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The Real Exchange Rate: Assessment and Trade Impact in the Context of Fiji and Samoa

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Abstract

This paper provides an assessment of real exchange rate measures and their impact on trade performance with special reference to two Pacific island countries, Fiji and Samoa. The analysis shows that the commonly used CPI-based real effective exchange rate (REER) measure provides a useful starting point of assessment, but alternative measures based on other price and cost indices should be used to check the robustness of the results, particularly given the large impact of global commodity prices on small open economies. The paper also offers some illustrations of how to quantify the impact of exchange rate movements on trade, especially in the face of data constraints in small open economies.

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I. INTRODUCTION

The real exchange rate has recently resurfaced in the policy debates relating to the economic performance and macroeconomic policies adopted by Pacific island countries (PICs). Following the 2008 global financial crises (GFC), most PICs experienced a general appreciation of their currencies, which have had implications for domestic price levels and the external competitiveness of these island economies that rely quite heavily on international trade. In this context, the question of whether these economies' exchange rate policies have contributed to their uneven export performance has emerged as an important policy issue. PIC experiences suggest that with a pegged exchange rate (except Papua New Guinea which has a de facto crawl-like arrangement with a de jure free float regime) the real exchange rate usually becomes misaligned over time as domestic inflation outcomes often exceed those in their trading partners. In this regard, competitiveness assessments are a critical element in evaluating PICs' macroeconomic performance and the sustainability of the various economic policies.

Examining a country's international/price competitiveness often begins with an evaluation of the real exchange rate. It is widely documented that a theoretical or empirical assessment of the real exchange rate is fraught with conceptual and methodological challenges that are even more pronounced for small island economies. These challenges include the ambiguities associated with the definition of the real exchange rate itself, the choice of the price index to be used, difficulty of computing proxies for analytical constructs and general non-comparability with advanced country studies that ultimately affect the usefulness of conventional competitiveness assessments for PICs. Notably, this raises a key policy issue about the appropriateness of existing measures of PICs' real exchange rates, particularly the commonly used consumer price index (CPI) based real exchange rate.

As such, this paper will begin with a revisit of the theoretical background on real exchange rates and move to a discussion in Section III on the conceptual definitions and the challenges associated with the conventional measurement of the real effective exchange rate (REER). Section IV details the evolution of exchange rates in Fiji and Samoa, the two PICs of focus in this paper. Section V involves a deeper look at the informational content of the CPI-based REER with regards to external competitiveness assessments, developing into a discussion about how the CPI-based measure may be modified and disaggregated to provide more relevant and potentially more meaningful results. The next section takes the price competitiveness assessment to a sectoral level, firstly taking a look at the price competitiveness of both Samoa and Fiji's tourism industries, secondly estimating an export demand function for Fiji's tourism industry and then simulating the impact of a nominal devaluation of the Samoan tala on Samoa's imports, exports and trade balance as an illustrative exercise. The paper ends with a concluding section.

II. THEORETICAL BACKGROUND

Theoretically, calculating the real exchange rate—the product of the nominal exchange rate and the relative price level—should be quite simple. In practice, however, each country's currency is affected by the movements in several bilateral exchange rates, necessitating the use of some form of weighted average of simple bilateral rates, or real effective exchange rates (REERs).

Since REER indices measure how nominal exchange rates, adjusted for price differentials, between a particular country and its trading partners have evolved over time, important choices have to be made about the three components of the REER measure, i.e. the number and range of trading partners to be considered, the relative weights, and the appropriate domestic price measure to be used. In general, the real effective exchange rate of a country (Q_i) can be expressed as:

$$Q_i = \prod_{j=1}^{n} \left(\frac{P_{it} S_{ijt}}{P_{jt}^*} \right)^{\omega_{ij}} \qquad (1)$$

Where P_i measures the domestic price level for country i; P_j^* the foreign price level in country j; S_{ij} being the relevant nominal exchange rate (expressed as foreign currency per unit of domestic currency); and ω_{ij} is the weight of country j in country's i's effective rate index. Since this measure is used as an indicator for international competitiveness, a fall (depreciation) in the REER should result, ceteris paribus, to an improvement in a country's real trade balance.

The selection of which bilateral rates to incorporate and the relevant weights is a function of the question of interest. Import shares, share of total trade (exports plus imports) with major trading partners or foreign currencies are different ways in which weights may be derived. It is useful to note that such measures indicate only competitiveness vis-à-vis trading partners and do not capture the competitiveness of domestic exports vis-à-vis third country competitors in trading partner markets. Nevertheless, weaknesses in data availability and quality will obviously limit the number of trading partners to be considered, and the usefulness of a broader measure of the REER depends on whether these alternative approaches provide a different view of a nation's competitiveness situation. A study of Canada's international competitiveness by Lafrance et al. (1998) confirmed that while different weighting schemes provided complementary information, the choice of country weights were not seen to significantly affect competitiveness measures for Canada as most trade is with the United States.

The choice of the price index is also key as the real exchange rate using different price series may move in very different ways (Driver and Westaway, 2003; and Bayoumi et al., 2011).

In the Canada study mentioned above, the choice of the price index was the critical factor. Ideally the price series should be representative of the price conditions (comprise a representative basket of (traded goods and services) that is comparable across countries, be relatively free of measurement errors, and reflect underlying price trends (Lafrance et al., 1998; and Ellis, 2001). The most widely used price series is the CPI, which is timely, easily available and is an appropriate index for the comparison of prices facing consumers in different countries. Nevertheless, the CPI has certain limitations as an indicator for competitiveness as they include only consumer goods and services and incorporate prices of both tradables and nontradables, and both domestic and foreign goods and services. Core or underlying price measure may also be used, but data availability may prevent certain currencies being included in a real exchange rate index. GDP deflators, which are generally comparable across countries, are also used in constructing real exchange rate measures, but they are not as easily available as the CPI.

While prices of nontradables or output prices remain a useful indicator for analyzing price competitiveness of domestic exports, the price indices for these commodity groups are often not available directly for most countries and therefore have to be constructed. Since a major difficulty relates to finding a good proxy for nontradables or domestic goods, the use of the CPI or wholesale price index is still problematic as the weights in these alternative price indices are still very different across countries. For instance, a rise in a given commodity price may yield a misleading change in relative levels of competitiveness (Di Bella et al., 2007). Other criticisms about the use of the CPI are that it does not measure production costs. Hence, in order to measure changes in competitiveness, it is conceptually preferable to deflate the nominal exchange rate by production costs or producer price indices (PPIs), instead of consumer prices. Nevertheless, unit labor costs (ULCs) and PPIs are generally unavailable for many low income countries. In addition, PPIs include both traded and nontraded goods prices whose coverage and weights may vary considerably across countries.

III. THE EVOLUTION OF EXCHANGE RATES IN FIJI AND SAMOA

This section provides a first look at exchange rate developments from 2005 to 2013, with a focus on the 2008 global food price shocks and their associated impact on trade for Fiji and Samoa. Looking at the conventional measure of the REER—nominal exchange rates adjusted for CPI differentials—the measures for both Fiji and Samoa appreciated considerably over 2007 to 2011, barring the devaluation of the Fijian dollar in the second quarter of 2009 (Figure 1). In contrast, their respective NEERs have remained almost flat over the same period, which implies that price differentials drove most of the movement in the aggregate real effective exchange rate measures. In the final quarter of 2008, Samoa's REER had appreciated by 18.9 percent over the fourth quarter of 2007, compared to 6.1 percent annual rise in Fiji's measure for the same period.

Figure 1. Fiji and Samoa: REER and NEER, 2005–2013
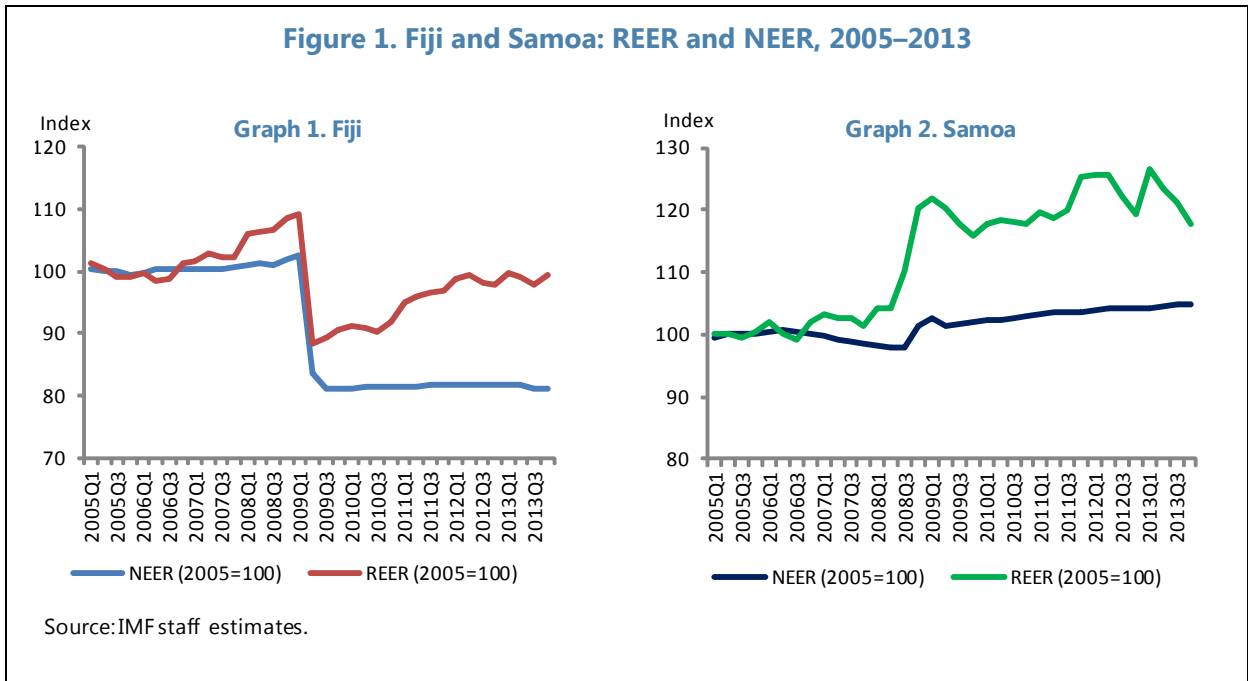
Inflation outcomes during this period reveal a pick-up in general prices from late 2007 through 2008, much more obvious in the Samoan case (Figure 2). In effect, the sharp run-up in global fuel and food prices in 2007 and 2008 accounted for these elevated inflation outcomes and by extension the real appreciation for both economies.

