

**PART II**  
**THE ECONOMY**

# Chapter 5

## PNG's economic trajectory: The long view

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### Abstract

The absence of good time series data make it difficult to analyse the economic history of Papua New Guinea (PNG). This chapter aims to fill this gap by providing time series for various important economic indicators since independence in 1975 or as close as possible thereafter. The data are available online for researchers as the PNG Economic Database at [devpolicy.org/pngeconomic](http://devpolicy.org/pngeconomic). The 36 graphs in this chapter are all sourced from the PNG Economic Database. The chapter also contains some analysis to tie the data together and begin to realise their value, and includes a summary of 15 findings of particular interest.

### Introduction

Anyone who seeks to work on the economic history of Papua New Guinea (PNG) is disadvantaged by the paucity of time series data. The most comprehensive source of historical data is the 2007 Bank of Papua New Guinea (BPNG) book *Money and Banking*, but its tables only run from the early days of independence (1975) to about 2000. Current BPNG (and other) contemporary national data sources typically go back in time only for a decade or two.

The International Monetary Fund (IMF) and World Bank have some PNG economic variables with long time series, but many missing variables as well, and even the series that are complete are not necessarily consistent. For example, the World Bank's current price GDP series shows an increase in 60 per cent in a single year (2006) in which not much happened. That does not inspire confidence and makes a mockery of any efforts to compare commonly used ratios, such as debt-to-GDP, over time.

The absence of good time series data make it difficult if not impossible to analyse the economic history of PNG. This itself is a pressing need since the last economic histories of the country were published over a decade ago: the above-mentioned BPNG (2007) and Webster and Duncan (2010). PNG is too young to suffer the fate of losing data from more than 20 years ago in the sands of time. Surely such data are not only of intrinsic interest, but relevant to an understanding of contemporary challenges.

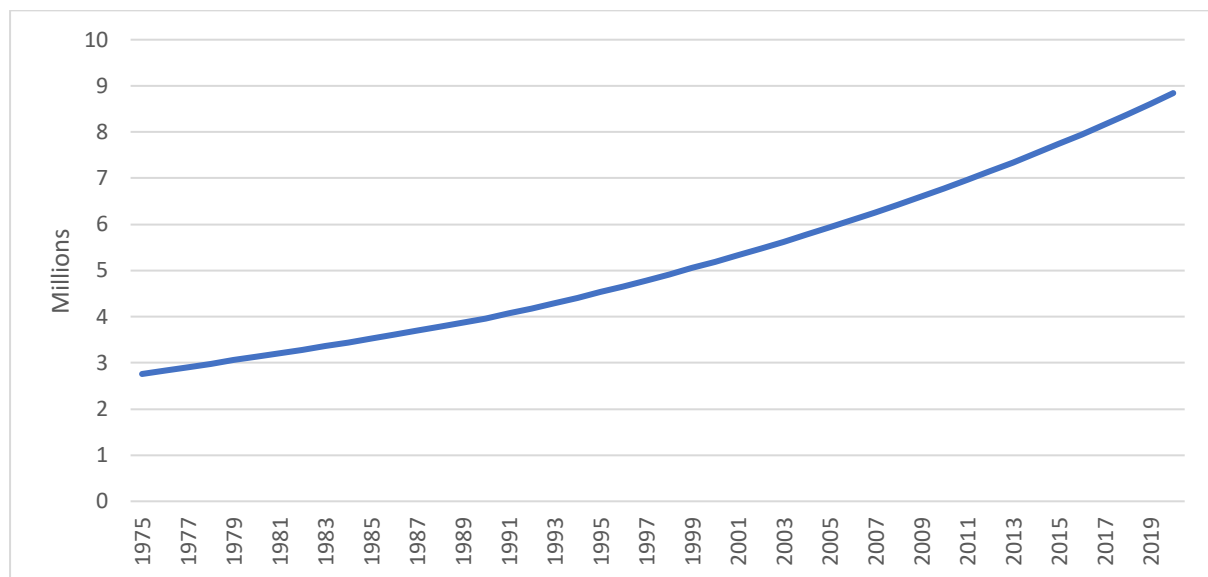
This chapter aims to fill the data gap by providing time series for various important economic indicators since independence in 1975 or as close as possible thereafter. The methods used are documented in this chapter, mainly in the data notes at the end. The data themselves are available online for researchers as the PNG Economic Database at [devpolicy.org/pngeconomic](http://devpolicy.org/pngeconomic). The series in the database are by no means comprehensive but are at least a start. Most of the time series used in this chapter run to 2019, but the database will be updated periodically to keep it current.

The 36 graphs that follow are all sourced from the PNG Economic Database. The chapter also contains some analysis to tie the data together and begin to realise their value. The discussion begins with population, then goes to economic activity (GDP, commodity exports

and employment), the balance of payments, fiscal data and, finally, financial sector and monetary data. Some 15 findings of particular interest are summarised at the end.

## Population

PNG has conducted decadal censuses since 1961, but the 2011 census is considered unreliable (Allen, 2014; Bourke and Allen, 2021). Bourke and Allen (2021) have constructed a time series using an earlier population growth rate (2.7 per cent, the average from 1980–2000, is their mid-range estimate) to estimate the national population from 2000 to 2020. This gives a 2020 population estimate of 8.8 million, close to the United Nations estimate for this year.



**Figure 5.1: Population, 1975–2020.**

Annual figures interpolated from Bourke and Allen’s (2021) decadal estimates.

PNG’s population in 2020 is some three times its population at independence. This is one of the biggest changes between PNG then and PNG now. Every year now, PNG gains 230,000 citizens – 8 per cent of the population at the time of independence, and more than three times the annual increment at independence.

The World Bank estimates PNG’s urban population share to be 13 per cent, only slightly above the 12 per cent at the time of independence. Bourke and Allen (2021) estimate a higher urban population share of about 15 per cent. Either way, PNG remains a predominantly rural country. According to World Bank data, PNG is the most rural country in the world (along with Burundi).

## GDP and non-resource GDP

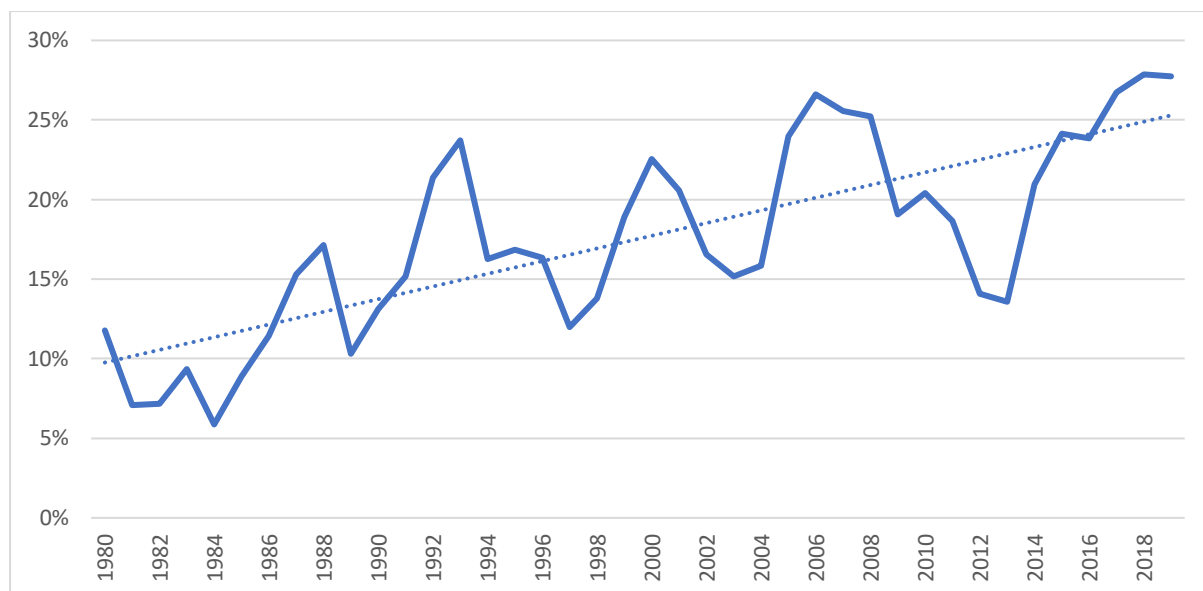
For any country, gross domestic product or GDP is one of the most important economic variables. However, PNG has become over time one of the most resource-dependent economies in the world. For resource-dependent economies, GDP can be a misleading indicator of national economic activity, since a large proportion of the benefits from large resource projects typically flows offshore. Ideally, one would measure gross national income (GNI), that is, the economic activity of PNG nationals. However, GNI is no longer reliably measured in PNG. An alternative is to measure non-resource GDP, which is GDP minus the

output of the resources sector. The rationale of this is not that the resources sector should be ignored, but rather that its benefits to PNG largely accrue in the stimulus it provides to the non-resource sector via tax and royalty payments.

Our GDP current price series starts in 1976. It includes total GDP and, from 1980, value added in the resources, agriculture and manufacturing sectors. Non-resource GDP is simply GDP minus value added in the resources sector (the latter we sometimes refer to as ‘resource GDP’). The constant price or real series cover the same variables, measured in 2013 prices, but sectoral data in constant prices are only available from 1983.

The GDP series from 2006 onwards was rebased in 2016 (National Statistical Office [NSO], 2020). The new series puts GDP some 50 per cent bigger in 2006 than in the old series. No explanation was ever provided for this massive increase. A comparison of the old and the new data reveals large increases in mining value added (an increase of 72 per cent in 2006); wholesale and retail trade (186 per cent); transport, storage and construction (172 per cent); finance, real estate and business services (419 per cent); and community social and personal services (135 per cent). Agriculture (which includes forestry and fishing) and construction are virtually unchanged (–2 per cent), and petroleum (–16 per cent), manufacturing (–38 per cent) and utilities (–24 per cent) fall. We have integrated the two series to develop a single series from 1976.

PNG has become increasingly resource dependent over time (Figure 5.2). The ratio of resource to total GDP increased from around 10 per cent in 1980 to 15 per cent in the late 1980s. Although it fell back to 10 per cent with the closure of the Panguna mine on Bougainville in 1989, it grew over the 1990s with the commencement of oil production and the opening of a number of mines. Subsequently, the ratio has moved up and down with resource prices. Since the commencement of PNG liquefied natural gas (LNG) exports in 2014, the country’s resource dependency has reached an all-time high of 28 per cent in 2018.

