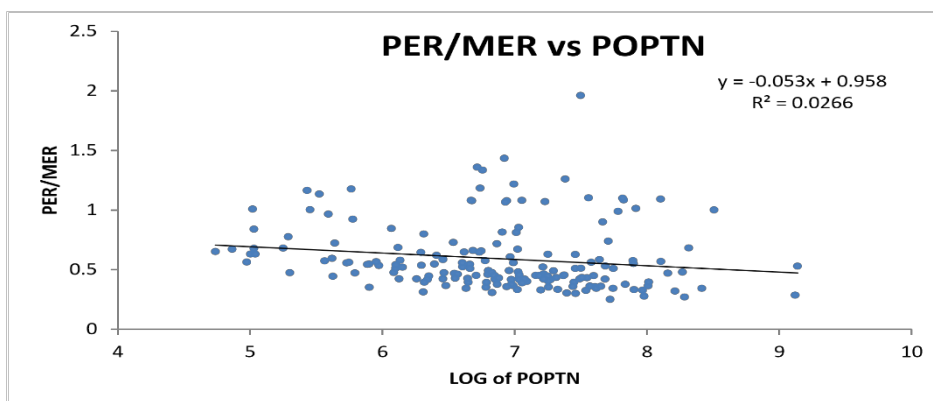


Figure 4.3 illustrates a negative relationship between the price level ratio and population, with the latter measured in logs. As explained in the literature review section, smaller countries with a low population size are likely to have higher transaction costs because of border effects and due to transportation for small consignments, resulting in a relatively higher transportation costs to the amount of goods and services being traded. Furthermore, small states tend to be characterised by monopolies and oligopolies, because of a small domestic market and also experience weak competition regulations. Larger countries experience low transaction costs because of a large domestic market and price competition among firms. All of these factors result into an outcome where small states are likely to experience a higher price level ratio than larger countries. Hence, the negative sign could be explained by the reasoning that a highly populated country will operate with fewer monopolies and therefore due to price competitiveness, the price level ratio is lower than less populated countries.

Figure 4.4: Trade Openness vs PER/MER ratio

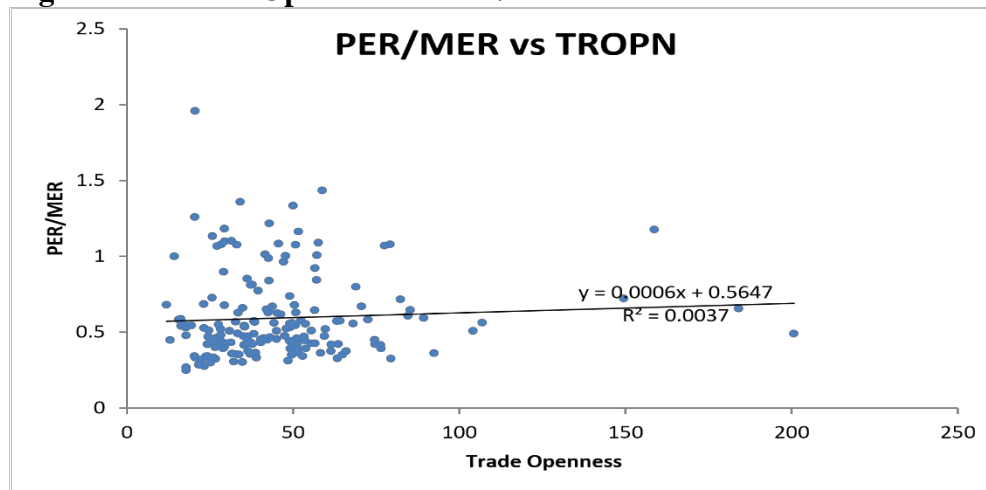


Figure 4.4 shows a positive relationship between the price level ratio and trade openness. This variable is not used in the main regression analysed, however, a replicated regression was estimated and trade openness variables was used instead of the population size variable. The replicated regression will confirm the results of the main analysed regression.

4.1 Empirical Results

As explained in Section 3, our model was specified as follows:

$$\ln y_{it} = \alpha + \beta_1 \ln GDP_{it} + \beta_2 \ln ACRDT_{it} + \beta_3 \ln POPTN_{it} + \varepsilon$$

where all variables and their database sources were discussed in same Section

Since panel data was used for this study, the Hausmann Test was used to test whether the fixed effects model (FEM) or the random effects model (REM) should be used. The test indicated that the FEM was the appropriate one.

The model covers a cross section of 174 countries and a nine-year time period. The total number of observations is 1566. The regression was tested for unit root and multicollinearity, where the results had a satisfactory outcome using the Levin, Lin and Chu test for unit root testing and the Variable Inflation Factor and the correlation analysis for multicollinearity testing.