Figure 2. Fiji and Samoa: CPI, 2005–2013
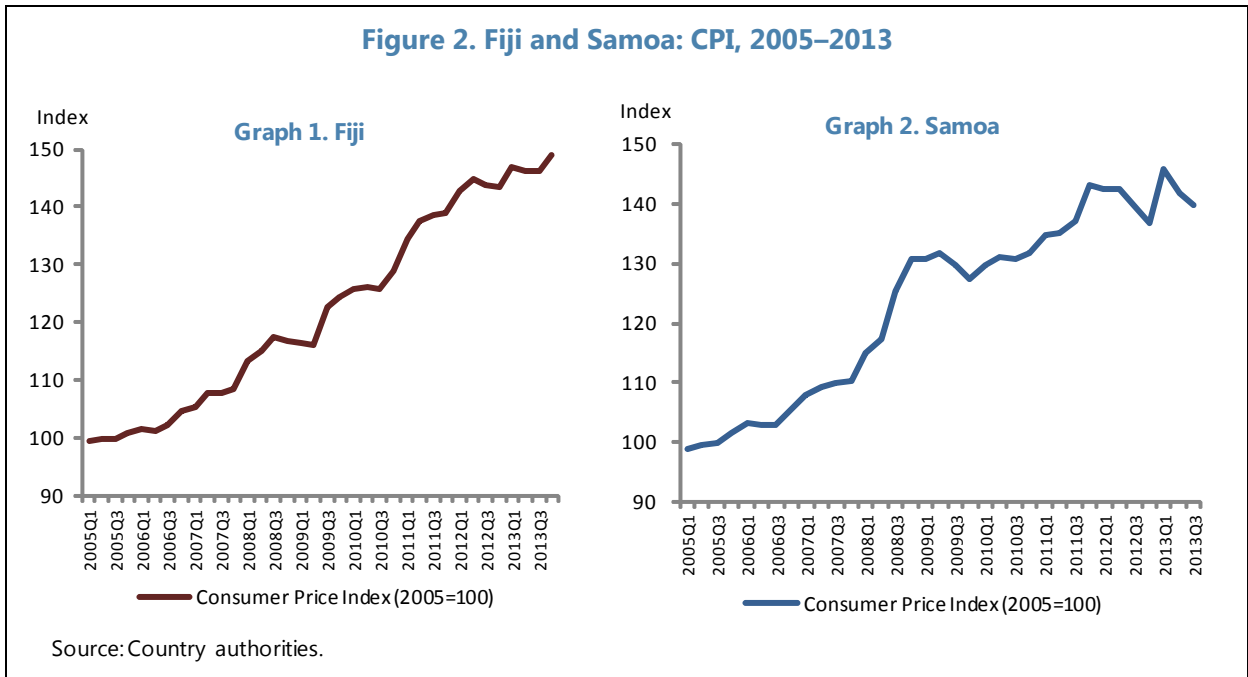
Looking at this 2008 global food price shock, the consequent appreciation of the CPI-based REER could be overstated due to the large share of food in PIC CPIs. This raises the critical question whether terms of trade shock-induced real exchange rate appreciation does weaken these countries' competitiveness as the CPI-based REER may overstate these effects. If so, this episode would provide a specific example of the conceptual shortfalls of the CPI-based REER that were outlined above in general terms.

Figure 3. Fiji and Samoa: REER and Merchandise Exports, 2005–2013

Sources: Country authorities and IMF staff estimates.
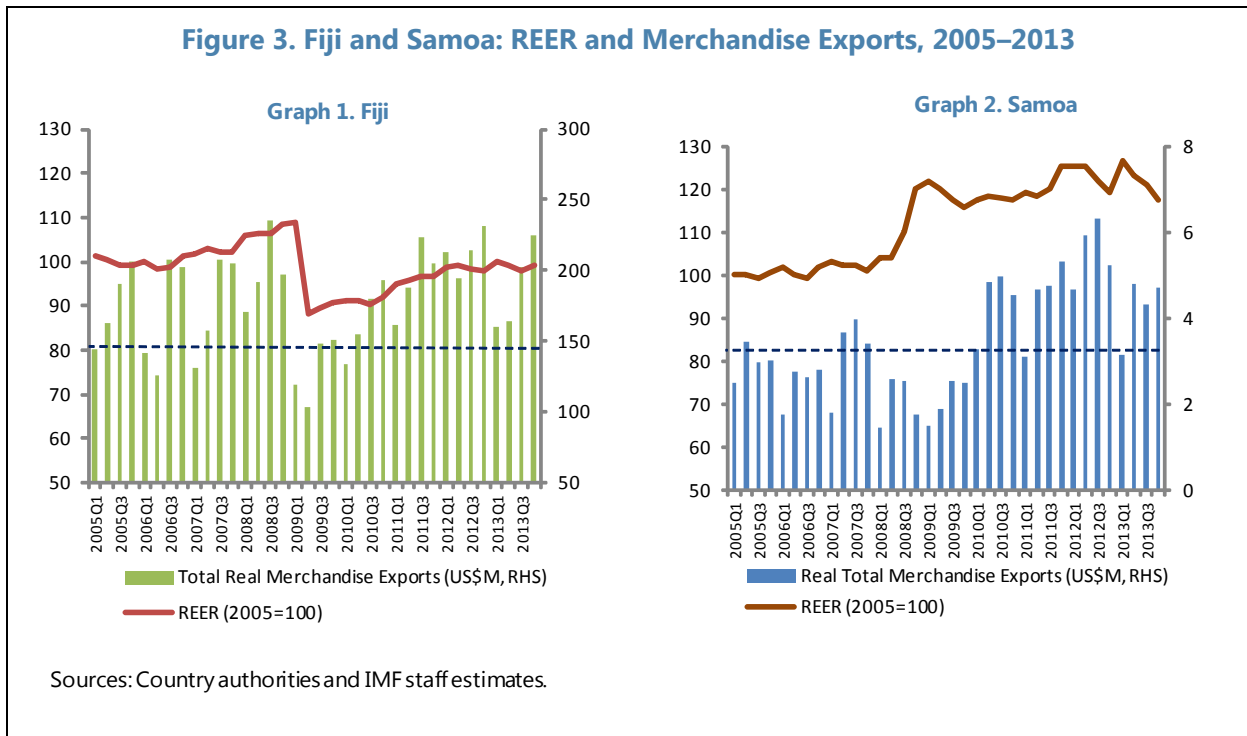
Considering the evolution of merchandise exports and focusing on the 2008 period when global food prices were at elevated levels, Samoa's exports had fallen by around 40 percent in the third quarter of 2008 in U.S. dollar terms relative to a year earlier, compared to a 14 percent rise in Fiji's goods exports for the same period. However, Samoa suffered a major shortfall in fish catch in 2008, and excluding fish exports from the data, Samoa's exports fell by about 5 percent during the period. Hence, real exchange rate appreciation seems to have been associated with deteriorating export performance, but the question whether elevated food and fuel prices had an adverse impact on competitiveness remains without a clear-cut answer.

Looking beyond the third quarter of 2008, the effects of the GFC and the Samoan tsunami and Fijian flood in 2009 complicate the visual inspection of exchange rate and trade developments during this period. Nevertheless, with the second quarter of 2009 devaluation of the Fijian dollar, it would be interesting to see how the export of services fared in both these countries by 2010 following this change in Fiji's nominal exchange rate. By the last three quarters of 2010, services credit in Fiji was growing on average by 23 percent on an annual basis in U.S. dollar terms while the recovery in Samoa was relatively weaker at

around 7 percent.[1] The same trend continued in 2011. Pinning down empirically the contribution of exchange rate changes to the actual outcomes in tourism and the trade balance is taken up in succeeding sections, but the visual inspection here provides a first hint that price competitiveness in general does seem to matter for both countries.

Figure 4. Fiji and Samoa: Services, 2005–2013

Sources: Country authorities and IMF staff estimates.
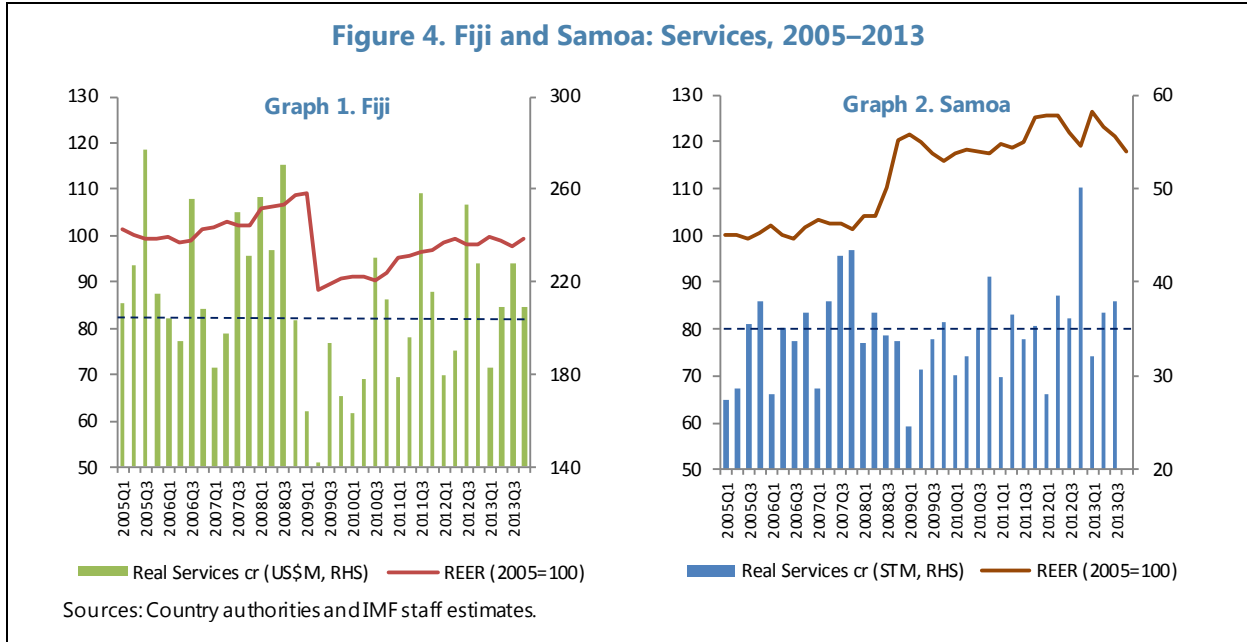
IV. MEASURING THE REAL EXCHANGE RATES IN FIJI AND SAMOA

A. Conceptual Issues

In the PIC region, data limitations mean that CPI-based REER measures are the most readily produced. A deeper look at the information content of the CPI-based REER reveals that the measure contains useful elements critical to competitiveness assessments and external/internal balance measures.