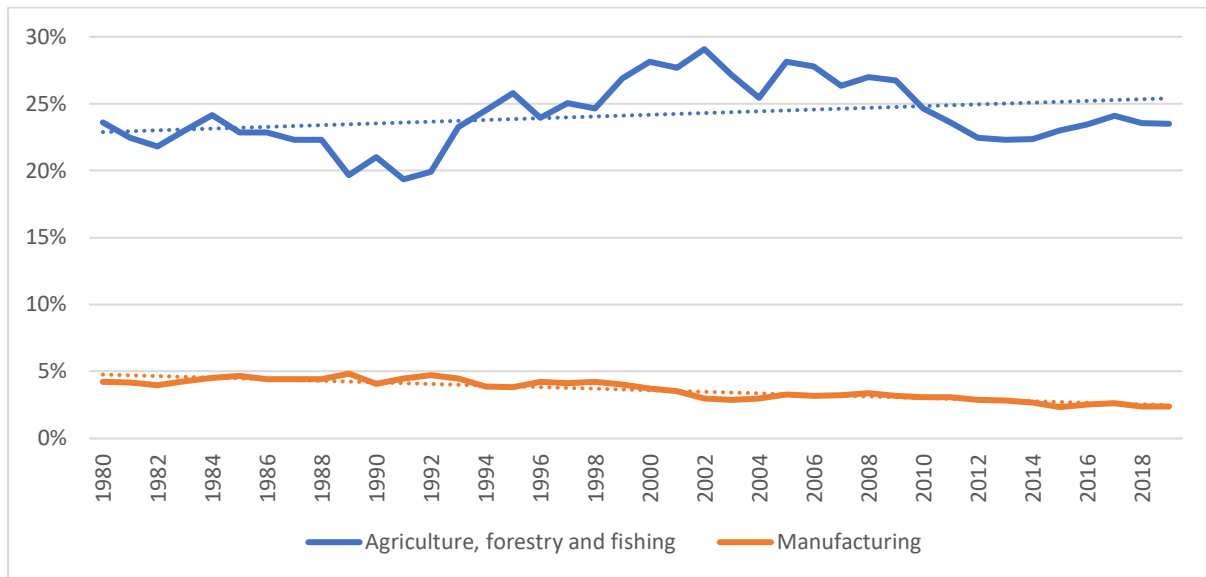


**Figure 5.2: Resource dependency, 1980–2019.**

The percentage share of resources in total GDP, both measured in current prices; trendline added.

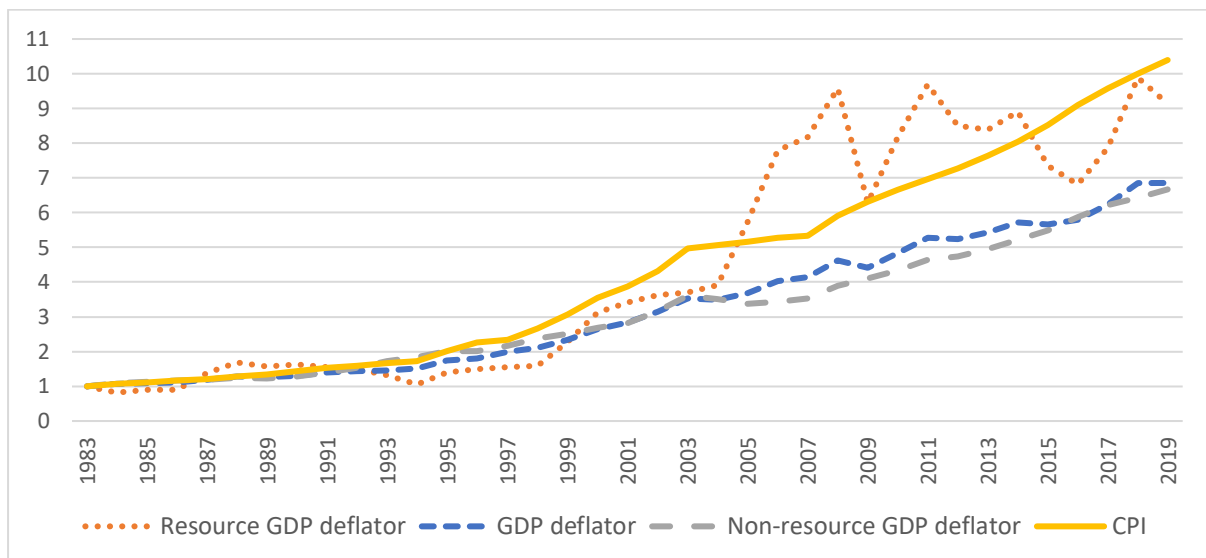
Figure 5.3 shows the share of agriculture, forestry and fishing as well as manufacturing in non-resource GDP, again at current prices. The share of the former rises and that of the latter falls, both mildly. Agriculture includes the production of commodities (discussed in the next section), the production of crops for domestic sale and subsistence production. The latter two

variables are not measured, but rather increased annually in the national accounts in line with population growth, which is surely inaccurate.



**Figure 5.3: Agriculture and manufacturing as a share of non-resource GDP, 1980–2019.**  
All variables measured in current prices.

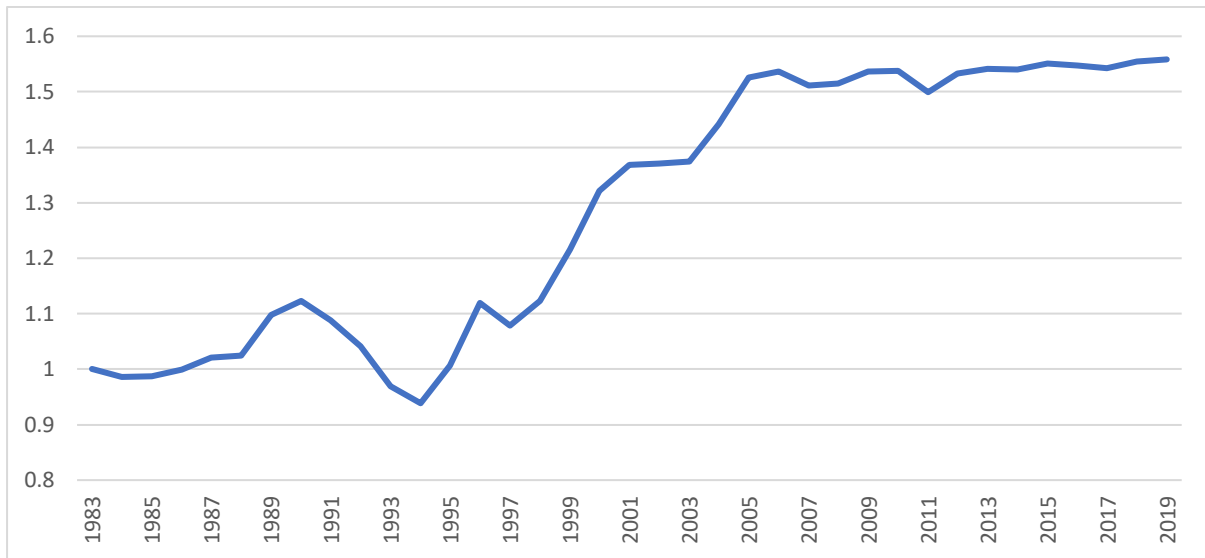
The deflators that convert from current to constant price GDP are shown in Figure 5.4, which, for convenience, sets them all equal to one in 1983. The resource deflator lies above the non-resource deflator with the GDP deflator by definition in the middle. The consumer price index (CPI) is also shown. It grows far more quickly, ending 60 per cent above the GDP deflator. As we will see, the choice of deflator is significant when assessing PNG's economic performance over time.



**Figure 5.4: GDP deflators and CPI index (1983 = 1), 1983–2019.**  
All indices set to unity in 1983.

The separation of the two aggregate indices (CPI and the non-resource deflator) mainly occurs between 1994 and 2004 (Figure 5.5), a period of rapid depreciation. The separation in

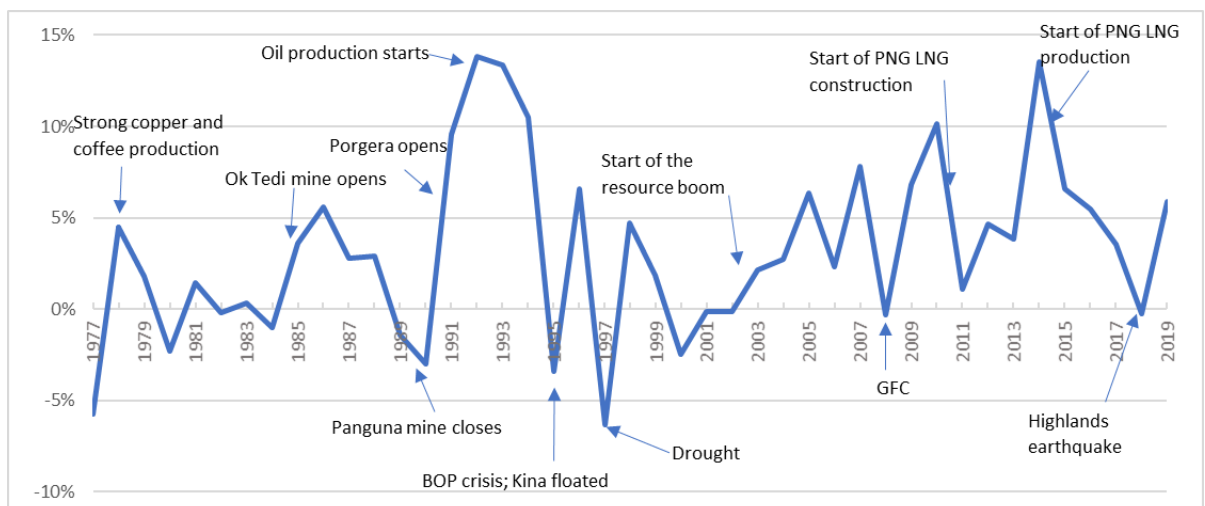
the 1990s may reflect that, during this period, internationally tradeable goods (such as food) experienced more inflation than non-tradeable goods, which is what one would expect given the real wage flexibility that was evident in the PNG economy from the early 1990s onwards (Figure 5.21) and the high rate of depreciation in that decade (Figure 5.23). A report from the mid-1990s commented that ‘the recent devaluation of the exchange rate has produced a substantial reduction in real wages’ (AusAID, 1996, p. 41). It is also plausible that the CPI puts a higher weight on tradeable goods than the GDP deflator. For example, government services, which are largely non-tradeable, are an important part of GDP but do not feature in the CPI. This combination of factors would explain why CPI increased more than the GDP deflator in the 1990s.



**Figure 5.5: Ratio of CPI to non-resource GDP deflator (1983 = 1), 1983–2019.**

This discrepancy between the GDP deflator and the CPI index raises the question of which deflator to use when. To get a consistent measure of output over time, we should use the GDP deflator. However, if we want to use GDP as a proxy for average living standards, then we should utilise the CPI index. We indicate in the notes to each relevant figure which deflator is used.

