

Unit labour costs in manufacturing in Fiji and Papua New Guinea

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Unit labour costs in manufacturing in Papua New Guinea are compared with estimates for Indonesia, Malaysia and the Philippines—countries which are likely competitors for investment funds. Assessed in these terms, manufacturing activities in Fiji and Papua New Guinea are uncompetitive for export-based investment. Of most concern is the relatively poor labour productivity performance which is most likely associated with their inward-looking industrial policies. Hopefully, the more outward-oriented investment, trade and financial policies being adopted will lead to improved productivity and ultimately wage growth.

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Given the existing and expected rapid growth in their working-age populations, Fiji and Papua New Guinea must create formal employment opportunities at a much higher rate than in recent years. Increased job opportunities are also necessary in situations where high unemployment is a contributory element to high rates of criminal activity, as seems to be the case in Papua New Guinea. It has been estimated that over the next five-year period, Fiji will add 11,000 to its working-age population each year (Cole 1993). Increases in wage employment over the period 1990–95 have, however, averaged only about 1,600 per year. Over the period 1995–2000 it is

estimated that Papua New Guinea's working-age population will increase by about 52,000 each year (Cole 1993) while, according to McGavin (1996), formal sector wage employment in Papua New Guinea was the same in 1995 as in 1988, except for short-lived increases in 1989 and 1994.

While it is likely that development of the agricultural sector is the main source to look to for substantial growth in employment—both directly, and indirectly in supporting activities—potential for fast-growing, labour-intensive industrial activities in these two countries should also be exploited. Because of the small size of their domestic markets, opportunities for development of



such industries on the basis of domestic market orientation are non-existent. Only in industries which are primarily producing for export markets, and can therefore take advantage of size economies, is there scope for large, labour-intensive activities.

To be attractive to investors as a site for labour-intensive industrial activities, Fiji and Papua New Guinea have to be competitive with other countries in terms of their total factor costs. It is often claimed that one of the major reasons for the low levels of formal wage employment in these countries is their comparatively high wages. But it is not the level of wages *per se* that is relevant. Wages relative to the level of labour productivity ('unit labour cost') is the appropriate measure. Wages may be low but so may productivity and thus unit labour costs may be high by comparison with other countries.

This paper presents estimates of unit labour costs in manufacturing industry since 1970 for Fiji and Papua New Guinea and makes comparisons with their likely regional competitors for such investment—Indonesia, Malaysia and the Philippines. Analysis of the changes in unit labour costs for the manufacturing sectors of these countries is also presented. These inter-country and inter-temporal comparisons point to reasons for the relatively high unit labour costs in both Melanesian countries and to areas for policy action.

The analytical framework

Golub (1995) presents comparisons of unit labour costs in manufacturing for ten countries for the period 1970–92. The countries include several Pacific region countries: Australia, Korea, Malaysia, the Philippines and Thailand. The results are presented in terms of their relativity to US wages, productivity and unit labour costs. According to these estimates, Australian

unit labour costs averaged about 30 per cent above US costs over the 1970–91 period, while costs in Korea, Malaysia, the Philippines and Thailand were generally 20–40 per cent below US unit labour costs.

Golub (1995) finds that wages and productivity are strongly correlated over time, though with deviations due to short-run swings in market exchange rates relative to purchasing power parity (PPP) exchange rates. Further, for the four East Asian countries, wages were low relative to productivity early in the sample period but there was a general tendency for wages to rise relative to productivity and hence for unit labour costs to rise over time.