Taking into account only one trading partner country, for simplicity, and beginning with the definition of the CPI-based real exchange rate yields:[2]

$$q_t \equiv s_t - p_t + p_t^* \tag{1}$$

Where q_t denotes the (natural logarithm) of the real exchange rate; s_t is the log of the nominal exchange rate defined in units of home currency per unit of foreign currency (where

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[1] Tourism accounts for a predominant share of service exports for both Fiji and Samoa.

[2] This analysis draws heavily on Chinn (2006).

an increase in the exchange rate indicates a depreciation); p_t is the log of the domestic CPI level and p_t^* is the CPI level in the trading partner country, measured in foreign currency.

Decomposing the CPI basket into tradable and nontradable components, firstly for the home country, yields:

$$p_t \equiv \alpha \cdot p_t^N + (1 - \alpha) \cdot p_t^T \tag{2a}$$

Where p_t^N denotes nontradable prices, p_t^T tradable prices, and α the weight of nontradables in the CPI basket of the home country.

The CPI is defined for the trading partner country as below:

$$p_t^* \equiv \alpha^* \cdot p_t^{N*} + (1 - \alpha^*) \cdot p_t^{T*} \tag{2b}$$

Inserting (2a) and (2b) into (1), yields the expression for the CPI-based real exchange rate as follows:

$$q_t \equiv (s_t - p_t^T + p_t^{T*}) - \alpha \cdot (p_t^N - p_t^T) + \alpha^*(p_t^{N*} - p_t^{T*}) \tag{3}$$

The first term, $(s_t - p_t^T + p_t^{T*})$, measures the difference between tradable prices. Consider if purchasing power parity (PPP) holds, this term should be zero, since tradable prices would be the same across countries once converted into a common currency.

Extending from this and assuming that in the case where tradable prices diverge in the short and medium term and PPP consequently not holding, then:

$$q_t^1 \equiv (s_t - p_t^T + p_t^{T*})$$

Since lower tradable prices relative to trading partner countries will give the home country a competitive advantage and lead to an improvement in the trade balance, q_t^1 is a measure of price competitiveness.

Another variation of this concept focuses on the competition of the home country's exports on a third market with exports from other countries, particularly for non-homogenous goods where quality differences underpin price differentials. The relative price variable below is useful in measuring price competitiveness in the exports market:

$$q_t^2 \equiv s_t - p_t^X + p_t^{X*}$$

Going back to the other component of the CPI-based real exchange rate, we now focus on the second term, $(p_t^N - p_t^T)$. Effectively, differentials between nontradable and tradable prices

determine how production factors are allocated to these two respective sectors. Hence, this term can be interpreted as a measure of internal balance:

$$q_t^{3a} \equiv (p_t^N - p_t^T)$$

Considering internal balance holds simultaneously in the home and trading partner countries, and assuming $\alpha \approx \alpha^*$, this can be written as:

$$q_t^{3b} \equiv (\hat{p}_t^N - \hat{p}_t^T)$$

where the circumflex indicates inter-country log-differences.

These considerations suggest that the CPI-based real exchange rate comprises useful and key competitiveness and external/internal balance measures. For advanced and emerging market countries, the composition of their CPI baskets is likely to be relatively similar. In terms of equation (1) this means the assumption above $\alpha \approx \alpha^*$ is justifiable; hence the CPI-based real exchange rate can be simplified as follows:

$$q_t \equiv (s_t - p_t^T + p_t^{T*}) - \alpha \cdot (\hat{p}_t^N - \hat{p}_t^T) \tag{4}$$

The CPI-based real exchange rate becomes a measure of internal balance if one assumes that trade integration and low transportation costs ensure that PPP holds, meaning$(s_t - p_t^T + p_t^{T*}) \approx 0$. Otherwise, the CPI-based real exchange rate can be used as a measure of price competitiveness if these countries are approximately in internal balance, i.e., $(\hat{p}_t^N - \hat{p}_t^T) \approx 0$.

However, this simplification may not apply to Fiji and Samoa. To begin with, the composition of their CPI baskets is very different from that of their trading partner countries. Technically, this means $\alpha \neq \alpha^*$. A specific issue in this context is the large share of food in PICs' CPI baskets. While food accounts for less than 20 percent of the Australian and New Zealand CPI baskets, the corresponding share for both Fiji and Samoa is close to 50 percent. Therefore, with any sharp run-up in international food prices, overall inflation in both PICs will rise much more than in their trading partner countries. Essentially, food price shocks can distort the analyses of external competitiveness for Fiji and Samoa since their CPI-based REER will interpret this resultant inflation differential as an appreciation in their currencies, an issue we touched upon in the previous section.

Specifically, by their nature global food price shocks affect all countries and should not negatively affect Fiji and Samoa's competitiveness necessarily more than other countries. However, food inflation in 2008 rose, on average, much more in Samoa and Fiji, compared to Australia. This suggests that the impact of the 2008 food price shock was indeed disproportionate, which raises the possibility that the impact on competitiveness was also disproportionate; if so, the loss of competitiveness indicated by conventional measures of external competitiveness such as the CPI-based REER for Fiji and Samoa could indeed be

the correct signal. Possible explanations for differential impact of food price shocks on competitiveness include: (1) variations in domestic supply response to the shocks; and (2) spill over into general inflation enabled by macroeconomic policy accommodation and/or greater food intensity in domestic production. Unfortunately, our first look at the data could not resolve whether the 2008 global food price shock episode had a disproportionate impact on competitiveness, leaving a question mark behind the usefulness of the CPI-based REER for these two countries. The next section will revisit this issue.

B. Alternative Aggregate Real Effective Exchange Rate Measures

Plotting headline CPI together with nonfood CPI shows that these two measures diverge markedly in 2008, which, by construction, should be due to significant increases in food inflation during the same period—this is exactly what happened during the 2007/2008 period. The obvious and consistent wedge between Samoa's two price measures after mid-2008 demonstrates the important role of food in the country's CPI basket (Figure 5, Graph 2). Hence, any alternative aggregate REER measure for Fiji and Samoa must address the role of food inflation, given the importance of price differentials in real exchange rate assessments.

Figure 5. Fiji and Samoa: CPI and Nonfood CPI, 2005–2013

Source: Country authorities.
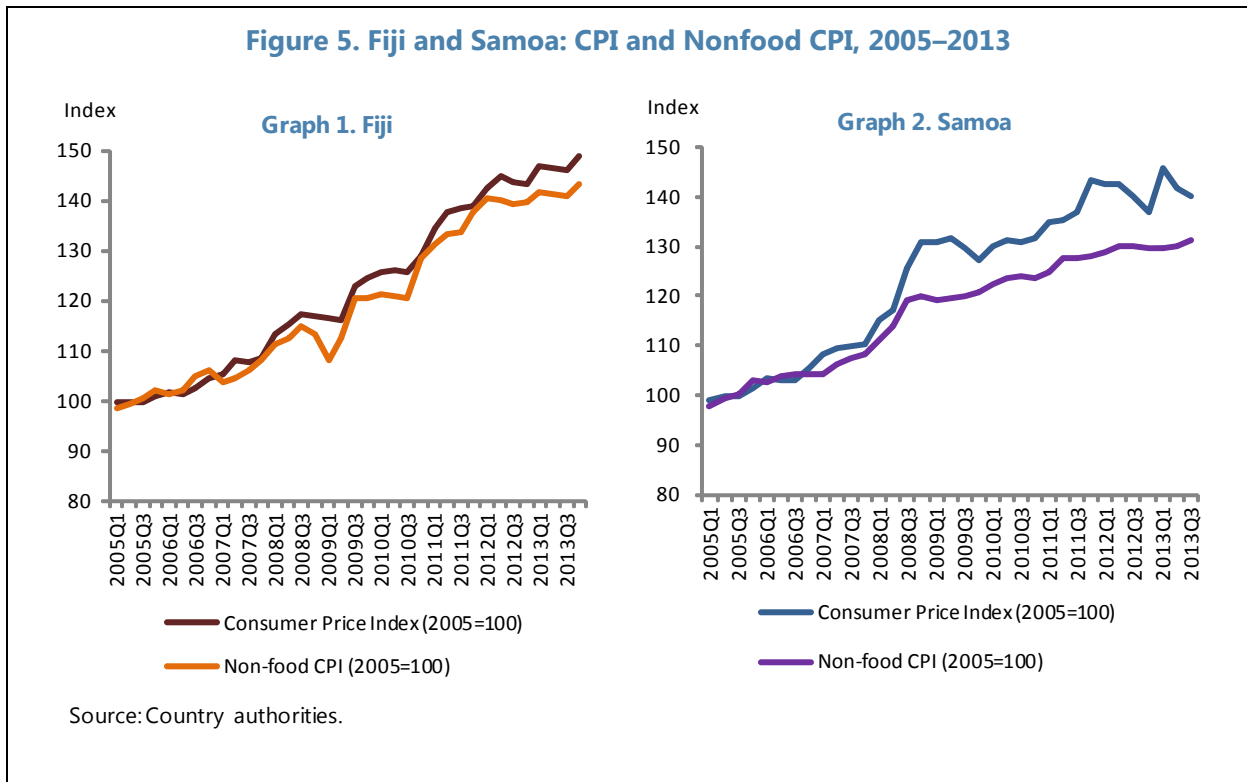
The first alternative REER measure re-weights trading partner CPI baskets to match the composition of the Fiji and Samoa baskets,[3] to address how inflation outcomes in both these PICs rise much faster following international food price shocks on account of their large food CPI basket weights.[4] For Samoa, while its conventional CPI-based REER appreciated by around 25 percent by the last quarter of 2011 from the first quarter of 2005, the re-weighted aggregate measure rose by 22 percent (Figure 6, Graph 1). For Fiji, the analyses are complicated by the devaluation in the second quarter of 2009, so focusing on the first quarter of 2009, the CPI-based REER appreciated by approximately 7 percent from the first quarter of 2007, while the re-weighted REER yielded an appreciation of 6 percent (Figure 7, Graph 1). The very small wedges between the CPI-based and reweighted REER measures for the two countries (Figures 6 and 7, Graph 1) indicate that re-weighting the CPI baskets has quite limited effect on the assessment of the real appreciation during this period for Fiji and Samoa. The key issue here is that food inflation in these PICs outpaced food inflation in Australia and New Zealand quite significantly during the review period, rather than the relatively high weight of food in Samoa and Fiji's CPI baskets.