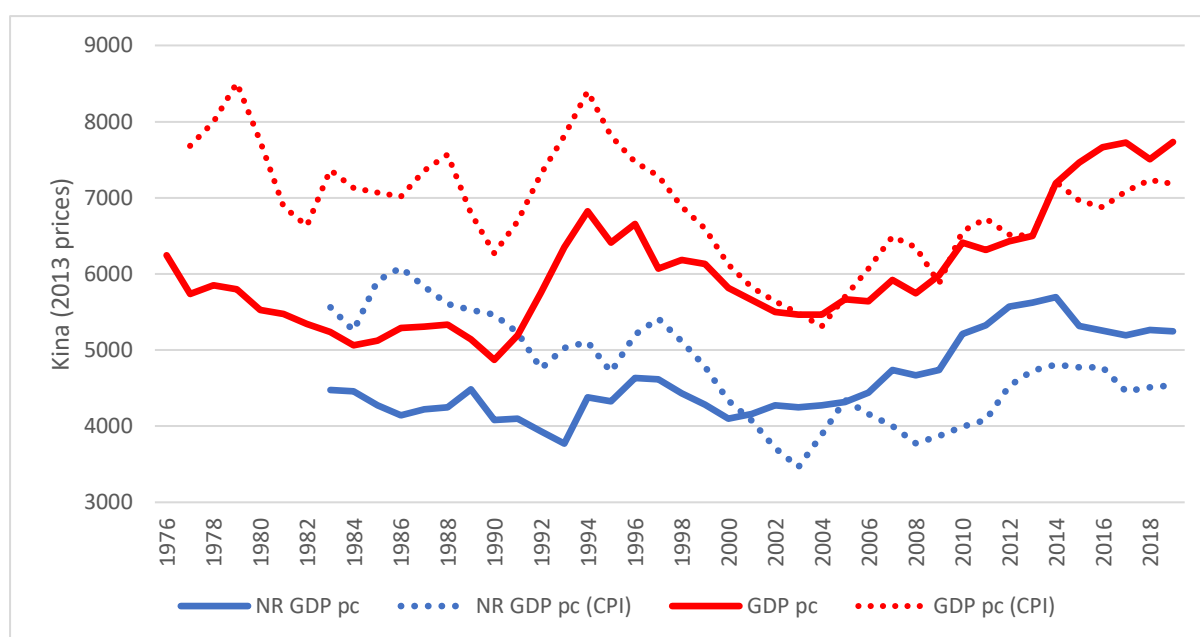
Figure 5.6 shows real GDP growth from 1977 onwards, using the GDP deflator. Key moments in the country’s economic history are indicated on the figure.



**Figure 5.6: Annual real GDP growth, 1977–2019.**

GDP deflator used. GDP data in the early years of independence are generally regarded as less reliable.

Figure 5.7 shows GDP per capita and non-resource GDP per capita, using both the relevant GDP deflator and the CPI index. Both variables show an overall positive trend using the GDP and non-resource GDP deflator, respectively, but both show a decline if CPI is used as the deflator. Using the GDP deflators, average growth rates for the period 1983–2019 are 1.1 per cent and 0.7 per cent for GDP and non-resource GDP per capita, respectively; using CPI, annual average growth for the same period is –0.1 per cent and –0.7 per cent, respectively.<sup>1</sup> Whether PNG is better off today in terms of GDP or non-resource GDP per capita depends most of all on an assessment of inflation in the 1990s. Using the non-resource GDP deflator, PNG ended the decade with a non-resource GDP per capita 10 per cent higher than when it started. Using the CPI, PNG ended that period about 15 per cent worse off by the same measure.



**Figure 5.7: GDP (from 1976) and non-resource GDP (from 1983) per capita, with different deflators, to 2019.**

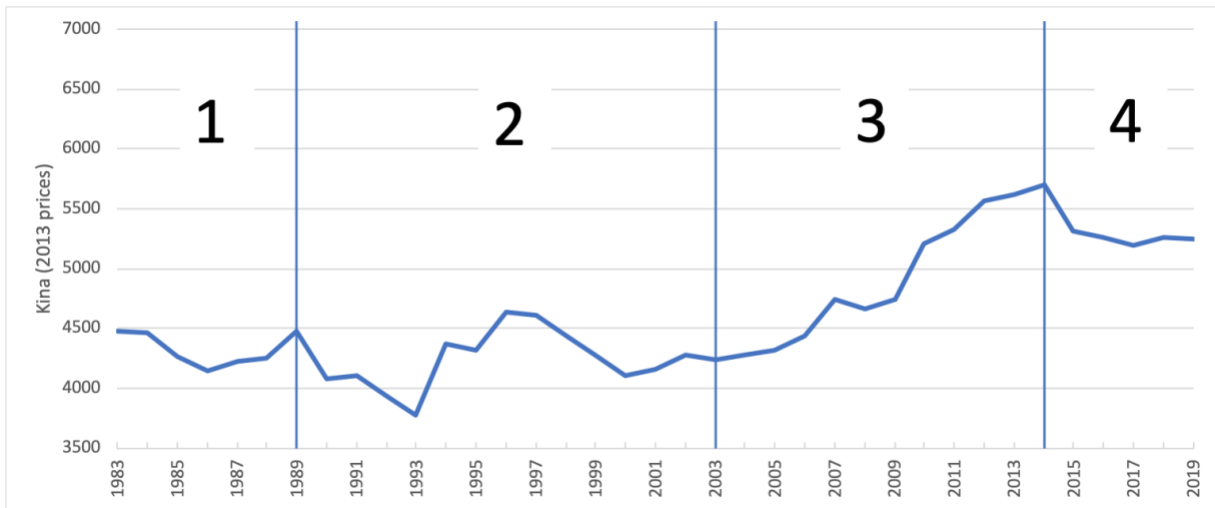
Variables denoted ‘CPI’ are deflated using the CPI. Other variables shown are deflated using the relevant GDP deflator. ‘NR’ is non-resource. All variables expressed in 2013 prices.

The trajectory of non-resource GDP per capita can be used to demarcate four distinct periods in PNG’s post-independence economic history (Figure 5.8).<sup>2</sup> The first to 1988 is a period of stability but also stagnation (with average growth from 1983 of 0 per cent per annum).<sup>3</sup> The second, from 1989 to 2003, is a period of economic instability – with interspersed periods of positive and negative growth cancelling themselves out (average of –0.4 per cent). The third is a long boom from 2003 to 2013, briefly interrupted by the global financial crisis (average of 2.7 per cent). Finally, the current period from 2014 is one of negative per capita growth, a bust following the boom (average of –1.7 per cent).

<sup>1</sup> These are end-to-end growth rates. For 1977–2019, the average growth rates for GDP per capita are 0.7 per cent (using the GDP deflator) and –0.2% using the CPI.

<sup>2</sup> For convenience, each sub-period is defined to the (end of the) year before the next one starts.

<sup>3</sup> Years prior to 1983 are missing, but other evidence suggests a similar conclusion: real GDP per capita growth for 1976–89 is –1.5 per cent; also see Figure 5.19 on employment.



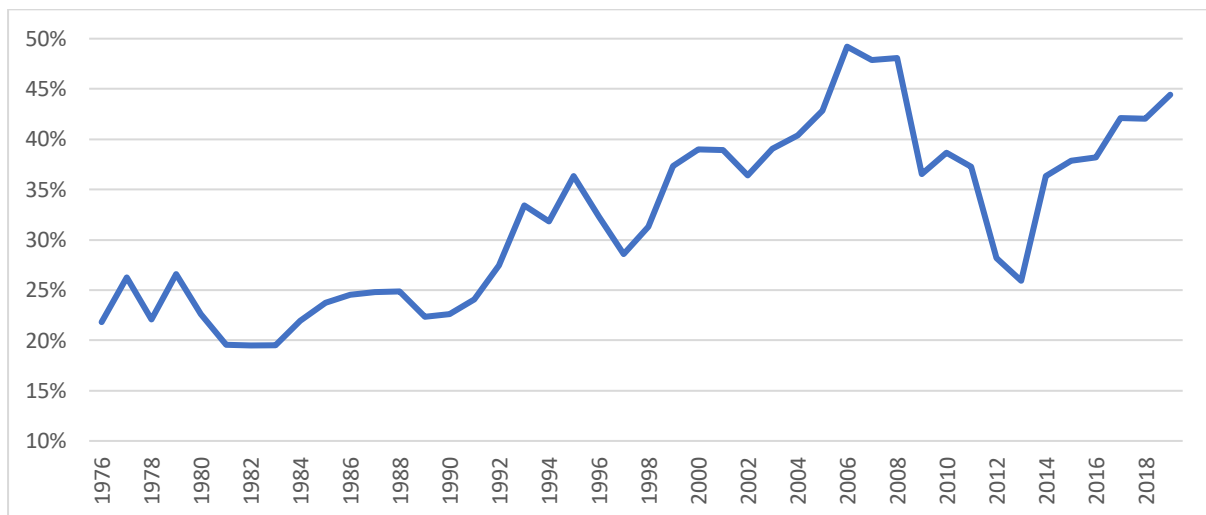
**Figure 5.8: Non-resource GDP per capita and the four sub-periods of PNG’s economic history post-independence, 1983–2019.**

Non-resource GDP deflator used.

## Commodity production

The PNG economy is heavily reliant on the production of resource and agricultural commodities. Because these commodities are exported, they are well measured.

As the figure below shows, the value of commodity exports to GDP increased from about 25 per cent at the time of independence to almost 50 per cent at the height of the resource boom, and, after falling to as low as 25 per cent just before PNG LNG production began, recovered to almost 40 per cent by 2018.<sup>4</sup>



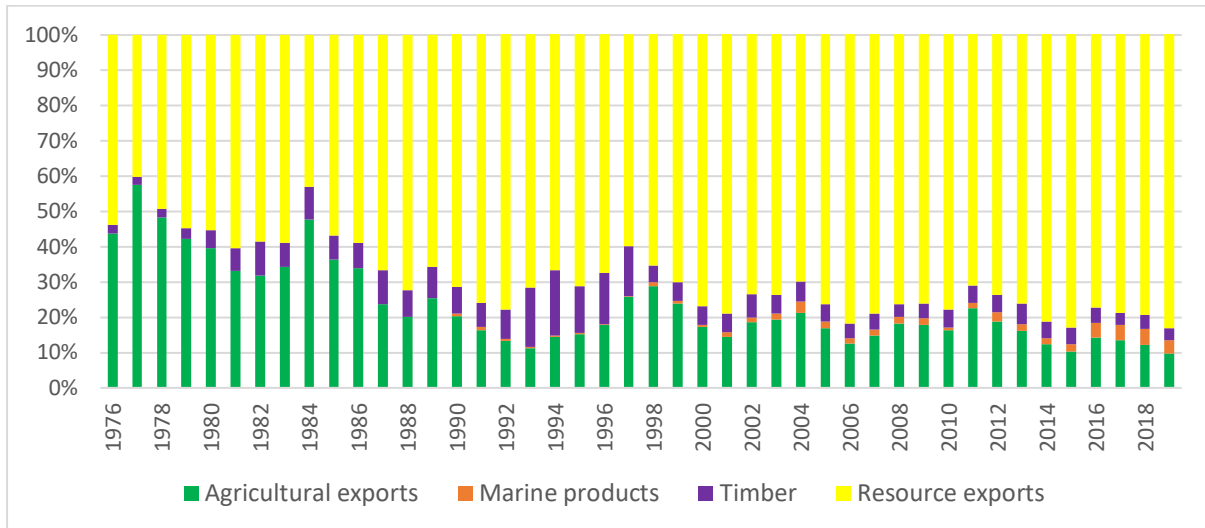
**Figure 5.9: Commodity exports as a percentage of GDP, 1976–2019.**

Note: Both variables measured in current prices. Commodity exports include resource exports, agricultural cash crops and other agricultural products, timber and other forest products, and marine products.

