

CHAPTER 5

CONCLUSIONS

This chapter provides the whole picture of this study. The first part includes a summary of this study and major findings. Limitations and suggestions for further studies are discussed in the second part.

5.1 Conclusions

Although the concept of Purchasing Power Parity has been introduced for a long time, the validity of long-run PPP has not been asserted. Numerous studies were conducted applying various techniques with several groups of countries over time. This study, however, tries to apply various econometric approaches for investigating three forms of PPP, i.e. relative PPP, weak PPP and strong PPP, in the case of Thailand and its trade partners during 1987-2006. Two groups of Thailand's trade partners, FTA partners and SEA neighbors, are included in this study. The group of FTA partners consists of six countries: Australia, China, India, Japan, New Zealand and the United states. The group of SEA neighbors includes four countries: Indonesia, Malaysia, Philippines and Singapore.

Quarterly data on exchange rate in terms of currency per US dollar and consumer price index are extracted from IFS to construct the real exchange rate and price ratio. In this study, Thai baht is used as the numeraire currency in calculating the real exchange rate. That is, equivalently, to position Thailand as a foreign country in all models. However, as suggested in cited literatures, different numeraire currencies might lead to different results. All tests using the US dollar as the numeraire are also conducted to confirm the results.

There are two main tasks in examining PPP. Firstly, relative PPP exhibits in mean reversion of the real exchange rate. Therefore, it can be verified by checking stationarity of the real exchange rate. Secondly, cointegration relationship between exchange rate and national prices implies weak PPP. Furthermore, if the cointegrating coefficient equals unity, strong PPP is also confirmed.

The empirical analysis is conducted by applying both traditional time series approach and recently developed panel data approach. For the time series approach, the ADF and Phillips-Perron unit root test are used to test for stationarity of real exchange rates. Engle-Granger cointegration test and Johansen multivariate cointegration test are employed for testing cointegration between nominal exchange rate and price levels.

In the case of panel analysis, various versions of the first generation of panel unit root tests, i.e. LLC test, IPS test, MW test and Choi test are used to test the relative PPP via testing stationarity of real exchange rates. In dealing with cross-sectional dependence in panel of real exchange rates, the second generation unit root tests, i.e. demeaned-IPS test and CIPS* test, are employed as well. Panel cointegration tests between nominal exchange rate and price ratio are conducted using Pedroni test, Kao test and Fisher test.

When using Thai baht as the numeraire, relative PPP cannot be confirmed in all cases using time series unit root tests. This is not surprising as it has been argued that traditional univariate unit root tests do not have enough power to reject the null hypothesis of unit root.

Time series cointegration tests yield no strong evidence supporting PPP. The results of Engle-Granger cointegration in both groups of countries do not firmly assure PPP. For FTA partners, only in the case of Japan does CRDW and ADF statistics show similar results in favor of cointegration. Nevertheless, the symmetry and proportionality conditions are not satisfied. Hence, no credible evidence asserting strong PPP can be found. For SEA countries, the results are quite similar. When Johansen multivariate cointegration is applied, a cointegration relationship can be found in four out of six FTA partners, but two of them have wrong signs of cointegrating coefficient. In the group of SEA neighbors, only the Philippines can reject the null of no cointegration. Moreover, strong PPP is not valid in all cases since the proportionality condition has never been achieved. Thus, time series cointegration tests provide no evidence for strong PPP and very little evidence in favor of weak PPP.

Although time series analysis gives quite similar results for each group of countries, panel analysis yields different results. The relative version of PPP are

overwhelmingly rejected for FTA partners, but strongly confirmed for SEA neighbors. This ensures that the tests applied in this study have enough power to detect PPP. Therefore, relative PPP does not hold among Thailand and FTA partners.