Figure 6. Samoa: CPI-based REER and Alternative Measures
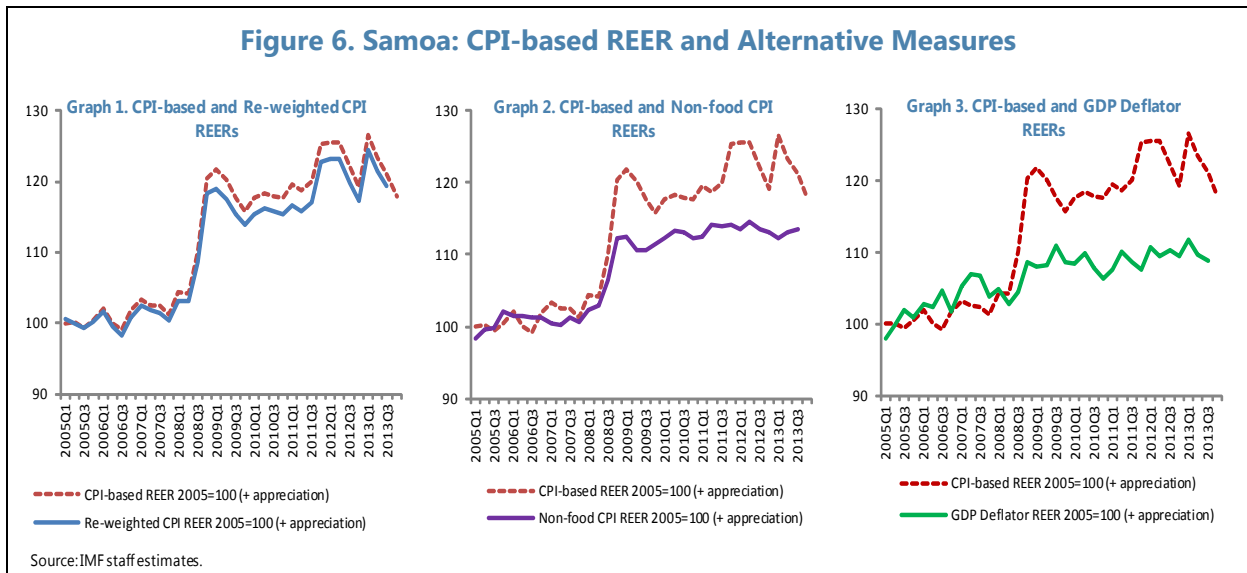
The second and third alternative aggregate REER measures use core prices and the GDP deflator to address the 'food centric' biases in the Samoa and Fiji CPI baskets. In the Samoan case, the nonfood CPI REER showed an appreciation of around 16 percent by the fourth quarter of 2011, compared to the first quarter of 2005 (Figure 6, Graph 2). While lower than the 25 percent appreciation on the CPI-based REER, this result remains quantitatively important. The consistent wedge between these two REER measures for Samoa from mid-2008 onwards suggests that food inflation had indeed spilled over (albeit not completely) to general inflation and consequently affected Samoa's competitiveness. For Fiji,

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[3] The total weight of food in the Fiji and Samoan basket adds up to around 40 and 52 percent, compared to the corresponding approximately 17 percent and 19 percent weights for Australia and New Zealand.

[4] For this exercise, we are adjusting only the CPI basket weights and keep the bilateral trade weights constant, i.e., we do not change the composition of countries included in the REER index.

the results are less obvious but similar to the general outcomes of the Samoan case (Figure 7, Graph 2). This result is perhaps not surprising given that Fiji is a more diversified economy and its price pass-through from the food to nonfood sector is probably weaker than in Samoa.

Figure 7. Fiji: CPI-based REER and Alternative Measures
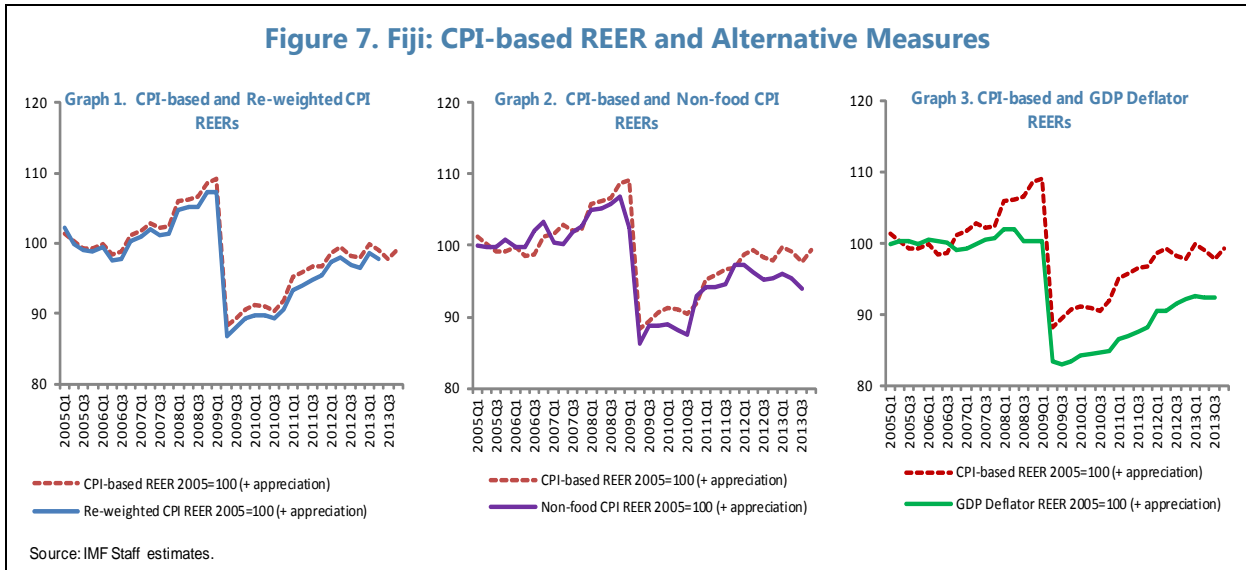
The GDP deflator is used as the price variable in the third aggregate alternative real exchange rate measure. With this measure, real appreciation for Samoa amounts to around 10 percent (Figure 6, Graph 3). For Fiji, the GDP deflator-based REER appreciated by 1 percent by the first quarter of 2009 from the first quarter of 2007 (Figure 7, Graph 3).

In summary, Fiji's and Samoa's experiences show that external shocks can undermine a country's competitiveness when their effects spillover to general inflation. Alternative aggregate price measures confirm that the real appreciation of the Samoan tala and the Fijian dollar in the periods under focus cannot be solely attributed to the differences in the CPI baskets between these two PICs and their trading partners.

C. Bilateral Real Exchange Rate Measures

The purpose of examining bilateral real exchange rates is to have a more disaggregated view of competitiveness.[5] Both Fiji and Samoa's aggregate REER measures were driven by price differentials (relatively flat NEER against a largely appreciating aggregate REER) during the period 2005–2013.

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[5] Results for Fiji are not presented as they are similar to those of Samoa.

The analyses of bilateral real exchange rates reveal different roles played by price and nominal exchange rate movements in driving the appreciations of the bilateral real exchange rates. In nominal terms, the Samoan tala largely depreciated against the Australian dollar from 2005 to 2012 (Figure 8, Graph 1), the bilateral real exchange rate remained broadly constant. The 2012 nominal value of the Samoan tala against the New Zealand dollar has been largely comparable to its 2005 value with noticeable exchange rate movements in the intervening period (Figure 8, Graph 2). It is the higher inflation in Samoa that has led the significant real appreciation of the Samoan tala against the Australian dollar and New Zealand dollar. In contrast, the bilateral real appreciation rate against the U.S. dollar since 2005 has been driven by both nominal appreciation of the Samoan tala and the higher inflation in Samoa (Figure 8, Graph 3).

Figure 8. Samoa and Trading Partners: Bilateral Exchange Rates & Price Differentials
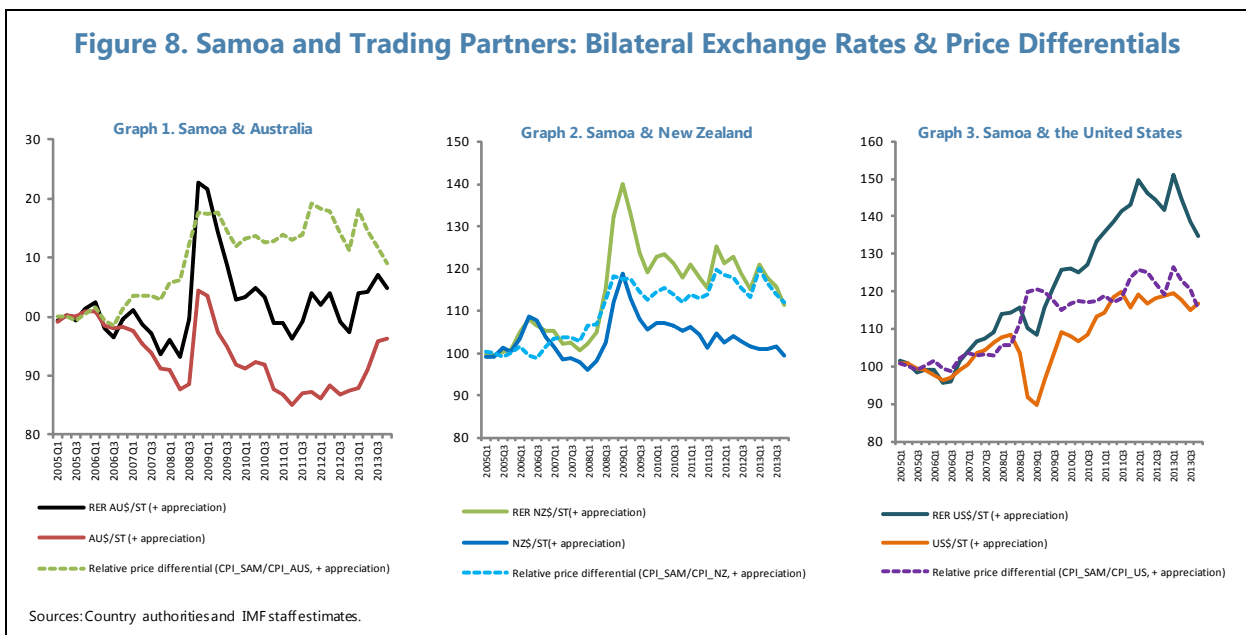
In summary, bilateral exchange rate analyses confirm that while Samoa lost in overall competitiveness during the period 2005–12, this is largely due to the real appreciation of the Samoan tala against the U.S. and New Zealand dollars, while its competitiveness against the Australian dollar remained largely unchanged. The United States and New Zealand are relatively more important tourist source markets for Samoa than for Fiji, and the Samoan tala's real appreciation against the U.S. dollar and New Zealand dollar may explain in part Samoa's relatively poor performance in tourism during the period. Evidently, there is usefulness in unpacking the content of the CPI-based REER into bilateral relations in order to gain insight into a country's external competitiveness.