<sup>4</sup> The share of commodity exports in GDP exceeds the share of the resources sector in GDP (Figure 5.2) for two reasons. First, the latter compares the value added of the resources sector with total value added, and the former the output of the resources sector with total value added. Second, the former includes non-resource commodity exports as well.

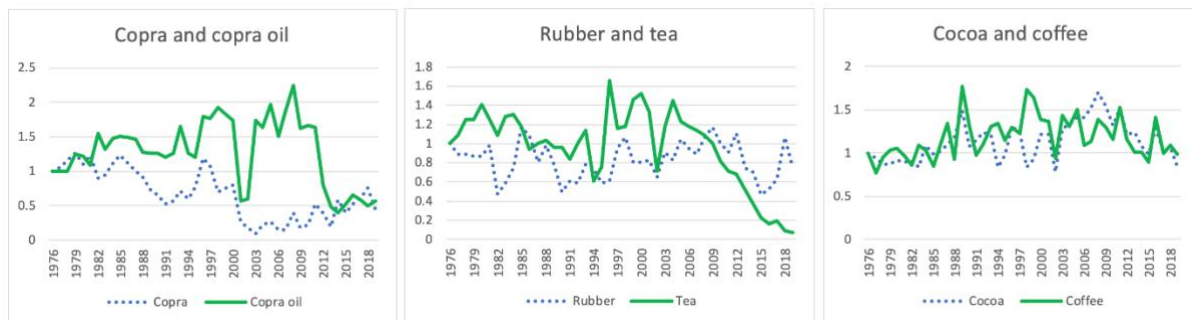


Adjusted by CPI, commodity exports have grown on average by 3.7 per cent between 1977 and 2019. This overall fairly rapid growth masks a radical shift in the composition of commodity exports, shown in Figure 5.10. At the time of independence, about half of commodities exported by value were agricultural. Now they are 10 per cent (including marine products). Timber and marine exports have both grown to about 4 per cent of the total. Resource exports have grown from half to over 80 per cent.



**Figure 5.10: The composition of commodity exports by value, 1976–2019.** All variables measured in current prices. Timber exports are logs and other forest products.

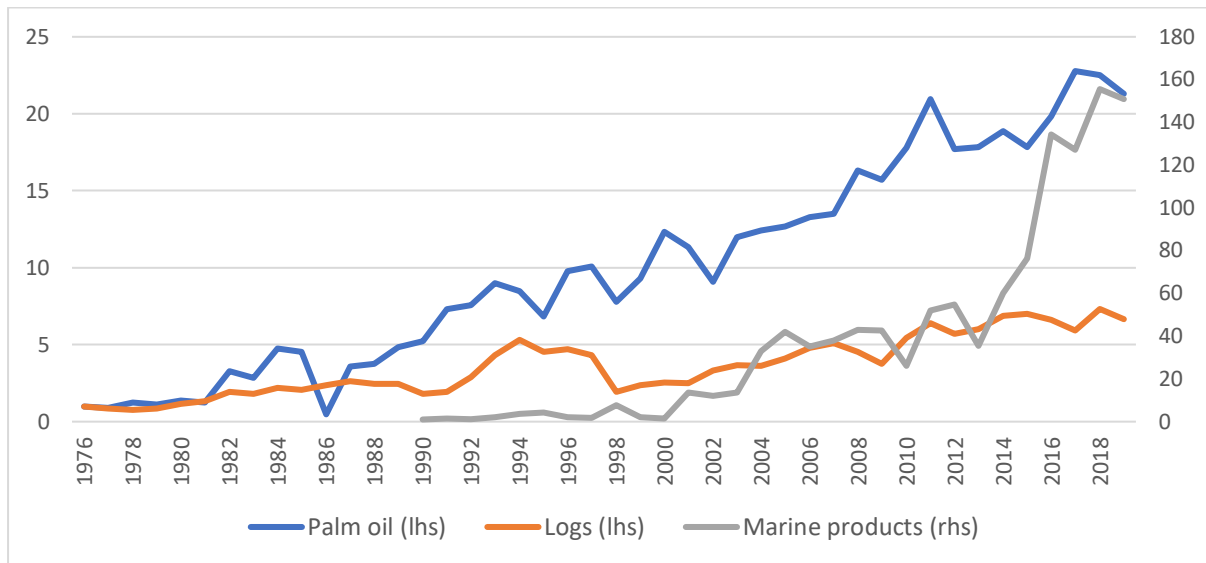
In fact, most agricultural exports show either a decline or no growth in volume since independence. As shown below, this is the case for copra, copra oil, rubber, tea, cocoa and coffee.



**Figure 5.11: Export volume indices of copra, copra oil, rubber, tea, cocoa and coffee, 1976–2019.** Indices set equal to unity in 1976.

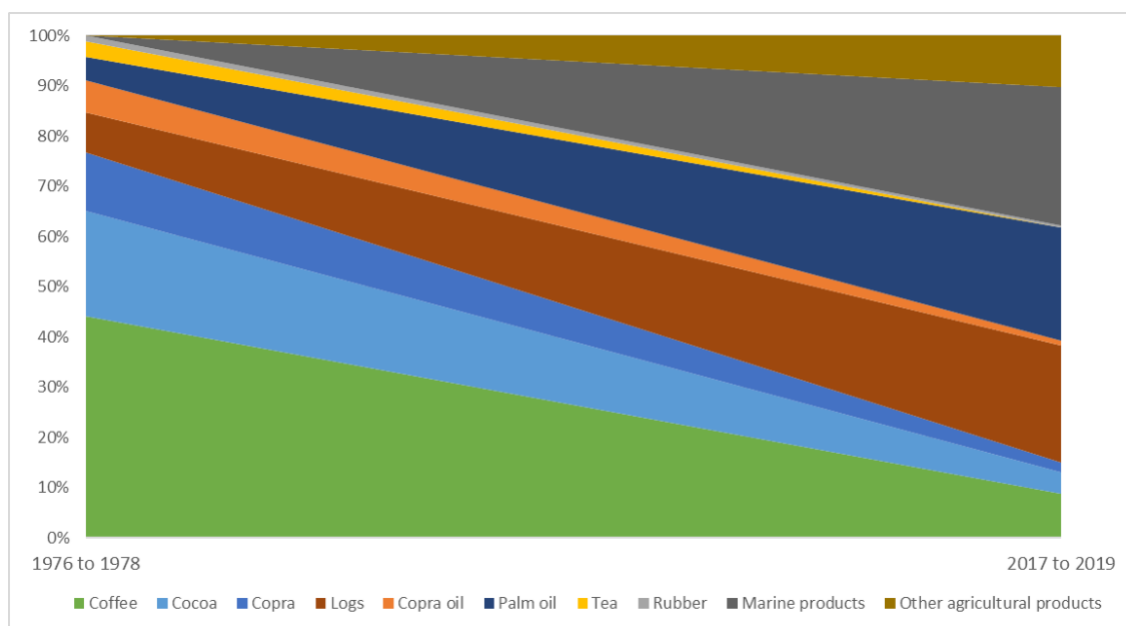
Unfortunately, the earlier claim by Bourke and Allen (2009) that cash crop export volumes are at a higher level than at independence is now only true for palm oil, shown in Figure 5.12. Twenty times as much palm oil is now produced as at independence (an annual average growth of 7.5 per cent). Marine product and log exports have also grown rapidly. The latter had a mini-boom in the mid-1990s, and overall have grown at an annual average rate of 4.5 per cent. Marine products are even more successful than palm oil. They were first counted in 1990 but have since grown at an annual average rate of 18.9 per cent. There is no volume index for the category of other (non-traditional) agricultural products but, since 1990 (the first

year in which it was recorded), its value, adjusted for inflation, has grown by an annual average of 6.1 per cent.



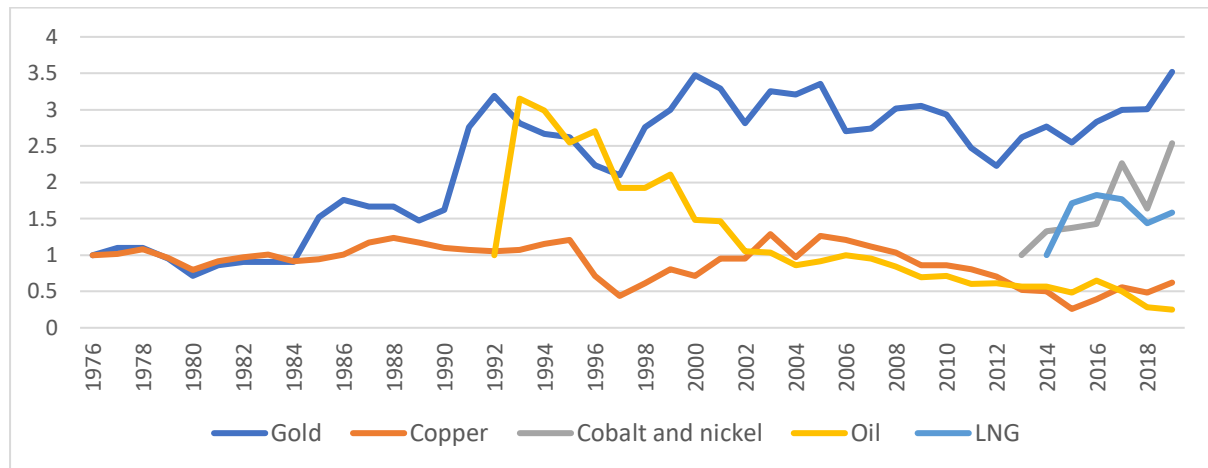
**Figure 5.12: Export volume indices of marine products, palm oil and logs, 1976–2019.** Indices set equal to unity in 1976 for palm oil and logs, and in 1990 for marine products.