This seems very surprising that FTA, which is claimed to reduce trade barriers, cannot lead to validity of PPP while PPP is found to hold in none-FTA countries. This might be due to the following factors. Firstly, it is raised that FTAs do not always reduce trade barriers. As suggested by Kohpaiboon and Jongwanich (2006), FTAs would not necessarily create a considerable effect of export creation. It largely depends on how FTA partners manage the Rule of Origin (RoO) which can also be used as non-traded barrier. Comparing this to the case of SEA neighbors, though there is no bilateral FTA between Thailand and these countries, they are all under the AFTA which has been established for a long time ago. This can be expected to reduce trade barriers as well as the FTA. Secondly, the period of FTA for Thailand may not be long enough to detect the existence of PPP, given that it holds. Lastly, according to Paul (2004), trading within SEA countries is significant.

Testing for weak PPP by panel cointegration provides some evidence supporting PPP. For the case of FTA partners, results of Kao test and Fisher test confirm the long run relationship between nominal exchange rate and price ratio. However, the panel of SEA countries yields much stronger results. All statistics, except Pedroni's panel- ν statistic, confirm the cointegration with equal or higher confidence than those of FTA countries. By contrast, the strong version of PPP is not valid in all cases as indicated by results of Swamy's test of parameter constancy.

To see the effect of the numeraire currency on test results, the US dollar numeraire case is also examined. When the US dollar is used as the numeraire, the results on univariate unit root tests remain unchanged that the real exchange rates are not stationary. In addition, Engle-Granger cointegration test reports quite similar results in resisting PPP. For Johansen multivariate cointegration test, only Japan and Singapore are found to have cointegration between exchange rate and price ratio. Furthermore, testing for cointegration using panel approach also yields similar results to the case of Thai baht numeraire.

The major change is in the results of panel unit root tests of real exchange rates. While stationarity of real exchange rates in panel of FTA partners is still overwhelmingly rejected, the results of SEA countries are dissimilar. Unlike the Thai-numeraire case, in this case, panel unit root tests of the first generation fail to confirm the relative PPP. Only the tests that account for cross-sectional dependence can reject the unit root of real exchange rates. Even though the results are changed, the conclusion is consistent with the Thai baht numeraire case. This confirms the previous conclusion that relative PPP does not hold among Thailand and FTA partners, but holds among Thailand and SEA neighbors. The reason why panel unit root tests of the first generation cannot assert PPP is that cross-sectional dependence in real exchange rates makes the choices of the numeraire affect the results, as suggested by O'Connell (1998). When the cross-sectional dependence is taken into account, relative PPP can again be validated.

Based on the findings that more evidence is found in case of Thai baht numeraire than the case of US dollar numeraire, this is because Thailand and SEA neighbors are close and share many common characteristics. Accordingly, it is sensible that relative PPP holds among these countries. Moreover, PPP is likely to hold when the numeraire country and other countries included in the study have similar economic growth rate (Alba and Papell, 2007; Lopez and Papell, 2007).

In addition, since SEA countries are located much closer to Thailand than to the United States, the transportation cost between them and Thailand may be negligible, but not for the case of United States. When transaction cost is significant, one of the underlying assumptions of PPP is violated. Subsequently, international arbitrage may not happen and this leads to the random walk in real exchange rates.

5.2 Limitations and Suggestions for Further Studies

There are some limitations of this study.

1) As noted in the first chapter, each country's CPI may be constructed differently, i.e. different commodities in basket, different weights among countries. Moreover, some commodities included in basket may not be *traded* goods. This might affect the precision of test and also the interpretation.

2) Since the CPI data of China is not available, they were calculated by the reported ‘percentage change relative to the same period of the previous years’ series. The error in each period is propagated through all remaining years. This can lead to data distortions in the series.

Suggestions for further studies can be listed as:

1) Since the FTAs period for Thailand is quite short, the data might be not extensive enough for long run PPP to be detected. It is worth verifying long run PPP when we have enough data available.

2) Besides applying unit root tests that allow for cross-sectional dependence, the bootstrap methodology can be applied to test for PPP as well. This approach can not only account for cross-sectional dependence, but also be a reliable choice when the sample size is small.