V.   ASSESSING PRICE COMPETITIVENESS AT THE SECTORAL LEVEL

A.   Measuring Fiji's and Samoa's Price Competitiveness in the Tourism Industry

Both Fiji and Samoa have sizeable tourism sectors, hence an analysis of the price competitiveness of these sectors is a useful starting point for a better measurement of external competitiveness.

The focus in this section is the comparison of Fiji and Samoa's tourism prices with their competitors, as expressed in the equations below:

$$q_t^2 \equiv s_t - p_t^X + p_t^{X*}$$

Samoa's central bank produces a tourism price index (TPI), while for Fiji, its tourism price is derived via the GDP deflators for the hotels & restaurants, air transport and activities of other transport agencies categories forming a composite tourism sector deflator.

Plots of the two countries' inflation outcomes against their respective tourism prices show that the measures track each other quite well (Figure 9). For Fiji, while the heavy discounting by the tourism industry in 2007 following the December 2006 coup may have explained the slowdown in tourism prices during that year, but overall there has been a gradual increase in the country's tourism composite deflator that was only interrupted temporarily by the 2009 devaluation of the Fiji dollar (Figure 10, Graph 1).

Figure 9. Fiji and Samoa: Tourism Price Indices, 2005-13
(US$, 2005=100)

Sources: Country authorities and IMF staff estimates.
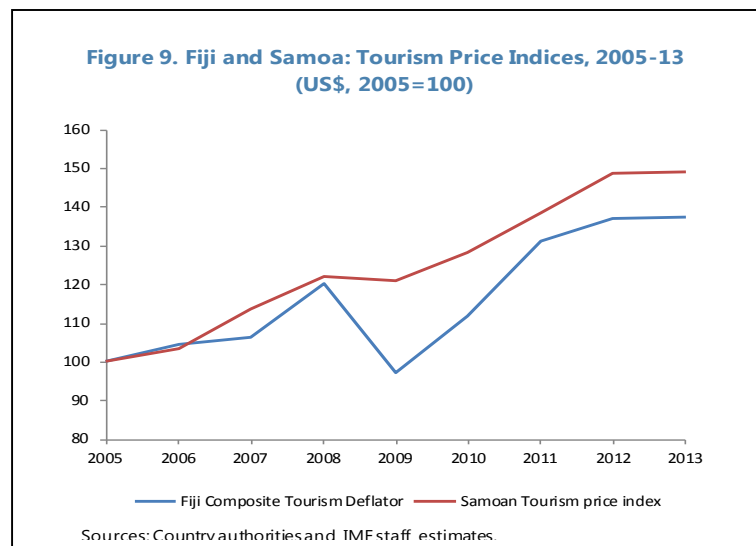
For Samoa, there has also been a consistent rise in its tourism price index since 2005, particularly through 2007 and 2008 as the run-up in global food prices raised tourism prices and headline CPI. The Samoan tala also temporarily depreciated during the GFC which raised the accommodation component of the TPI, particularly for those hotels that price rooms in U.S. dollars, but this devaluation was much less than the Fijian dollar devaluation.

Both Fiji and Samoa compete with fellow neighbors for tourism, in particular the Cook Islands and Vanuatu, and destinations in Asia including Bali, Indonesia and Thailand. Hence, a useful further step would be to compare the tourism price indicators—measured by GDP deflators for tourism-related sectors—of these other destinations with Fiji and Samoa's tourism prices. For comparability, all prices are converted to U.S. dollars and indexed to a base year of 2005=100.

Figure 10. Fiji and Samoa: Tourism Price Indicators, 2005–13

Sources: Country authorities and IMF staff estimates.
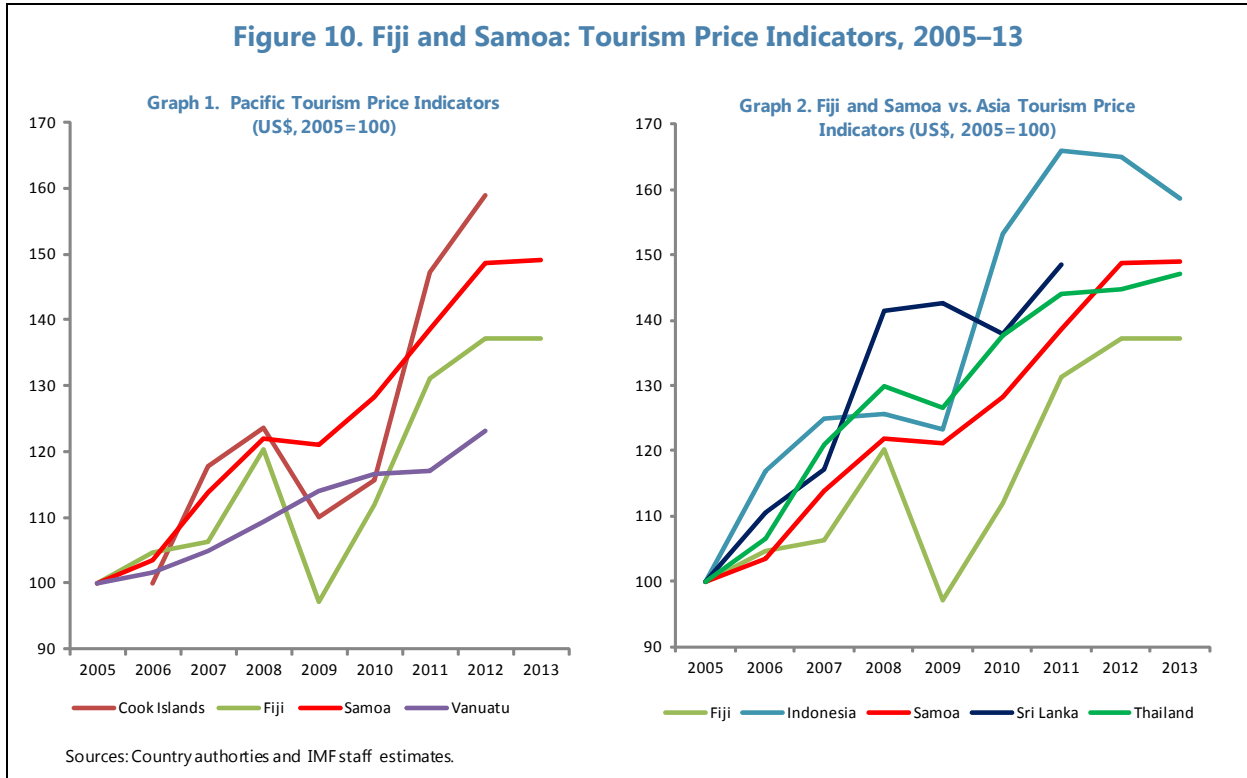
Looking first at the region, Vanuatu ranks consistently as the major cost-competitor to Fiji and Samoa from 2005 to 2013 (Figure 10, Graph 1). While the 2009 devaluation of the Fijian dollar certainly assisted the country's competiveness in 2009, Fiji's tourism prices have consistently risen since then. Looking at prices in general, domestic price pressures have been relatively lower in Vanuatu, compared to Fiji and Samoa.

A comparison with Asian competitors places Fiji and Samoa in better stead. While both PIC currencies appreciated against the U.S. dollar in real terms from 2005 to 2012, these two countries gained in price competitiveness against their Asian competitors (Figure 10, Graph 2). Both general price and exchange rate factors help explain these outcomes.

Firstly, domestic inflation in Indonesia, Sri Lanka and Thailand outpaced that of Fiji and Samoa, reflective of stronger demand in Asia during the review period. Secondly, individual Asian countries such as Thailand also experienced a substantial nominal appreciation against the U.S. dollar. A useful next step is to assess whether changes in price competitiveness have a noticeable impact on tourism. This involves the use of trade equations and determining relevant trade elasticities, which is the focus of the next section.