As a result of these very different trends, the composition of the non-resource export bundle has changed completely (Figure 5.13). At independence, coffee was by far the most important crop by value, followed by cocoa. Together, these two made up two-thirds of non-resource exports. Now, they make up just over 10 per cent. Palm oil and timber now each make up just over 20 per cent: palm oil volumes have grown faster, but, as discussed below, timber prices have risen more. Marine product exports have become even more important, and now make up 28 per cent. Other (non-traditional) agricultural products at 10 per cent are more important than coffee (9 per cent) and other traditional agricultural exports.



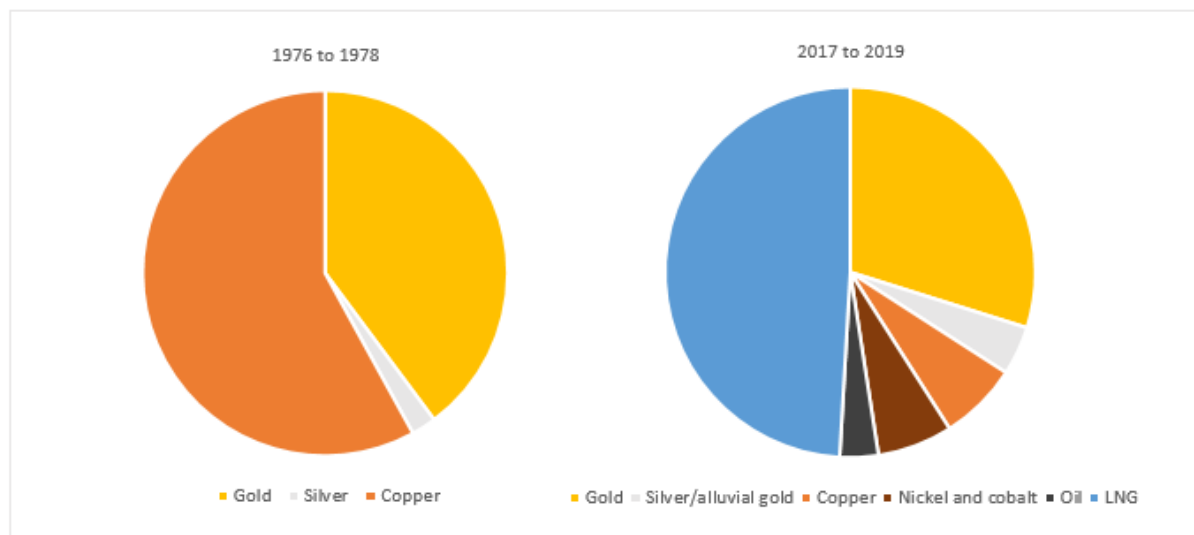
**Figure 5.13: Composition of non-resource commodity exports by value, 1976–78 and 2017–19.**  
 Three-year averages taken to minimise year-to-year volatility. Current prices used for all variables. Timber exports are logs and other forest products.

We turn now to resource exports. Gold and copper have been exported since independence. Gold is the stand-out performer, with production more than tripling by volume since independence. Copper production is now only at half the level of independence. Oil exports began in 1992, peaked by volume the following year and have fallen ever since. Cobalt and nickel started in 2012 and LNG in 2014. It is striking that there is no significant increase in the volume of resources exported during the resource boom years of the 2000s. We shall see that the boom of this period was rather driven by resource prices.



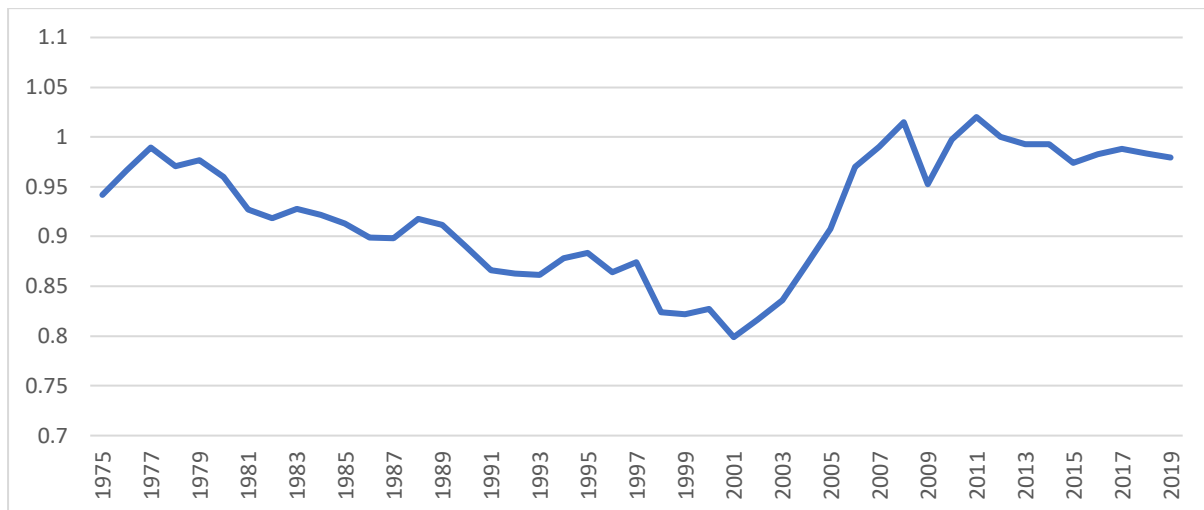
**Figure 5.14: Resource export volume indices, 1976–2019.**  
 Indices set equal to unity in 1975 for copper and gold and in the first year of production for other commodities.

Turning now to the value of resource exports, at independence, copper sales dominated. Now LNG does, followed by gold (Figure 5.15).



**Figure 5.15: Composition of resource commodity exports by value, 1976–78 and 2017–19.**  
 Three-year averages used to minimise year-to-year volatility. Current prices used for all variables.

Figure 5.16 shows aggregate export terms of trade for PNG from the IMF. The series uses exports as a share of GDP as weights, adjusting them over time, which means that the index can be interpreted as a measure of the windfall gain associated with commodity price increases (Gruss and Kebhaj, 2019).<sup>5</sup> Figure 5.16 is indispensable for an understanding of PNG’s economic history. Apart from a minor rise in commodity prices immediately after independence, the 1980s and 1990s were a period of commodity price decline. Then, everything changed. Commodity prices rocketed upwards and, despite a mild decline in recent years, are still above their level at independence. PNG’s economic turnaround in the 2000s finds a clear explanation in this trajectory.

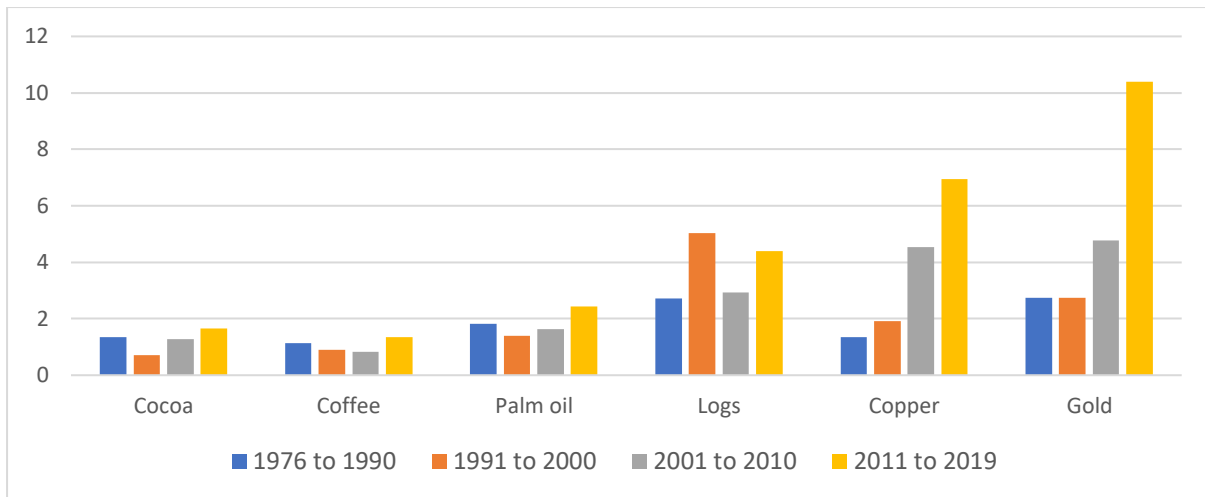


**Figure 5.16: PNG’s commodity export terms of trade, 1975–2019.**

IMF (2021). Note: Annual data; index set equal to unity in 2012; exports as shares of GDP used as weights.

Resource commodity prices have increased much more than non-resource prices. Figure 5.17 shows USD price indices over time relative to 1976 for PNG’s three most important non-resource commodities for which data are available (palm oil, logs and coffee) and for gold and copper, the two resource commodities exported since independence. Cocoa, coffee and palm oil show only moderate price growth. By contrast, the price of logs is now four times as high as it was in 1976. This no doubt reflects the fact that PNG is one of the few suppliers of tropical woods; in coffee and palm oil, by contrast, there has been massive growth in global supply, pushing prices down. Resource prices have done even better, with the copper price more than six times as high, and the gold price more than 10 times as high in the 2010s as in 1976.

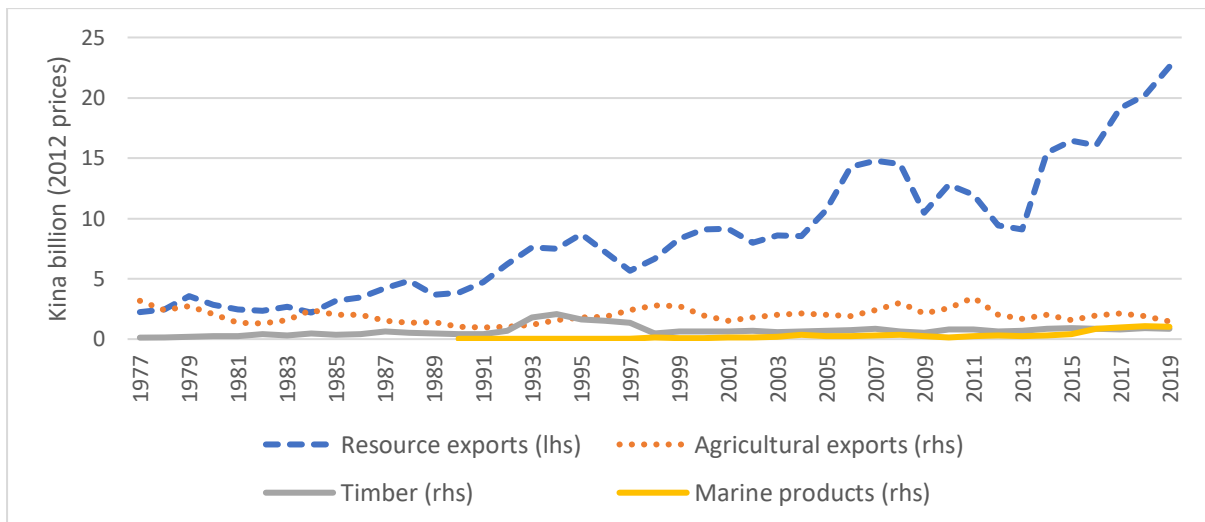
<sup>5</sup> ‘Variations in the commodity terms-of-trade index provide an estimate of the windfall gains and losses of income associated with changes in international prices. That is, a one percentage point change in the commodity terms-of-trade index can be interpreted as a change in aggregate disposable income equivalent to one percentage point of GDP’ (Gruss and Kebhaj, 2019, p. 10).