Golub (1995) argues that unit labour costs can be the point of focus on international cost competitiveness given that capital and raw materials are freely traded internationally, while labour is basically a non-tradable. Therefore, capital and raw material costs can be ignored and wage costs and productivity treated as the important factors determining the location of labour-intensive manufacturing activities. Golub then goes on to show how competitiveness between countries, as measured in terms of relative unit labour costs, can be decomposed into productivity differences, wage differences, and movements in exchange rates, as follows

Relative unit labour costs, C_{ijk} , can be defined as

$$C_{ijk} = a_{ij} w_{ik} / a_{ik} w_{ij} e_{jk} \quad (1)$$

where a_{ij} and a_{ik} are unit labour requirements for sector i in countries j and k ; w_{ij} and w_{ik} are wage costs per employee in sector i in countries j and k ; and e_{jk} is the market exchange rate between country j and country k . On a bilateral basis, country i will specialise in goods where $C_{ijk} < 1$ and import goods when $C_{ijk} > 1$.



If equation (1) is multiplied and divided by the PPP exchange rate, the equation becomes (suppressing i)

$$c_{jk} = (a_j / a_k) \cdot (w_j / w_k \text{ PPP}_{jk}) \cdot (\text{PPP}_{jk} / e_{jk}) \quad (2)$$

Thus, differences or changes in competitiveness, in terms of relative unit labour costs (between countries j and k), can be seen in terms of movements in productivity differentials, in relative wages measured in PPP terms, and in movements of the PPP exchange rate relative to the market exchange rate. The introduction of the ratio of the PPP exchange rate to the market exchange rate shows the short-run and long-run movements in the market rate relative to the PPP rate. An increase in the PPP/ e ratio indicates an appreciation of the market rate relative to the PPP rate.¹ When the PPP/ e ratio is below 1.0, it indicates that output is undervalued in market exchange rate terms relative to its valuation in PPP terms.

Definitions and data

Unit labour cost is defined as labour compensation (wages and salaries plus other employee benefits such as vacation and sick leave payments) per employee, divided by productivity per employee. Productivity per employee is defined as value added per employee and is measured at PPP exchange rates to allow international comparisons over time. Because purchasing power parity does not seem to hold in the short run, use of the market exchange rate for currency conversion purposes could be misleading. The PPP exchange rates used are the producer durable rates from the Summers-Heston International Comparison Project (ICP) published by the World Bank (1995). The data on number of employees, employee compensation, value added and manufacturing value added deflators are mostly taken from UNIDO data series also

reported by the World Bank (1995). However, while UNIDO data for the Southeast Asian countries are available up to 1992, for Papua New Guinea they are not available after 1989. Therefore, to obtain estimates of unit labour costs in Papua New Guinea after the critical changes in wage determination in 1992, the UNIDO data was extended by estimation and extrapolation.

The numbers of employees in Papua New Guinea's manufacturing industries over the 1990–94 period were estimated by using the Bank of Papua New Guinea's indices of employment classified by industry to extrapolate from the UNIDO's 1989 figure. The UNIDO's 1989 value added in manufacturing was extrapolated to 1994 using the PNG National Statistical Office's growth rates for value added in those years. Extension of 1989 employee compensation figures proved much more difficult as there have been no statistical collections of wages and salaries data since 1989. Extrapolation was made possible by reference to recent work by Levantis (personal communication) who is undertaking a study of the labour market responses in Papua New Guinea subsequent to the 1992 Minimum Wage Board decision. This decision substantially reduced urban minimum wages and stated that wages would no longer be directly linked to changes in the costs of living but be determined by changes in productivity.

Levantis noted from the average weekly earnings data collected by the National Statistical Office in the annual Census of Employment between 1984 and 1988 that average weekly earnings were consistently 2.25 to 2.3 times the minimum wage for unskilled labour. This ratio was used to extend the 1989 UNIDO earnings data to 1992, that is, prior to the 1992 Minimum Wage Board decision. In 1995 Levantis carried out a survey of firms in Port Moresby and Lae to obtain, among other



information, an estimate of how average weekly earnings had changed since the 1992 decision. To gain estimates of employee compensation for 1993 and 1994, interpolations were made between the 1992 estimate described above and Levantis' 1995 estimates. These show average weekly earnings increasing by 5 per cent between 1992 and 1993 and by 2.7 per cent between 1993 and 1994.