B. Estimating an Export Demand Function for Fiji's Tourism Industry [6]

Fiji's traditional major source markets for tourists include Australia, New Zealand and the United States, and modeling tourism demand for Fiji with a focus on these countries suggests that key determinants will include aggregate real demand in Australia, New Zealand and the United States and a relative price variable of Fiji's tourism export price against similar prices in these source markets and competitor countries. Elasticities, which represent the response of export volumes to a change in relative prices, will also form a critical component of Fiji's tourism demand equation.
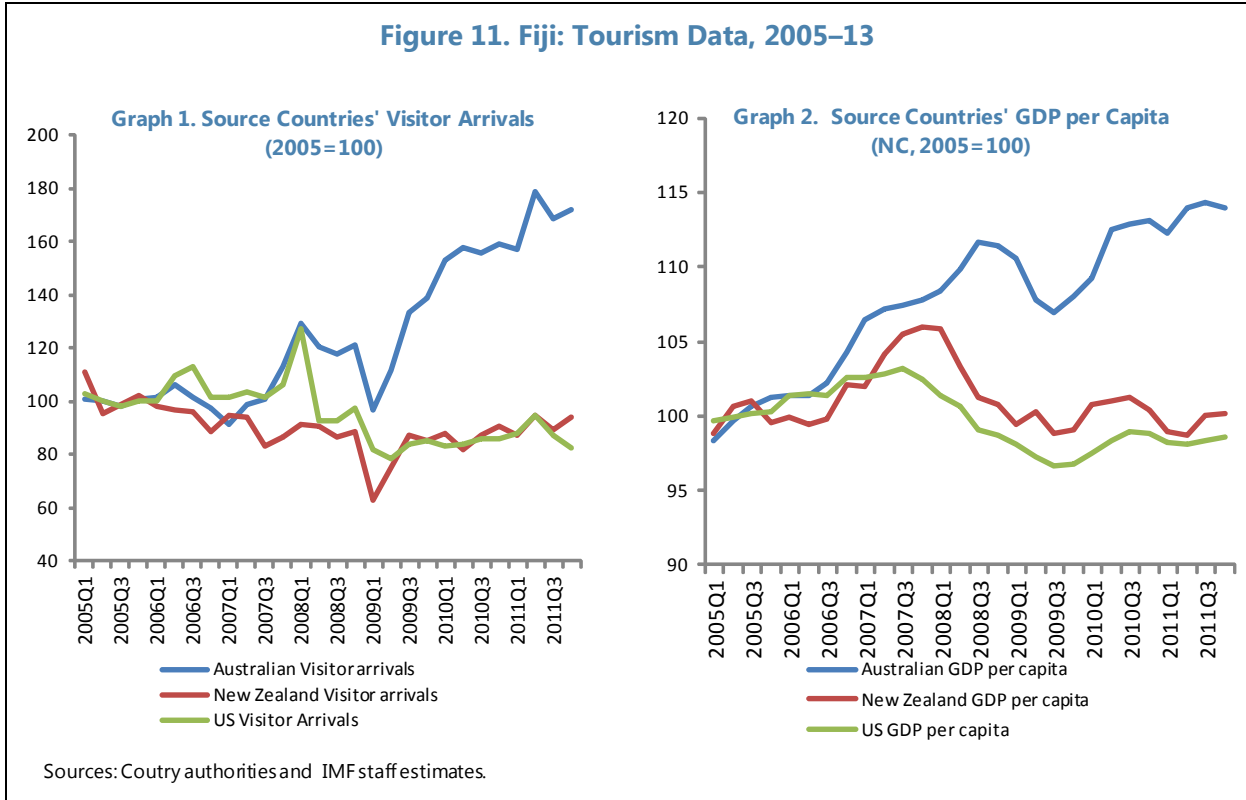
Typically, the level of aggregate real demand in trading partner countries, weighted by their respective trade shares, are positively related to income levels. In contrast, export demand depends negatively on the relative price variable that compares the home country's export price to prices of a similar product in its trading partner countries, with both prices expressed in the same currency. Since the primary focus is price competitiveness amongst competitors, constructing the relative price variable along these lines is useful and consistent with q_t^2 already used in the price comparison for the tourism industries in the Pacific and Asia regions above. This also addresses the issue about whether price competitiveness measures should also include competitors rather than just trading partners, as is the case with the CPI-based REER.

We tried to replicate Narayan (2004) who modeled Fiji's visitor arrivals as a function of real disposable income in source countries, Fiji's hotel price relative to substitute hotel prices in source countries, total cost of holidaying in Fiji relative to Bali (a competitor for Fiji's tourism), real airfares to Fiji and a coup dummy variable, while focusing on Australian, New Zealand and United States tourists to Fiji.[7]

Before the presentation of the model, it is useful to briefly review recent developments in Fiji's tourist sector. A visual inspection of visitor arrivals data shows that Australian visitors to Fiji have continued to grow since 2005, while visitors from New Zealand and the United States have remained flat post-2009 (Figure 11, Graph 1). Notably, tourist numbers from the United States turned downwards by the second quarter of 2008 as the effects of the GFC set in. The floods in Fiji in the first quarter of 2009 further depressed arrivals from the Unites States and underpinned the contraction in both Australian and New Zealand visitors during the same period.

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[6] This section draws on Miller, C., Rauqeuqe, L., and Wainiqolo, I. (2014).

[7] The corresponding equations are estimated on a bilateral basis, i.e., we estimated three separate equations trying to explain tourist arrivals from Australia, New Zealand and the Unites States. Detailed results for tourist arrivals from Australia are documented in an unpublished working paper (Miller, C., Rauqeuqe, L., and Wainiqolo, I., 2014), which is available upon request.

Figure 11. Fiji: Tourism Data, 2005–13

Graph 1. Source Countries' Visitor Arrivals (2005=100)

Graph 2. Source Countries' GDP per Capita (NC, 2005=100)

Australian Visitor arrivals
New Zealand Visitor arrivals
US Visitor Arrivals

Australian GDP per capita
New Zealand GDP per capita
US GDP per capita

Sources: Coutry authorities and IMF staff estimates.

The 20 percent devaluation of the Fijian dollar occurred in the second quarter of 2009. While arrivals from all three source countries picked up in the second quarter of 2009, it is hard to distinguish which part of the recovery was attributable to the weaker Fijian dollar and how much could be apportioned to base effects and seasonal factors, given that visitor arrivals usually pick up by June. Generally speaking, following the second quarter of 2009 Fijian dollar devaluation, the strong Australian dollar meant that Australian tourists found Fiji an increasingly affordable destination, similar to New Zealand tourists, albeit to a smaller extent (Figure 12, Graph 1). In contrast, the Fijian dollar was consistently gaining against the U.S. dollar from 2006 right through early 2009, which may have contributed to the declining trend of U.S. tourists to Fiji over the period. Post-devaluation, the recovery in Australian arrivals was much stronger than that registered for New Zealand and U.S. tourists.

Fiji's hotel price index (HPI) was derived by taking the food and accommodation component of hotel turnover data and divided this by room nights sold. The aim was to construct a relative price variable that measured the cost of a hotel stay in Fiji versus the cost of staying at the tourists' home country, measured through the country-specific CPI. Hence, the computed HPI were deflated by source country CPIs and converted to national currencies, respectively.

Figure 12. Fiji: Tourism Indicators, 2005–13

Sources: Country authorities and IMF staff estimates.
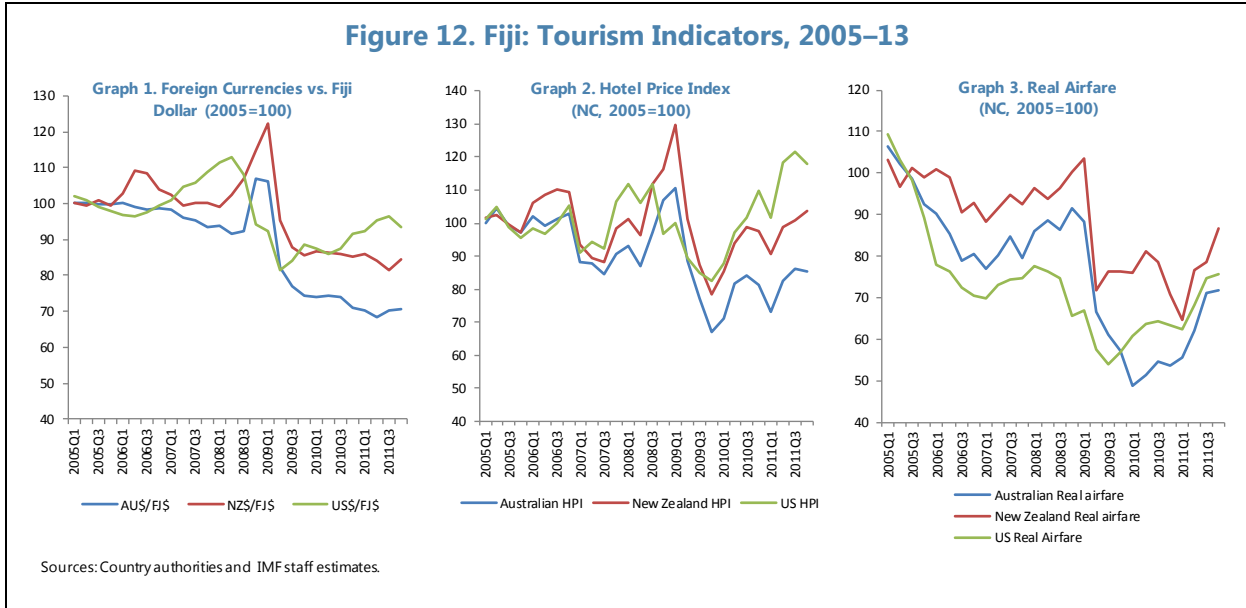
As can be seen from Figure 12, Graph 2, the HPI facing Australian tourists remained the lowest after the 2009 second quarter devaluation, indicative of the strength of the Australian currency. In contrast, by early 2011, American tourists were facing tourist prices in Fiji that were above the previous high levels registered towards the end of 2007.

Nominal airfare data from the three source countries (Sydney, Auckland and Los Angeles) to Nadi were sourced from Air Pacific Ltd., with the relevant CPI and exchange rate data used to derive real airfare (RAF) data (Figure 13, Graph 3). Unfortunately, we could not compute the key relative price data as was used in the Narayan (2004) study—i.e., the total cost of holidaying in Fiji relative to Bali or a similar market.

Returning to our Fiji model, it included the log of GDP per capita (GDPPC) of origin countries, log of the hotel price index (HPI), log of the real airfare (RAF) and two dummy variables, specified as follows:

$$lnVA_{ij,t} = \propto_0 + \propto_1 lnGDPPC_{i,t} + \propto_2 lnHPI_{ij,t} + \propto_3 lnRAF_{ij,t} + \propto_4 Coup_{j,t} + \propto_5 Flood_{j,t} + \varepsilon_t \quad (5)$$

The specification differs from Narayan (2004) in two ways: one, there is no substitute price to reflect prices in a competing/third country destination due to lack of data; and two, an additional dummy to account for the floods in the first quarter of 2009 is included.

Going from general to specific details, and looking at Australian visitors first, the coup and real airfare variables were removed for being insignificant and having the wrong signs. Other studies assert that the wrong sign for the airline variable is due to tourists booking/purchasing tickets ahead of travel dates, hence even if ticket prices fell within the quarter, this has little effect on the demand for pre-booked tickets.