**Figure 5.17: USD price indices of some important commodities, 1976–2019.**

Indices derived from unit value data calculated by dividing commodity export values by commodity export volumes and then by that year's USD–PGK exchange rate. Indices set equal to unity in 1976.

We close the discussion by returning to Figure 5.10, but now showing absolute growth in value rather than changes of shares. The figure shows the growth in the value of exports from the four major commodity sectors: resources, agriculture, marine products and timber. We deflate nominal values by CPI. The real value of agricultural commodity production has declined, with the rapid growth in palm oil volumes and other agricultural products unable to offset the lack of growth in other sectors, and the lack of price improvement. Timber values have gone up but have never recovered their importance of the mid-1990s, when they briefly exceeded agricultural exports in value. Marine products have shown rapid growth in recent years. Resource commodity exports have performed strongly for most of the post-independence period, with an annual average growth of 5.1 per cent.

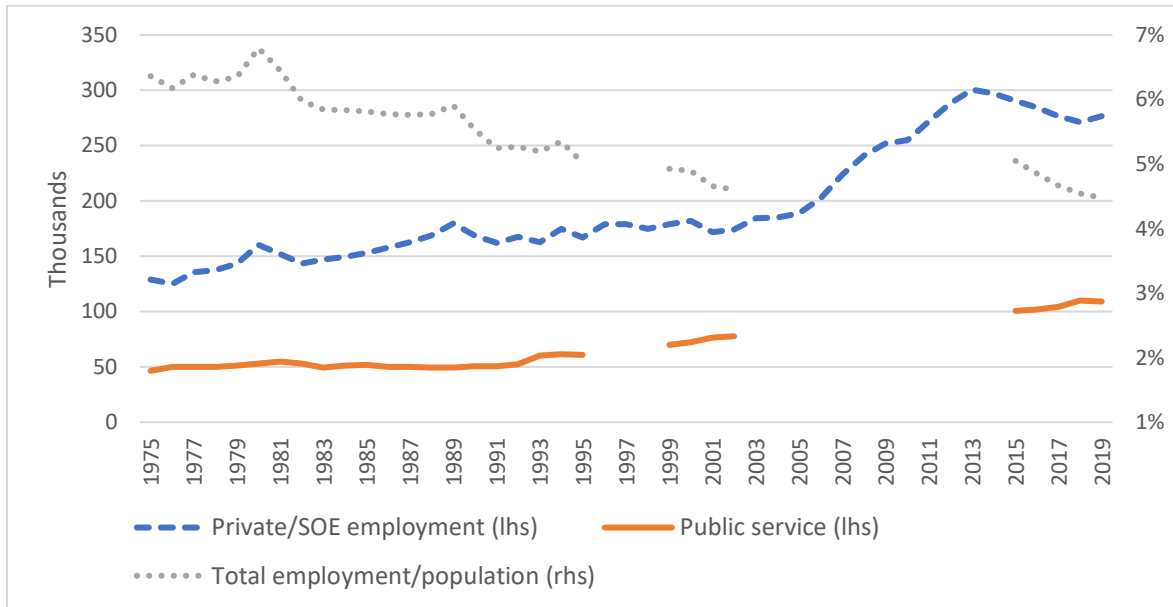


**Figure 5.18: The value of resource, agricultural, timber and marine exports (Kina billion in 2012 prices), 1977–2019.**

## Employment

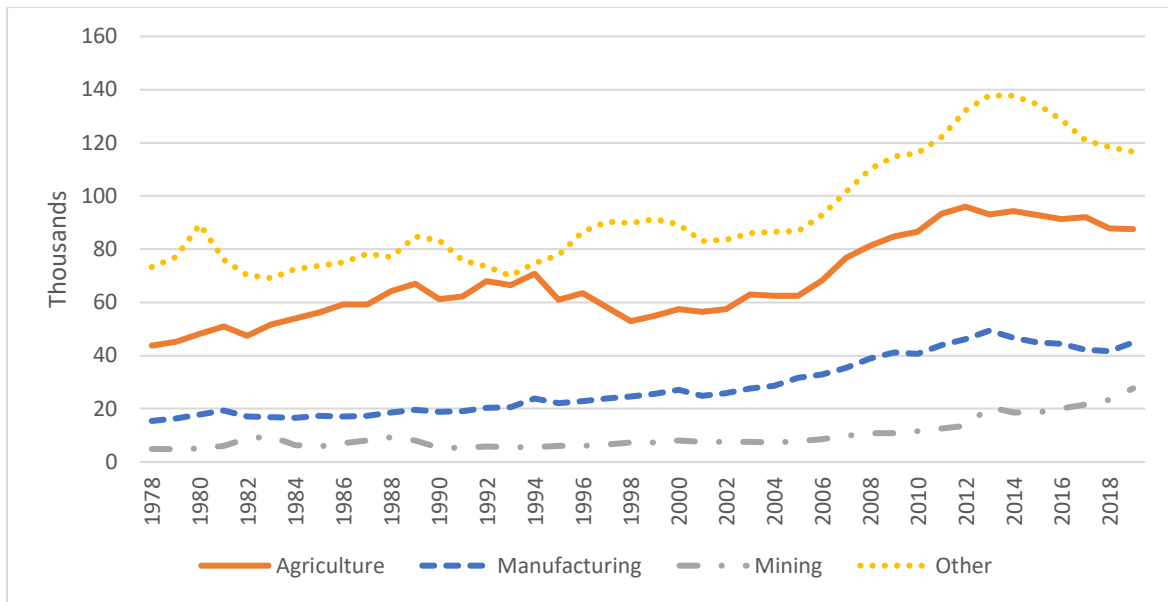
Employment is another key measure of economic activity. BPNG surveys formal sector employment in the private and state-owned enterprise (SOE) sector. Ironically, the public

service time series is incomplete. Formal sector employment, both private and public, is mainly flat until the end of the 1990s. Private sector/SOE employment increased rapidly in the 2000s, but has fallen since the boom ended. Overall, one sees a decline in the employment/population ratio, from 6 per cent just after independence to 4.5 per cent today. The share of formal employment in the public sector grew has grown only slightly, from 27 in 1978 per cent at independence to 29 per cent in 2019.



**Figure 5.19: Formal sector employment, totals and population percentage, 1975–2019.** SOEs are state-owned enterprises.

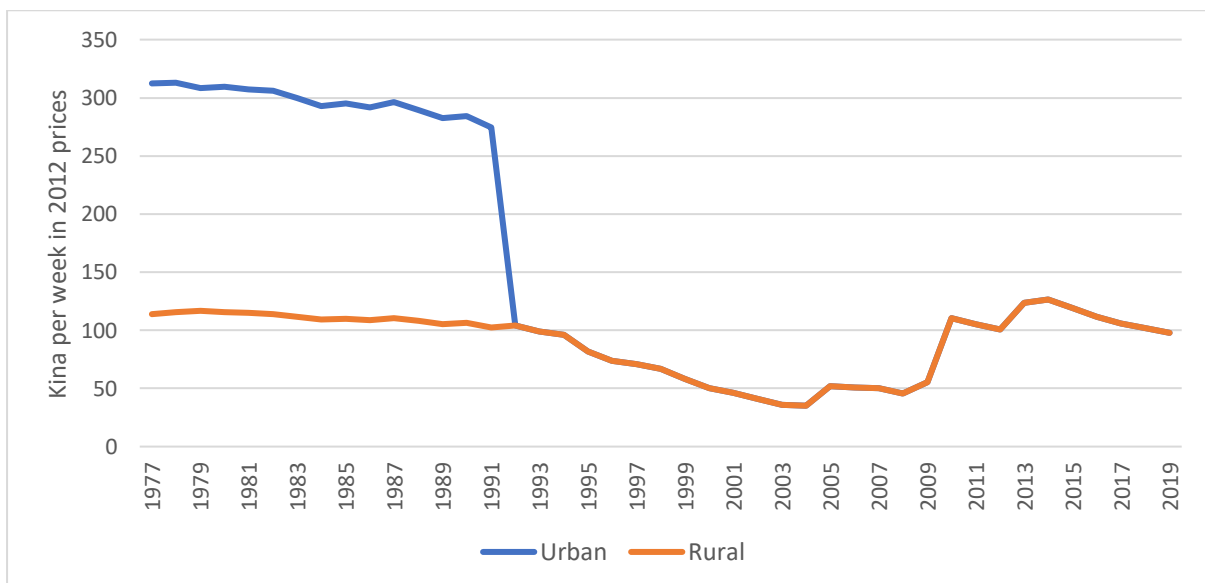
Employment numbers by major sector are shown in the next figure. The resources workforce has grown in importance over time but is still only 6 per cent of total employment (including the public service). Based on the latest data, the agriculture sector contributes 23 per cent of total employment, and the manufacturing sector 11 per cent. All sectors show strong employment growth in the 2000s, until the end of the resource boom. It would have been expected that agriculture and manufacturing would have suffered as a result of the real appreciation of the resource boom period (Figure 5.24). On the other hand, this was a period of great confidence in the PNG economy, and presumably the expansion was on that basis.



**Figure 5.20: Formal employment by sector, 1978–2019.**

Only private sector and SOE employment shown, so ‘other’ excludes public servants.

Minimum wages were an important policy issue in the years after independence, when it was widely believed that the urban minimum wage was too high given the country’s exchange rate. As Figure 5.21 shows, there was then a policy of partial indexation that resulted in a gradual decline in the real value of the urban minimum wage from independence to 1991. Then, during PNG’s first structural adjustment program, the urban and rural wage were unified in 1992. There is no evidence that nominal wages were reduced, but the minimum wage was not increased for a decade. Nevertheless, there was no growth in formal sector employment until the boom years, suggesting that other constraints were holding back formal sector employment. Even today, in real terms, the minimum urban wage is less than the minimum rural wage at independence, and less than half of the minimum urban wage at that time.