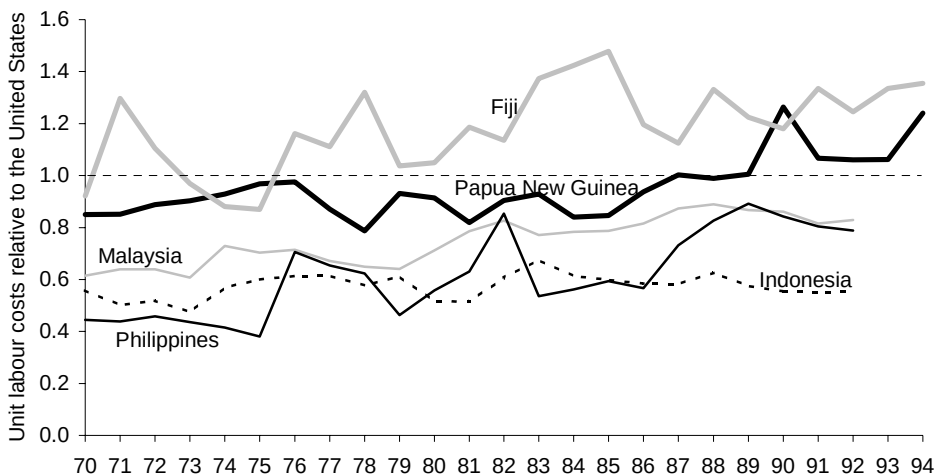
Unit labour cost comparisons

In presenting the unit labour cost estimates for Fiji and Papua New Guinea and comparing them with Indonesia, Malaysia, and the Philippines, all estimates are shown as relative to those of the United States. Any country could be used as a benchmark but the United States seems most suitable as it can be thought of as the largest, least distorted trading country. The East Asian

comparators are countries which Fiji and Papua New Guinea have to see as among their strongest competitors for investment—whether it is potential foreign or domestic investment.

Unit labour costs for Fiji, Indonesia, Malaysia, Papua New Guinea, and the Philippines relative to the United States are presented in Figure 1. Indonesia's unit labour costs have been consistently between 50 and 60 per cent of the level of unit labour costs in the United States since 1970. The Philippines and Malaysia's unit labour costs have been steadily increasing in relative terms and in 1992 were around 80 per cent of costs in the United States. Fiji's unit labour costs have been almost consistently above unit labour costs in the United States over the whole period and steadily increasing in relative terms. In the 1990–94 period, Fiji's costs have been more than 20 per cent above those of the United States and therefore double Indonesia's.

Figure 1 Unit labour costs^a relative to the United States, 1970–94



^a Labour cost per unit of output, or the ratio of wage cost to productivity. A value of 1.0 implies that unit labour costs are equal to those in the United States. Wages and value added are converted to US\$ at the PPP exchange rate. **Source:** Drawn from data held in the International Economic Databank, The Australian National University, Canberra.



Papua New Guinea's unit labour costs ranged between 80 per cent and 100 per cent of the level of US unit labour costs from 1970 to 1989, but rose above them in 1990 and remained so up to 1994. Hence, from these estimates, Fiji and Papua New Guinea have to be considered less favourable places for labour-intensive investment than their Southeast Asian competitors—particularly Indonesia. Moreover, Fiji and Papua New Guinea's unit labour costs have been rising relative to Indonesia's. The sharp increases in Papua New Guinea's unit labour costs in 1990 and 1994 would have been due to the significant declines in industrial activity experienced in those years, at which time capacity utilisation and productivity would have also fallen. Further, it appears that the 1992 Minimum Wage Board decision had no impact on unit labour costs up to 1994.

The decomposition of Equation 2 allows some understanding of the reasons for the trends in each country's unit labour cost—specifically in terms of wage and productivity relativities and in terms of movements in the market exchange rate relative to the PPP exchange rate. Figure 2 presents estimates of productivity and wage costs over the 1970–94 period for Fiji and Papua New Guinea and for the 1970–92 period for the other three countries. Again, these variables are presented in terms of ratios relative to US variables. The ratios of the PPP exchange rate to the market exchange rate for the five countries are presented in Figure 3.