So the modified model included variables for estimation as below:

$$lnVA_{ij,t} = \propto_0 + \propto_1 lnGDPPC_{i,t} + \propto_2 lnHPI_{ij,t} + \propto_3 Flood_{j,t} + \varepsilon_t \qquad (6)$$

Using the Akaike (AIC) and Schwarz (SBS) criterion favored a lag of order 1. In order to test for any long-run relationship between the remaining explanatory variables and visitor arrivals, the Wald Test was used to test for co-integration. The resultant Wald test for co-integration F-statistic fell below the 1 percent and 5 percent critical value bounds, thus the null hypothesis of no co-integration among the variables could not be rejected. In other words, evidence for a long-run relationship between Australian visitor arrivals and real Australian GDP per capita and also with the real hotel price index could not be established. Computing alternative measures for trading partner income and relative price variables for Australia to see if these substitute measures fared better in our estimations did not yield improved results.[8]

These results could point to the important role of competitors' relative prices in any model created to measure external competitiveness at the sectoral and by extension aggregate level. In particular for the tourism industry, the challenge of obtaining relative price variables is complicated by the widespread practice of providing tour packages to tourists. Packaging makes it difficult to distinguish between travel costs and local expenses in destination countries, particularly in the South Pacific region where family packages are popular. While packaging does not diminish the role of prices as determinants of tourist arrivals, it does make it harder to define relevant price variables to use and find a comparable price index to deflate them. It may also mean that in future studies, one may need to define more composite/comprehensive price variables to capture the effect of prices on tourist arrivals.

C. Trade Balance Response to the Exchange Rate

The central questions that have guided the discussions in the previous sections have been first, whether the CPI-based real effective exchange rate is a suitable indicator of competitiveness and which alternatives are available, and second, if a sector-by-sector analysis shows evidence for a competitiveness problem for Samoa and Fiji. The final question relates to assessing the trade implications of a change in the level of the nominal exchange rate, for instance, a devaluation.

In this section, we pursue the last question with an Excel-based simulation model based on Tokarick (2010) to assess the impact of changes to Samoa's exchange rate on its trade

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[8] Besides the autoregressive distributed lag (ARDL) approach documented here, we also used error correction models (ECM) and Johansen's approach to co-integration using vector autoregressive (VAR) models to test for co-integration but found no robust evidence for the existence of a co-integration relationship. The detailed results for the ARDL approach are documented in an unpublished working paper (Miller, C., Rauqeuqe, L., and Wainiqolo, I., 2014), which is available upon request.

balance.[9] This assessment of the impact on Samoa's trade balance is decomposed into three blocks that show (i) the import response to the exchange rate change, (ii) the export response and (iii) the trade balance response as the difference between the import and export responses. Key input for this exercise is assumptions on price elasticities and pass-through.

Imports

Starting with imports and focusing on price elasticities, we considered studies by Senhadji (1997), Lee et al. (2008) and Tokarick (2010) to get a sense of a plausible range of elasticities for Samoa. Given that Samoa is a small and highly open economy, its narrow production base suggests that there are few local substitutes for many imported products. This would tend to lower price elasticities. The above-mentioned studies show that cross-country summary estimates for import price elasticities fall between 0 and -2.5, while short-run elasticities have a shorter range between 0 to -1. The results for island countries were not very different.

Next, we considered more direct empirical evidence for Samoa regarding import price elasticities. Since the availability of local substitutes have a large bearing on trade elasticities, Samoa's imports were decomposed into three distinct groups depending on the availability of local substitutes:

- local substitutes are practically nonexistent (represented by imported fuel), with the import price elasticity expected to be low for this type of imports;
- local substitutes exist (represented by imported Portland cement), with price elasticity expected to be moderate; and
- local substitutes are easily available (represented by imported chicken cuts), with import price elasticity expected to be high.

Table 1. Price Elasticities for Select Samoa Imports			
	Fuel Products	**Portland Cement**	**Chicken Cuts**
Short-run price elasticity	-0.2	-0.5	-0.5
Long-run price elasticity	-0.2	Below -1	-1.5
Source: Authors' compilation.			

Table 1 above shows results for the estimation of elasticities for the three types of imports listed above. Beginning with imported fuel, a result of -0.2 is consistent with expectations since imported fuel products in Samoa have very few local substitutes. This suggests that a short-run (SR) price elasticity close to zero and a long-run (LR) elasticity between -0.1

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[9] This exercise can be easily replicated for Fiji. However, given that the purpose here to demonstrate how to apply the methodology, we focus on the Samoan case only. The results for Fiji would be very similar given that the simulation results depend for the most part on our export and import elasticity assumptions, which probably are in a similar range for Fiji and Samoa.

and -0.5 are plausible for this group of imports. For Portland cement, estimated price elasticities are in line with the low- to mid-range suggested by international evidence on products with some but imperfect local substitutes. While one would expect relatively larger price elasticities for the last group, the mid-range, short-run estimate for chicken cuts could reflect supply constraints, particularly for agricultural products, that make a large short-run supply response unlikely in Samoa. Nevertheless, the LR elasticity of about -1.5 is consistent with many countries' experiences, falling into the upper range of international estimates.

The model developed by Tokarick (2010) specifies the percentage change (denoted by ' $\widehat{}$ ') in the equilibrium import price ($\widehat{P}_M^*$) in foreign currency as a function of the import demand elasticity η_M, the pass-through coefficient ϕ_M, the import supply elasticity ε_M, and the change in the U.S. Dollar/Samoan tala exchange rate $\hat{r}$:[10]

$$\widehat{P}_M^* = \frac{-\eta_M \phi_M}{(\phi_M \eta_M - \varepsilon_M)} \hat{r} \tag{7}$$

An appreciation of the U.S. Dollar/Samoan tala exchange rate by 10% ($\hat{r} = -10\%$) is approximately equivalent to a 10% depreciation of the Samoan tala against the U.S. dollar. Hence, the factor $\frac{-\eta_M \phi_M}{(\phi_M \eta_M - \varepsilon_M)}$ determines by how much the equilibrium import price would decline upon a devaluation of the Samoan tala. A key factor is the import supply elasticity, ε_M: the 'small country' assumption would suggest that Samoa's import supply elasticity is very large (e.g., $\varepsilon_M = 10,000$), resulting in $\frac{-\eta_M \phi_M}{(\phi_M \eta_M - \varepsilon_M)}$ being very small, which implies that the equilibrium import price would generally remain unchanged in response to a depreciation of the Samoan tala. This is a realistic assumption for almost all of Samoa's imports.

The pass-through equation 8 shows by how much a change in the international import price and/or the exchange rate will lead to a change in the domestic currency import price via the pass-through coefficient ϕ_M, with the import price expressed in tala ($\widehat{P}_M$).[11]

$$\widehat{P}_M = \phi_M (\widehat{P}_M^* - \hat{r}) \tag{8}$$

The change in the volume of import demand ($\widehat{M}^D$) can be obtained by multiplying the domestic currency import price $\widehat{P}_M$ with the (negative) import demand elasticity:[12]

$$\widehat{M}^D = \eta_M \widehat{P}_M \tag{9}$$

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[10] See Tokarick (2010), equation 39.

[11] For the pass-through equation, see Tokarick (2010), equation 36.

[12] For the specification of the import demand and supply equations, see Tokarick (2010), p. 23.

Next, while the import supply equation has a similar structure to the import demand equation, the volume of import supply depends on the import supply elasticity ε_M and the change in the international import price in U.S. dollars.

$$\widehat{M}^S = \varepsilon_M \widehat{P}_M^*$$ (10)

These equations determine simultaneously import volumes, international import price in U.S. dollar, and the import price in domestic currency.

Calibrating the Import Equations

As discussed already, the key parameters for the import simulations include (i) the pass-through coefficient, (ii) the import demand elasticity, and (iii) the import supply elasticity. For the first parameter, in the case of a permanent devaluation of the exchange rate, firms have an interest in passing through the price change to customers, as not doing so would negatively and permanently affect margins. This ensures that the LR pass-through coefficient should be close to 1 and the SR pass-through coefficient could be somewhat lower since full pass through may take some time. In the Samoa simulations, a 0.7 pass-through coefficient was assumed for the short run and pass through of 1.0 for the long run. Imposing the 'small country' assumption involved setting the import supply elasticity to a very high value of 10,000 so that the international import price in U.S. dollars will largely remain unchanged in the simulations for all import groups.

The import demand elasticities for the three groups of Samoa's imports were calibrated as follows:

- Imports with low degree of substitutability: -0.1 short run & -0.2 long run
- Imports with moderate degree of substitutability: -0.5 short run & -0.8 long run
- Imports with high degree of substitutability: -0.5 short run & -1.5 long run

The final step is simulating the effects of a devaluation of the Samoan tala against the U.S. dollar, with the resulting import volumes and values reported in Table 2:

	Volume		Value in US$		Value in SAT	
Degree of Substitutability	Initial value US$	Change in %	Change in %	Change in US$	Change in %	Change in SAT
Low – SR [2/]	250	-0.7%	-0.7%	-1.8	10.3%	64.6
Low – LR [2/]		-2%	-2%	-5.0	8.9%	55.6
Moderate – SR	80	-3.5%	-3.5%	-2.8	7.2%	14.4
Moderate – LR		-8%	-8%	-6.4	2.2%	4.4
High – SR	50	-3.5%	-3.5%	-1.8	7.2%	9.0
High – LR		-15%	-15%	-7.5	-5.6%	-6.9

Table 2. Results for Import Responses to Devaluation of the Samoan Tala[1/]

[1/] This scenario is based on a 10% appreciation of the U.S. dollar/Samoan tala exchange rate, which corresponds to an 11.1% devaluation of the Samoan tala against the U.S. dollar.
[2/] SR denotes short run and LR long run.
Source: Authors' compilation.

The results in Table 2 show that with increased substitutability and passage of time, the volume response to the devaluation becomes larger. The percentage changes of volumes and U.S. dollar values are practically identical due to practically unchanged international prices in U.S. dollars given the large import supply elasticity. Notably, the two import groups with moderate and high degree of substitutability account for the bulk of the reduction in the U.S. dollar value of imports, despite these two groups accounting for only one-third of total imports. As almost all import demand elasticities are smaller than 1, the positive price effect of the devaluation on the Samoan tala import value more than compensates for the negative volume effect, resulting in the import value in Samoan tala increasing in most cases.

Exports of Services

Tourism constitutes a major part of Samoa's export of services, so will be the focus in this section.[13] Similar to imports, the pass-through co-efficient and export demand and supply elasticities are key inputs for the export block. Hotels and other tourist service providers sell directly to tourists and therefore should benefit in full from a devaluation, making the relevant pass-through coefficient register close to 1 in both the short and long run.