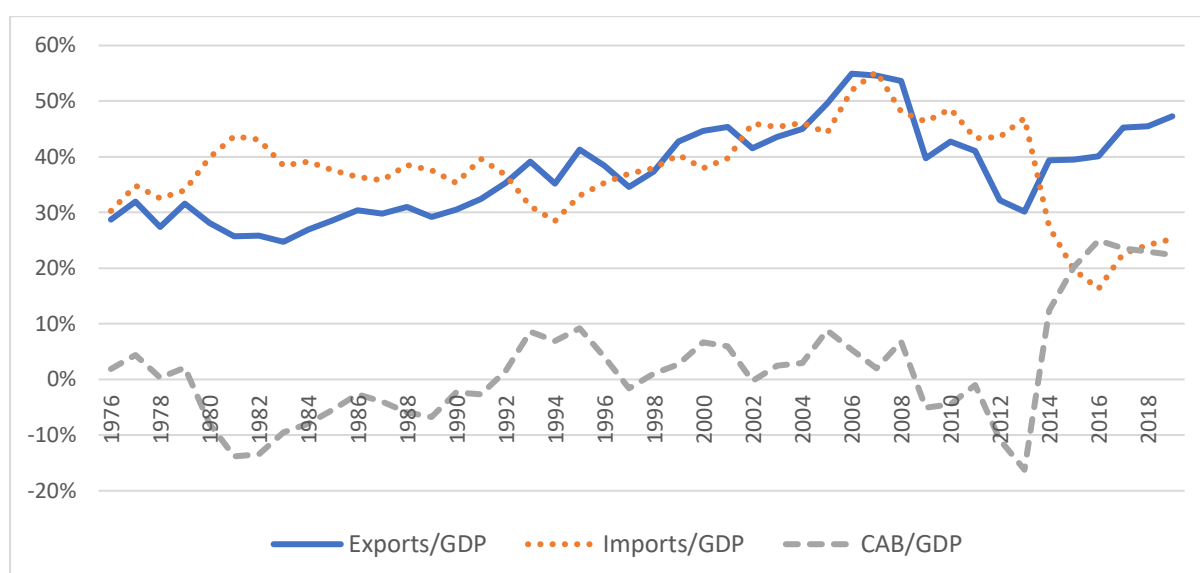


**Figure 5.21: Urban and rural minimum weekly wage (Kina per week in 2012 prices), 1977–2019.**

CPI used to convert from current to constant prices.

## Balance of payments and the exchange rate

Figure 5.22 shows exports and imports (of goods and services) as a percentage of GDP, along with the current account balance. Exports of services are small, but imports of services consequential. Imports outpaced exports until the early 1990s, when oil exports commenced. For the next two decades, PNG mainly ran current account surpluses. During the early boom years, both exports and imports grew rapidly. Exports fell briefly with the global financial crisis, but imports remained strong due to the PNG LNG construction, and PNG returned to a sustained current account deficit for several years. Then, from 2014, PNG entered a new era with strong export growth due to the PNG LNG project coming on line. However, imports fell sharply in part due to foreign exchange rationing, discussed further below. The current account balance is now in excess of 20 per cent of GDP, and imports that had been on a rising trend fell from 47 per cent of GDP in 2013 to 28 per cent in 2014 and 16 per cent in 2015. They have recovered slightly to 25 per cent in 2019, but are still at one of the lowest levels seen since independence. The previous lowest (before the last few years) was 28 per cent in 1994, another time of foreign exchange crisis.



**Figure 5.22: Exports, imports and the current account balance (% GDP), 1976–2019.** CAB is the current account balance.

PNG went into independence with a ‘hard kina’ policy, which was essentially a commitment not to engage in nominal depreciation. The kina was originally pegged to the Australian dollar, but, after a couple of years, the peg was changed to a basket of currencies. As the Australian dollar weakened over this period, the kina appreciated against it. The hard kina policy was softened over the course of the 1980s (Goodman et al., 1987), but the peg remained. With the closure of the Panguna mine in 1989, the government depreciated the kina by 10 per cent in response to the loss of foreign exchange. There was then a period of expansionary fiscal policy, leading to the depletion of foreign exchange reserves and a balance of payments crisis in 1994. In response, the kina was again depreciated, and then floated, and it began a period of rapid depreciation. The kina fell against the USD every year to 2002, with major falls in 1994 (17 per cent), 1998 (30 per cent), 1999 (19 per cent), 2001 (18 per cent) and 2002 (14 per cent), at which stage the kina was only one-quarter of its pre-float 1993 value.



Then, in 2003, with the start of the resource boom, the kina began to appreciate again, reaching a high of USD0.48 in 2012. The end of the resource boom and LNG construction in 2013 saw the resumption of depreciation, but after a couple of years, the government introduced exchange rate rationing and brought the kina back under a de facto crawling peg to limit further depreciation. The shift from a floating to a pegged exchange rate sounds like a return to the hard kina policy of independence; however, the crucial difference is that now, with queueing to obtain foreign exchange to purchase imports, the kina is no longer convertible. There is little support for depreciation; at the same time, the shortage of foreign exchange is the primary complaint of business.<sup>6</sup>

**Figure 5.23: The PGK–AUD and PGK–USD exchange rates, 1975–2019.**

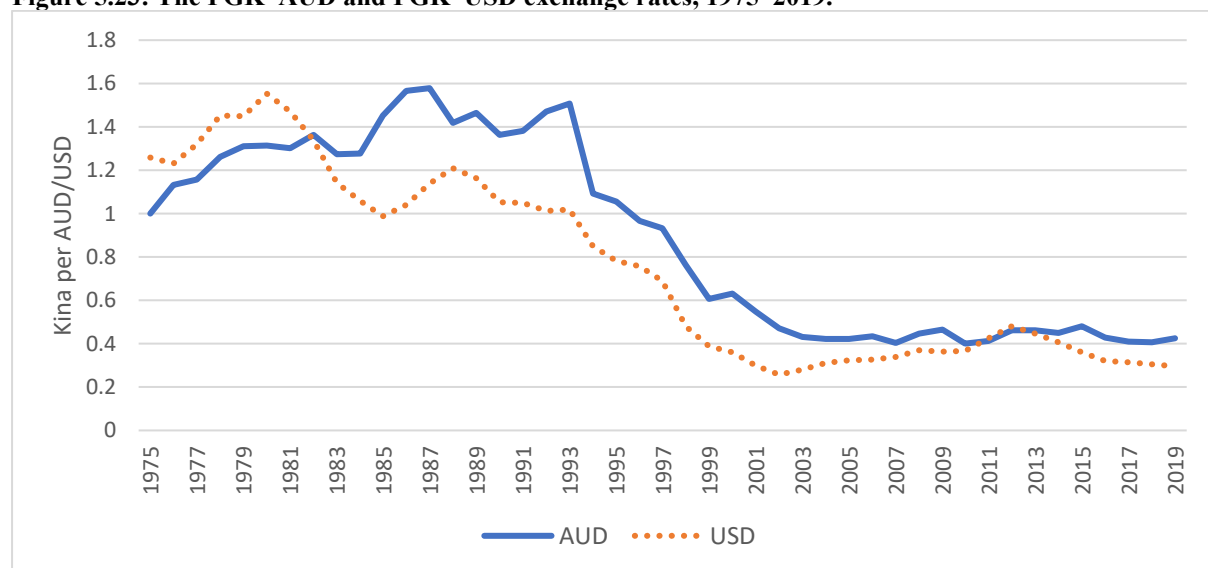
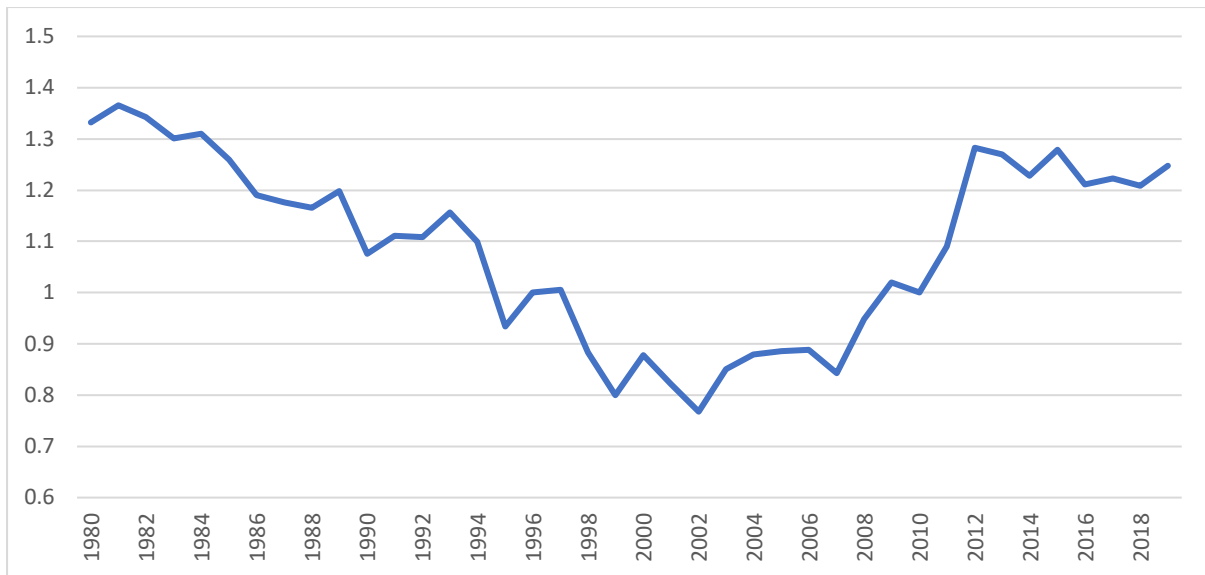