Indonesia's productivity and wages rose strongly relative to those of the United States over the 1970–77 period with productivity increasing even faster than wages (Figure 2). Over the period 1977–87 productivity and wages fell in relative terms, but productivity fell faster than wages. Over the 1987–92 period,

productivity and wage growth stabilised relative to that of the United States.

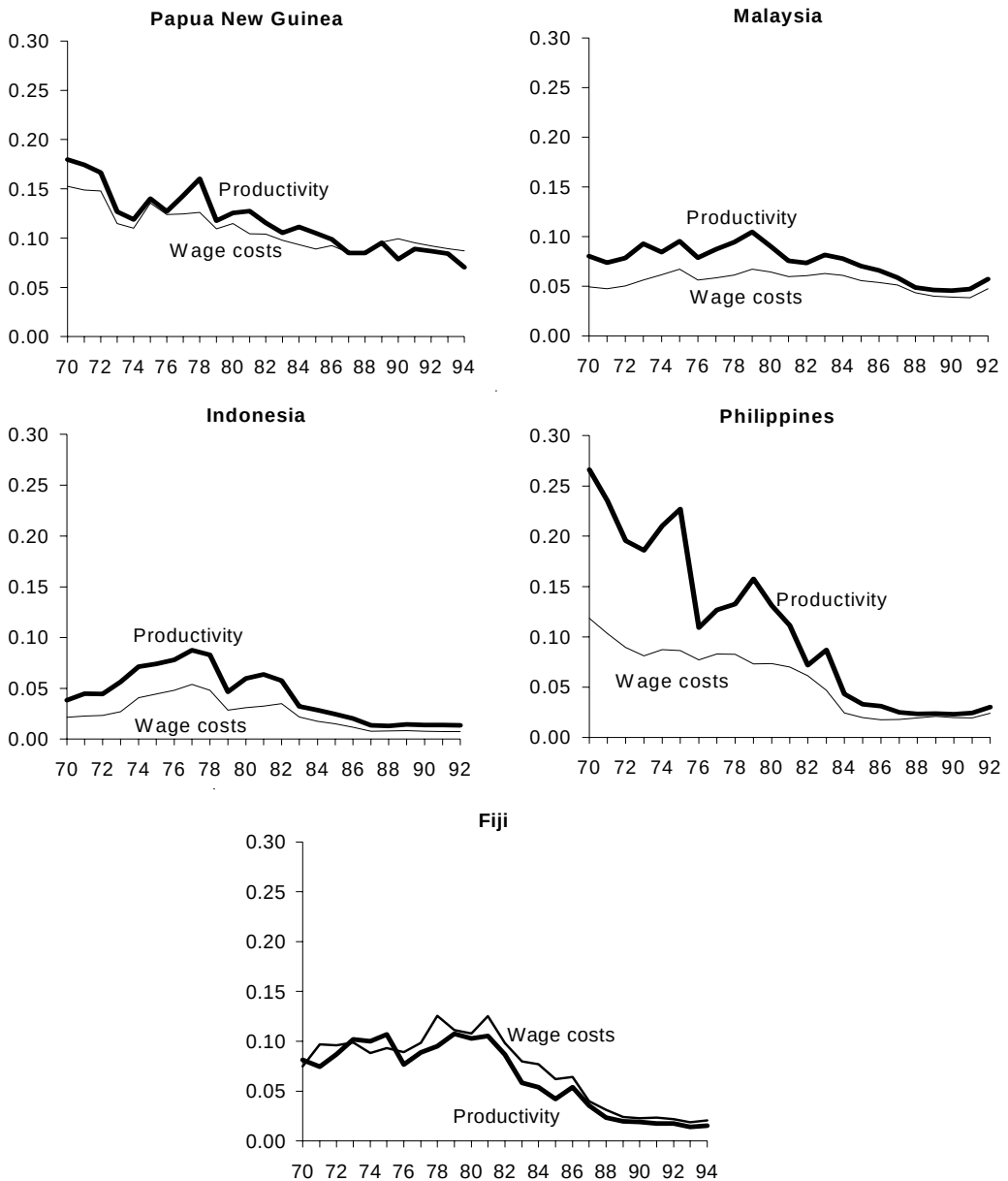
The behaviour of Malaysia's productivity and wages growth relative to the United States was much the same as Indonesia's, with faster productivity growth than wages in the early part of the period and then a slowing and convergence of the two. In the Philippines, productivity growth was much higher than wages growth in the 1970s and the two rates converged and stabilised in the 1980s. As Golub (1995) points out, these results give credence to the idea that productivity drives wages over the long term. They also indicate that in rapidly industrialising countries, such as these fast-growing East Asian countries, productivity growth gives wages a strong push in the early stages of industrialisation.