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[13] The export of wiring harnesses is treated in the BOP as a service export but this activity does not fit with our tourism-based service elasticity assumptions. Hence, for the purpose of this exercise we treat the export of wiring harnesses as an export of goods; the elasticity assumptions we make for goods exports should be consistent with the production and export of wiring harnesses.

On export supply elasticities, hotels typically do not operate at full capacity over the medium term so that it is possible to raise occupancy levels in the short run following a devaluation. In the long run, the industry has the capacity to expand when the conditions are right, as demonstrated in the 2000s in Samoa. A short-run export supply elasticity of 0.75 and a long-run of 1.5 are assumed in the simulations.

Samoa's competitors for tourist dollars from Australia, New Zealand and North America are its regional neighbors of Vanuatu and Fiji. Following a devaluation, Samoan service providers will have to lower their prices in U.S. dollars, since it will be quite difficult to sell additional hotel beds to tourists at a fixed international price.

Table 3. International Evidence on Tourism Demand Price Elasticities			
Source Market	**Destination**	**Tourism Demand Price Elasticity**	**Source**
Canada	Barbados	-0.18	Song et al (2010)
Australia	Fiji	-2.0	Narayan (2004) [1/]
New Zealand	Fiji	-0.6	Narayan (2004) [1/]
United States	Fiji	-0.9	Narayan (2004) [1/]

[1/] Long-run price elasticities for relative hotel price.
Source: Authors' compilation.

In this regard, the export demand elasticity is critical for the required reduction in prices and Table 3 presents selected international evidence on tourism demand elasticities that equate to the export demand elasticity in the simulation model.[14] The tourism demand elasticity for travel from Australia to Fiji is especially relevant for Samoa and points to a long-run elasticity of about -2 as a benchmark. As such, the simulation model assumes a short-run export demand elasticity of -0.5 and -2 for the long run for Samoa.

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[14] Table 3 summarizes evidence from a literature survey in Kim, H., Song, J. H., Yang, S. (2010) (see Table 1 on published tourist demand elasticities). The second source on Fiji tourism demand elasticities is Narayan, P. K. (2004), cited earlier.

Table 4. Results for Exports of Services Responses to Devaluation of the Tala[1]							
	Volume		**International Price (US$)**	**Value in US$**		**Value in SAT**	
	Initial value US$	Change in %	Change in %	Change in %	Change in US$	Change in %	Change in SAT
Short run	200	3%	-6%	-3.2%	-6.4	7.6%	37.9
Long run		8.6%	-4.3%	3.9%	7.8	15.5%	77.3

[1] This scenario is based on a 10% appreciation of the US dollar/Samoan tala exchange rate, which corresponds to an 11.1% devaluation of the Samoan tala against the US dollar.

Source: Authors' compilation.

Results in Table 4 show that with these assumptions Samoan tourism operators/hoteliers have to lower their U.S. dollar prices to attract more tourists following a devaluation. Still, this a profitable strategy in that the domestic currency price of tourism exports rises due to the devaluation and overall revenue in Samoan tala increase both in the short and long run. Revenues in U.S. dollars exhibit a J-curve effect as the price reduction in U.S. dollar terms outweighs the increase in volumes in the short term, leading to a short-term drop in the U.S. dollar value of export services, which becomes positive over the long term as tourism volume increases. In other words, there is an initial deterioration U.S. dollar export revenues in response to a devaluation, with the improvement taking place only in the medium and long term.

Results for the Trade Balance

Putting the import and export simulation results together yields three notable findings for the trade balance:

- First, low import demand elasticities in the short run and the fall in the U.S. dollar value of tourist exports mean that the short-run response of the trade balance in U.S. dollars is almost zero. This suggests the benefits of devaluation will take some time to materialize.
- Second, the short-run trade balance measured in Samoan tala deteriorates following the devaluation, on account of the domestic currency price effect for imports outweighing the import volume adjustments. Given that Samoa's external constraint mostly constitutes the availability of foreign exchange—for which the trade balance measured in U.S. dollars is relevant—this impact probably matters little.
- Third, the long-run improvement in the trade balance in U.S. dollars is quite significant.

Table 5. Results for Trade Balance Responses to Devaluation of the Tala 1/							
		Value in US$			Value in SAT		
	Initial value	Value post-devaluation	Change in %	Change in US$	Value post-devaluation	Change in %	Change in SAT
Short run	-130 US$	-129.7	-0.3%	0.3	-360.2	10.8%	-35.2
Long run	-325 SAT	-102.3	-21.3%	27.7	-284.1	-12.6%	40.9

1/ This scenario is based on a 10% appreciation of the U.S. dollar/Samoan tala exchange rate, which corresponds to a 11.1% devaluation of the Samoan tala against the U.S. dollar.

Source: Authors' compilation.

VI. SUMMARY AND CONCLUSIONS

Data constraints mean that the CPI-based indices have become the standard measure of the real effective exchange rate, especially for developing countries with weaker analytical capacity. While the CPI-based REER measure has the clear advantage of making use of timely available CPI data, the robustness of conclusions drawn from this measure needs to be checked using measures based on alternative price and cost indicators, such as core inflation indices and the GDP deflator. Large differences in the composition of the CPI basket between developing and advanced countries, particularly with respect to the weight of food in the consumption basket, deserve special attention as higher CPI inflation in developing countries often results from global food price shocks. While the asymmetrical impact of food price shocks on the CPI-based REER is obvious, its asymmetrical impact on external competitiveness is not inevitable as long as there is no spillover of food price shocks to other prices. To check this possibility, an alternative price index using a same consumption basket can be constructed to evaluate the impact of food price shocks on competitiveness.

The analysis along the lines outlined above shows that food price shocks of 2007–08 have weakened external price competitiveness in Samoa and Fiji. The results indicate that not only did domestic food price increases following the 2007–08 food price hikes were higher in these two countries, but they also led to higher inflation in nonfood prices. Clearly, food price shocks had larger second-round effects on domestic price levels in Samoa and Fiji possibly because the food intensity of domestic production is higher and/or there was greater accommodation of macroeconomic policies to the food price increases.

The next question to ask is how countries such as Samoa and Fiji should address the loss of external competitiveness as a result of external price shocks. Tighter monetary and fiscal policies to control domestic price levels would have been an option, but given rigidities in domestic prices, including wage rates, such policy measures would have been economically painful and politically difficult. Given this, both Fiji and Samoa opted for devaluation of their currencies in the wake of the global food price shocks and the global financial crisis.

This episode also highlights the importance of timely assessment of real exchange rate developments. In the case of Fiji, such a practice could have helped take early action to avoid the forced large step devaluation after losing competitiveness for a long time with foreign reserves running very low.

The effect of such devaluations on external competitiveness has been a subject of debate, and hence assessing the effect is important for policymakers. Concerns about the effect in small open economies such as Fiji and Samoa are legitimate given the heavy concentration of imports in essential commodities (e.g., food and fuel) and reliance on primary commodity exports, apart from the increasing importance of tourism exports. Ideally, these concerns should be addressed with empirical estimates of price elasticities of imports and exports. However, the scarcity of relevant data means that it is challenging to estimate these elasticities and alternative methodologies have to be sought. This paper shows that simulation models using calibrated elasticity estimates drawn from the literature can be useful in this regard, particularly when imports and exports can be disaggregated to pin down price elasticities at the sectoral level with greater confidence. Using plausible elasticity estimates available, this study shows that in the case of Samoa a devaluation is likely to lead to an improvement in the trade balance over the medium to long run.

REFERENCES

Atukorala, V., Bose, S., and Gulhati, R., 1985, "Exchange Rate Policies in Eastern and Southern Africa, 1965-1983," World Bank Staff Working Paper No. 720 (Washington: The World Bank).

Bayoumi, T., Harmsen, R., and Turunen, J., 2011, "Euro Area Export Performance and Competitiveness," IMF Working Paper 11/140 (Washington: International Monetary Fund).

Bella, G. D., Lewis, M., and Martin, A., 2007, "Assessing Competitiveness and Real Exchange Rate Misalignment in Low-Income Countries," IMF Working Paper 07/201 (Washington: International Monetary Fund).

Chinn, M. D., 2006, "A Primer on Real Effective Exchange Rates: Determinants, Overvaluation, Trade Flows and Competitive Devaluations," Open Economies Review, Vol. 17, No. 1, pp. 115-143.

Dervis, K., and Petri, P., 1987, "The Macroeconomics of Successful Developments: What are the Lessons?," NBER Macroeconomics Annual (Cambridge, Massachusetts: National Bureau of Economic Research)

Driver, R. L., and Westaway, P. F., 2005, "Concepts of Equilibrium Exchange Rates," Working Paper No. 248 (London: Bank of England).

Edwards, S., 1989, "Real Exchange Rates in Developing Countries: Concepts and Measurement," NBER Working Paper No. 2950 (Cambridge, Massachusetts: National Bureau of Economic Research)

Lafrance, R., Osakwe, P., and St-Amant, P., 1998, "Evaluating Alternative Measures of the Real Effective Exchange Rate," Bank of Canada Working Paper No. 98/20 (Ottawa: International Department, Bank of Canada).

Lee, H. L., Nicita, A., and Olarreaga, M., 2008, "Import Demand Elasticities and Trade Distortions," *Review of Economics and Statistics,* Vol. 90, No. 4, pp. 666-682.

Lee, J., Milesi-Ferretti, G.M., and Ricci, L.A., 2008, "Real Exchange Rates and Fundamentals: A Cross-country Perspective," IMF Working Paper No. 08/13 (Washington: International Monetary Fund).

Meese, R., and Rogoff, K.,1983, "Empirical Exchange rates of the Seventies: Do They Fit out of Sample?," *Journal of International Economics*, Vol. 14, pp. 3-24.

Miller, C., Rauqeuqe, L., and Wainiqolo, I., 2014, **"**Estimating Tourism Demand in Fiji*,"* Reserve Bank of Fiji (unpublished).

Narayan, P. K., 2004, "Reformulating Critical Values for the Bounds F-statistics Approach to Cointegration: An Application to the Tourism Demand Model for Fiji," Discussion Papers No. 02/04 (Melbourne: Monash University).

Senhadji, A., 1997, "Time-Series Estimation of Structural Import Demand Equations: A Cross-Country Analysis," IMF Working Paper 97/132 (Washington: International Monetary Fund).

Tokarick, S., 2010, "A Method for Calculating Export Supply and Import Demand Elasticities," IMF Working Paper 10/180 (Washington: International Monetary Fund).