Autocorrelation tests using the Durbin-Watson statistic show that the model suffered from high autocorrelation. Hence, to correct for autocorrelation, the Baltagi and Wu (1999) method was used, where they used a Prais-Winstten transformation matrix. This transforms disturbances into serially uncorrelated errors.

After the necessary adjustments for autocorrelation, the results of the model estimation are those shown in Table 4.1.

Table 4.1: Panel regression with PER/MER as dependent variable

Explanatory variable	Coefficient.	Std.Err.	t-statistic	P> t
ln_GDPPC	0.619	0.013	46.66	0.000
ln_ACRDT	-0.401	0.011	-3.57	0.000
ln_POPTN	-0.778	0.041	-18.97	0.000
Constant	6.469	0.607	10.65	0.000

Rsqr: Within = 0.6237; Between = 0.3086; Overall = 0.2951

Table 4.3 shows that the signs of the estimated coefficients are in line with the a-priori expectations. There is a positive relationship between the dependent variable, the price level ratio, with the explanatory variables, GDP per capita and availability of credit. On the other hand, a negative relationship can be observed between the price level ratio and the population size. Furthermore, all variables are statistically significant, where GDP per capita is highly significant (t-statistic value of 68.98). R-squared is also quite high, where the within R-squared is reported at about 81 per cent. As already mentioned in the methodology section, the coefficients represent direct estimates of elasticities because a logarithmic regression is analysed.

GDP per capita has a positive coefficient of around 0.75 implying that a one per cent increase in GDP per capita leads to a 0.75 per cent increase in the price level ratio. This result is in line with other studies such as findings by Rogoff (1996), Rodrik (2008) and Gelb; Diofasi (2015), which concluded that GDP per capita explains around 70 per cent of price level differentials across countries. Ahec-Šonje and Nestiæ (2002) found that real income per capita accounts for more than 80 per cent of variations in price levels across countries.

Availability of credit also has a positive coefficient indicating that as availability of credit increases by one per cent, the price level ratio in the corresponding country increase by 0.03 per cent in the same country. Although this variable has a small impact on the price level ratio, it is still statistically significant, with a t-statistic value of 2.51.

This confirms that the higher the availability of credit to the citizens of a country, the higher the purchasing power of that country and therefore the higher the price level ratio.

The population size variable is of special interest for the present study. The coefficient on this variable is -1.35, indicating that as the country's population increases by one per cent, the price level ratio for that particular country would decrease by 1.35 per cent.⁸ This is also in line with our hypothesis and to Ahec-Šonje and Nestiæ (2002) findings, where a small country tends to experience a higher price level ratio.

This negative relationship could be due to the fact that a small state can have higher transaction costs on traded goods due to border effects, trading for small consignments resulting in relative higher transportation costs and limitations of competition possibilities.

5 CONCLUSION

The estimation results produced in the previous section, in response to the first research questions set in the introductory chapter, indicate that the price level ratio is influenced by GDP per capita, availability of credit by banks and population size, as hypothesized.

The second research question related to the possibility that small states exhibit certain particular tendencies with regard to the price level ration. The results would seem to indicate that small states tend to experience higher price level ratios when compared to larger states, as indicated by the estimated coefficient on population size of countries. This result was confirmed when the population size variable was replaced by trade openness. It is well known that small countries tend to be highly trade open when compared to larger countries. Both estimations basically gave the same results.

Thus, although in theory, the PPP implied conversion rate and the MER should balance each other, in reality, this is not the case. In our study, we try to explain why they do not cancel each other out, with reference to the stated explanatory variables.

Thus we expect the PER/MER ratio to be higher in high income countries and where availability of credit is high. Furthermore, the PER/MER ratio is also higher in smaller and highly trade opened countries.

⁸ A similar regression was also estimated using the trade openness variable instead of population size. The results were broadly similar, due to the fact that small states tend to be highly trade open.