Indonesia's unit labour costs maintain a virtually constant ratio relative to that of the United States (as observed in Figure 1) by virtue of the fact that the market exchange rate appreciated relative to the PPP exchange rate in the 1970s and depreciated in the 1980s (Figure 3). Thus, the appreciating market exchange rate in the 1970s offset the effect of productivity growing faster than wages.

Similarly, there is an appreciating market exchange rate trend in Malaysia in the 1970s which more than offsets the impact of productivity being relatively higher than wages, resulting in unit labour costs rising. The increase in unit labour costs continues in the 1980s because of the slowing of productivity relative to wages. In the Philippines the relativity between the PPP exchange rate and the market exchange rate has not changed much over the sample period. Thus, the increasing trend in its relative unit labour costs is mainly due to the faster decline in relative productivity than in wages. The sharp increases in unit labour costs in 1976 and 1982 are due to the declines in productivity in those years.



Figure 2 **Productivity^a and wage costs^b relative to the United States, 1970–94**



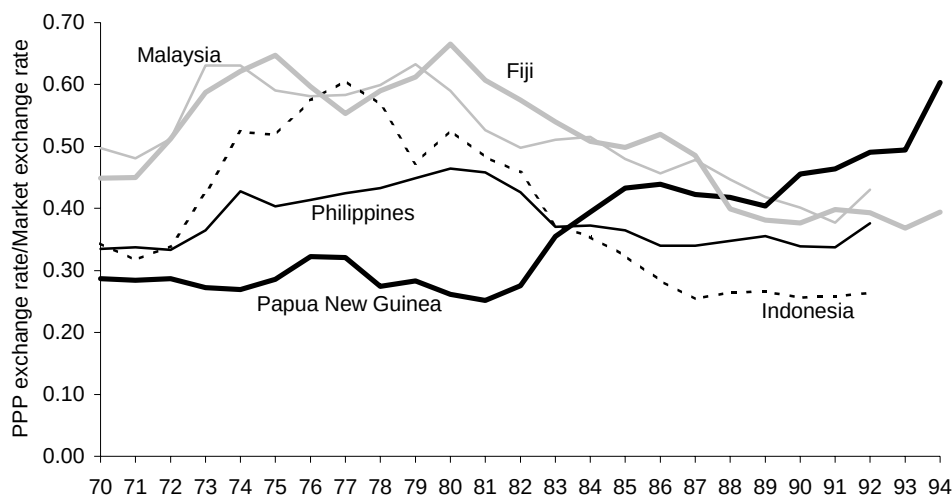
^a Value added per employee, converted to US\$ at PPP exchange rates.

^b Total labour wages and salaries (compensation) per employee, converted to US\$ at PPP exchange rates. A value of 1.0 would imply that wage costs or productivity are equal to that of the United States.

Source: Data are drawn from the International Economic Databank, The Australian National University, Canberra.



Figure 3 **PPP exchange rates relative to market exchange rates^a, 1970–94**



^aThe PPP exchange rate is the producer durable PPP exchange rate from the Heston-Summers International Comparison Project.

Source: Data are drawn from the International Economic Databank, The Australian National University, Canberra.

Productivity and wages also move closely together in Fiji, but unlike the East Asian comparators, productivity is almost continually below wages, giving rise to the increasing trend in unit labour costs. There is a sharp decline in relative productivity and wages after 1981 only stabilising after 1988. Similar to the East Asian countries, Fiji's market exchange rate depreciates relative to its PPP rate which would have tended to dampen the rise in unit labour costs.

Papua New Guinea's relative productivity and wages growth moved very closely together over the whole period with a slowly declining trend relative to the United States (Figure 2). However, relative productivity and wages were maintained at higher levels over the 1980s and 1990s than in any of the other three countries. Contrary to the experience of the East Asian countries and to Fiji, Papua New Guinea has had a sharply appreciating market exchange rate relative to its PPP exchange rate since

1982, indicative of 'Dutch Disease' effects from mining. The impact of this appreciation on unit labour costs was reinforced by wages in PPP terms rising faster than productivity, leading to the substantial increase in unit labour costs since the mid-1980s.

The same exercise as carried out above for the manufacturing sectors in aggregate was also undertaken for Fiji's and Papua New Guinea's manufacturing sectors on an individual ISIC-level basis. The results for ten manufacturing industries in Papua New Guinea and 18 manufacturing industries in Fiji for the 1970–89 period are presented in Duncan (forthcoming).

A general picture comes across of, first, very low levels of productivity and wages relative to the United States and, second, highly variable productivity, which is the likely result of sharp movements in capacity utilisation and value added as a result of



fluctuations in economic activity. The sharply fluctuating value added and productivity and the low productivity are probably symptomatic of industries which are confined to small domestic markets behind import barriers. In Papua New Guinea's case, moreover, the domestic market is highly volatile because of the sharp fluctuations in mining revenues. In most manufacturing industries in Papua New Guinea, relative unit labour costs rose sharply in the latter part of the 1980s due to declining productivity while wages maintained their level relative to those in the United States. Presumably, the latter was because of Papua New Guinea's policy of indexing wages to changes in the cost of living. It is not clear why productivity declined in so many industries during the 1980s, leading to the substantial rise in unit labour costs in that period. In Fiji's case, most of the manufacturing industries show an upward trend in unit labour costs over the whole of the 1970–89 period. This increase was the result of both relative productivity and relative wages falling, but productivity falling faster than relative wages.

Conclusions

Assessed in terms of unit labour costs, manufacturing industries in Fiji and Papua New Guinea are uncompetitive with countries such as Indonesia, Malaysia, and the Philippines, which are likely to be competitors for investment in export-based investment. Moreover, in unit labour cost terms, they have been losing ground to Indonesia. Of most concern is the poor performance of productivity growth, both relative to the growth of productivity in the United States and the East Asian comparators and relative to the rate of growth of wages. Relative productivity levels in Fiji have been below relative wages since 1975, while in Papua New Guinea

relative productivity has been below relative wages since 1990. By comparison, in Indonesia, Malaysia and the Philippines relative productivity has been above relative wages over the whole 1970–92 period.

The low and falling productivity in Fiji and Papua New Guinea is most likely strongly associated with the inward-looking industrial policies that these countries have followed. Once the small domestic market is supplied there is no opportunity for any further productivity growth through economies of size, as well as little incentive for adoption of new technology. It is also possible that industry protection and capital controls² have constrained the adoption of productivity-enhancing technology. Sorting out the factors contributing to the poor productivity growth in manufacturing in these two countries is a topic worthy of research. Hopefully, the more outward-oriented investment, trade, and financial policies which are in the process of being adopted in these countries will have the intended effect of encouraging more efficient industries which can improve productivity growth as well as generating higher wages.

Notes

1 With both the PPP and market exchange rates expressed in the sample countries' currencies relative to the US dollar, an appreciation of the market exchange rate increases the ratio.

2 Introduction of capital controls means that the assumption of international capital mobility is not appropriate and the model would have to be extended to take restrictions on capital movements into account.



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