REFERENCES

- Ahec-Šonje, A., & Nestić, D. (2002). International Differences in Price Levels: An Empirical Analysis. *Croatian Economic Survey*, (4), 85-120.
- Alessandria, G., & Kaboski, J. (2008). Why are goods so cheap in some countries?. *Business Review Q*, 2, 1-12.
- Almås, I. (2012). International Income Inequality: Measuring PPP bias by estimating Engel curves for food. *American Economic Review*, 102(2), 1093-1117.
- Balassa, B. (1964). The purchasing-power parity doctrine: a reappraisal. *Journal of political Economy*, 72(6), 584-596.
- Baltagi, B. H., & Wu, P. X. (1999). Unequally spaced panel data regressions with AR(1) disturbances. *Econometric Theory*, 15(6), 814-823.
- Bhagwati, J. N. (1984). Why are services cheaper in the poor countries?. *The Economic Journal*, 94(374), 279-286.
- Bianco, N. (2018). *Factors affecting the price level ratio across Countries*. Dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Commerce (Honours) in Economics, University of Malta
- Briguglio, L. (1995). Small island developing states and their economic vulnerabilities. *World development*, 23(9), 1615-1632.
- Briguglio, L. (2017). Competition Law and Policy in Small States. *Small States in a Legal World*. 23-34. Springer, Cham.
- Callen, T. (2007). PPP versus the market: which weight matters?. *Finance and Development*, 44(1), 50.
- Cassel, G. (1916). "The present situation of the foreign exchange," *Economic Journal*.
- Causa, O., Araujo, S., Cavaciuti, A., Ruiz, N., & Smidova, Z. (2014). Economic growth from the household perspective: GDP and Income Distribution Developments across OECD Countries. OECD Economic Department Working Papers, (1111), 0_1.
- Clague, C. K. (1988). Purchasing-power parities and exchange rates in Latin America. *Economic Development and Cultural Change*, 36(3), 529-541.
- Click, R. W. (1996). Contrarian macparity. *Economics Letters*, 53(2), 209-212.
- Engel, C., & Rogers, J. H. (2001). Deviations from purchasing power parity: causes and welfare costs. *Journal of International Economics*, 55(1), 29-57.
- Feenstra, R., & Kendall, J. (1997). Pass-through of exchange rates and purchasing power parity. *Journal of International Economics*, 237-261. *Finance*, 45(1), 157-174.
- Frankel, J. A., & Rose, A. K. (1996). A panel project on purchasing power parity: mean reversion within and between countries. *Journal of International Economics*, 40(1-2), 209-224.
- Gelb, A., & Diofasi, A. (2016). What Determines Purchasing-Power-Parity Exchange Rates?. *Revue d'économie du développement*, 24(2), 93-141.
- International Monetary Fund (2011). "World Economic Outlook Database." Available at <http://www.imf.org/external/pubs/ft/weo/2018/01/weodata/index.aspx>
- Kravis, I. B., & Lipsey, R. E. (1983). Toward an explanation of national price levels. *Princeton Studies in International Finance*, No. 52
- Krugman, P., Melitz, M., and Obstfeld, M. (2012), *International Economics: Theory & Policy* (9th edition). Boston, Mass.: Pearson Addison-Wesley.

- Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics*, 108(1), 1-24.
- MacDonald, M. R., & Ricci, M. L. A. (2001). *PPP and the Balassa Samuelson effect: The role of the distribution sector*(No. 1-38). International Monetary Fund.
- Pakko, M. R., & Pollard, P. S. (2003). Burgernomics: A Big Mac™ Guide to Purchasing Power Parity. *Federal Reserve Bank of St. Louis Review*, 85(6), 9-28
- Redding, S., & Venables, A. J. (2004). Economic geography and international inequality. *Journal of international Economics*, 62(1), 53-82.
- Rodrik, D. (2008). The real exchange rate and economic growth. *Brookings papers on economic activity*, 2008(2), 365-412.
- Rogoff, K. (1996). The purchasing power parity puzzle. *Journal of Economic literature*, 34(2), 647-668.
- Samuelson, P. A. (1964). Theoretical notes on trade problems. *The Review of Economics and Statistics*, 145-154.
- Summers, R., & Heston, A. (1991). The Penn World Table (Mark 5): an expanded set of international comparisons, 1950–1988. *The Quarterly Journal of Economics*, 106(2), 327-368.
- Taylor, A. M., & Taylor, M. P. (2004). The purchasing power parity debate. *Journal of economic perspectives*, 18(4), 135-158.
- United Nations Conference on Trade and Development (2017) “Trade openness indicators, annual.” Available at <http://unctad.org/en/Pages/statistics.aspx>
- Winters, L. A., & Martins, P. M. (2004a). Beautiful but costly: Business costs in small remote economies (Vol. 67). Commonwealth Secretariat.
- Winters, L. A., & Martins, P. M. (2004b). When comparative advantage is not enough: business costs in small remote economies. *World Trade Review*, 3(3), 347-383.
- World Bank (2011) “World Bank Open Data.” Available at <https://data.worldbank.org/> (accessed on 24 February 2018)
- Zhang, K. (2012). *Does purchasing power parity hold between European countries? investigation using non-linear STAR model* (Doctoral paper).