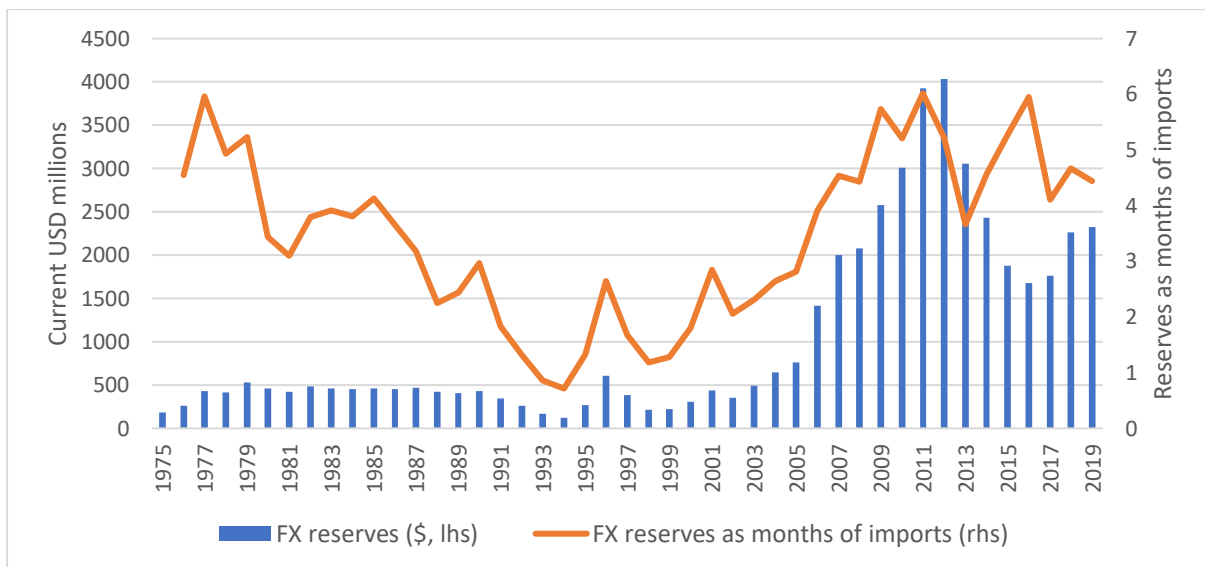
Figure 5.24 shows the value of the kina in real terms, using data from the World Bank on PNG’s real effective exchange rate. The figure shows that the kina is almost back at its pre-float hard kina level, once inflation is taken account of in both PNG and its trading partners. The fact that commodity prices are significantly above their value at independence, and that the resource sector as a whole is much bigger than at independence might support this as a reasonable outcome. However, the PNG kina was widely regarded as overvalued in the early years of independence (see e.g. Goodman et al., 1987, p. 65). Extensive import rationing implies that currently the currency is certainly overvalued. This is linked to the fact that, as we discuss below, a declining share of resource sector revenue (and thus foreign exchange) is finding its way into the rest of the economy.

<sup>6</sup> According to a survey of CEOs conducted between 2012 and 2018, from 2014, foreign exchange shortages have been one of the top four concerns of CEOs, and, since 2016, it has been their major concern (Howes, 2018).



**Figure 5.24: Real effective exchange rate index, 1980–2019.**  
Index set equal to unity in 2010.

Figure 5.25 shows foreign exchange reserves. A prerequisite of the hard kina policy was to have sufficient reserves to meet demand for the kina at the exchange rate set. In fact, however, foreign exchange reserves fell over time as a ratio of months of imports most years starting in the late 1970s. In this sense, the balance of payments crisis of 1994 was a long time coming. Despite the macro-economic reform program mounted in response to that crisis, there was a second balance of payments crisis in 1988–99, also evident from the graph.



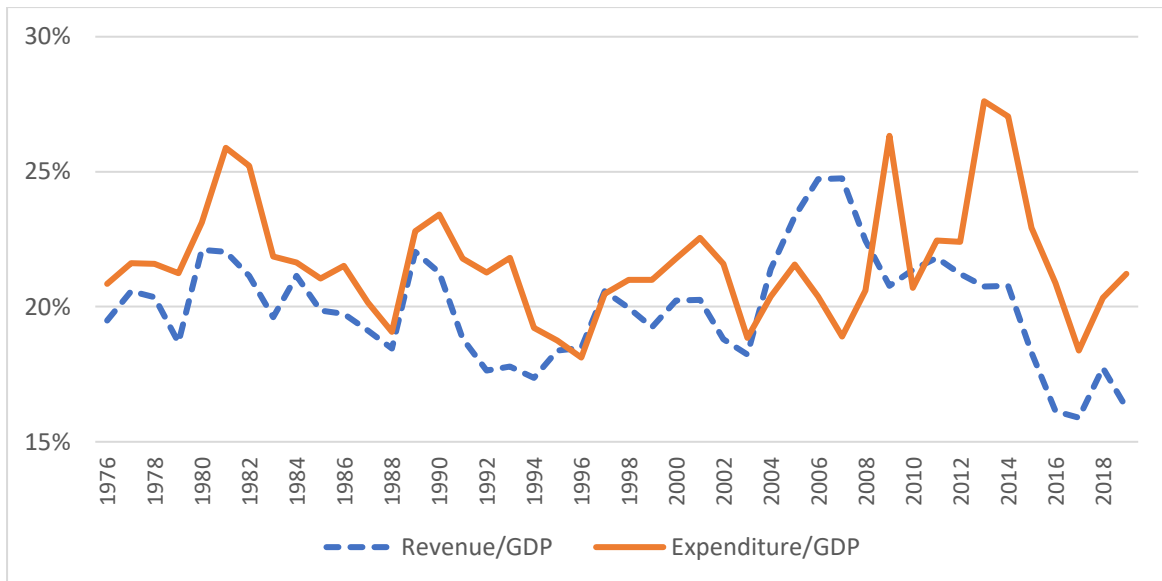
**Figure 5.25: Foreign exchange reserves, 1975–2019.**

## Fiscal data

Fiscal data have been collated from successive budgets and from BPNG (2007) for earlier years. In the boom years, a significant amount of funds were allocated to trust funds for later spending. From 2005 to 2011, these funds were counted as expended when they were placed

in a trust fund, rather than when they were actually spent. We have adjusted official expenditure figures to correct this.

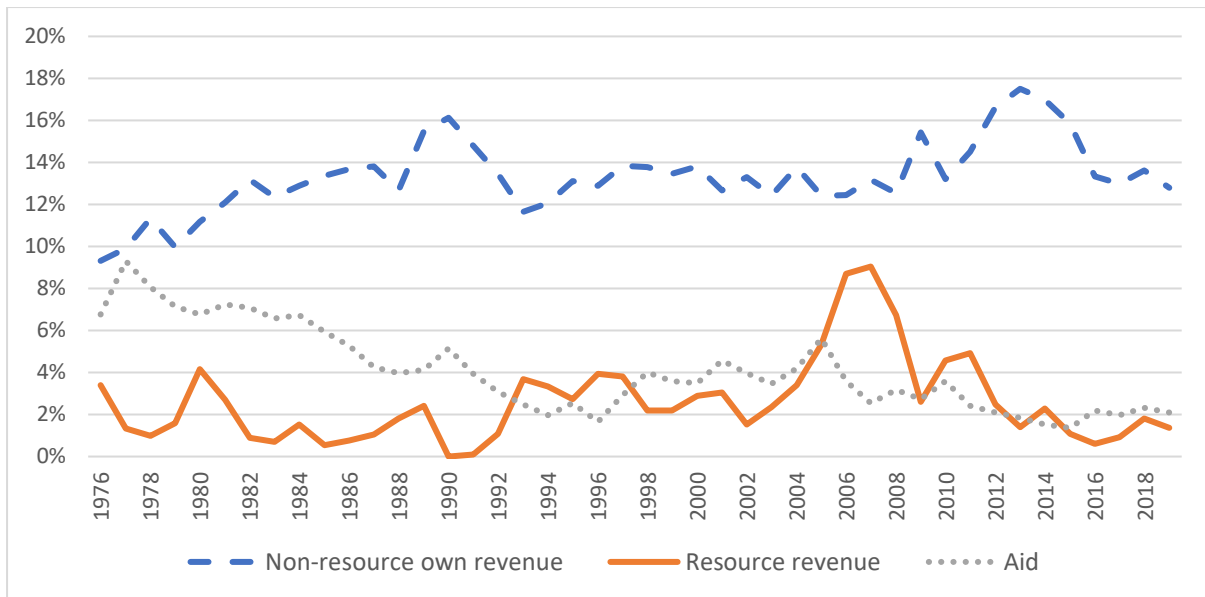
Government expenditure and revenue as a share of GDP are shown in Figure 5.26. Both are highly volatile. Revenue is on a downward trend.



**Figure 5.26: Government revenue and expenditure (% GDP), 1976–2019.**

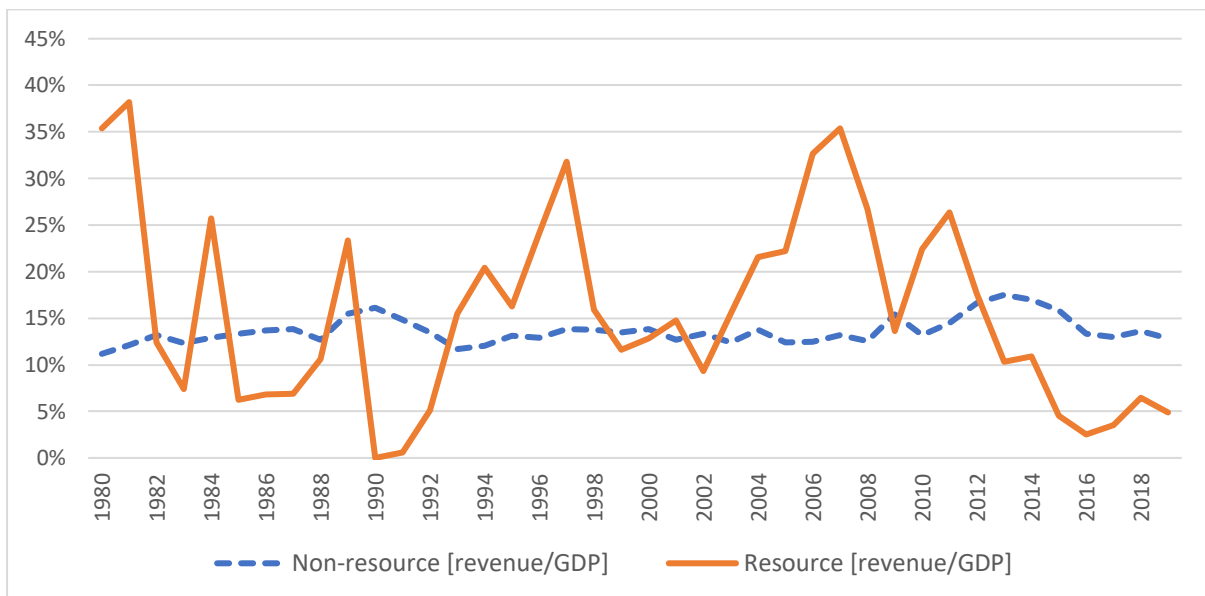
The weak revenue growth can be explained by the poor revenue performance of the resource sector and by declining foreign aid, both shown in Figure 5.27. The reduction in aid/GDP is hardly surprising, though it should also be noted that there was a shift from budget support to project aid over the 1990s, which means that the decline in total aid underestimates the fiscal shock from the change in aid policy over this period.

Resource revenue to GDP was about 3 per cent for most of the 1990s. Resource revenue exploded in the 2000s reaching almost 10 per cent of GDP, as high copper prices coincided with high copper exports. This is the primary explanation of the economic boom of the 2000s. However, copper production declined, and commodity prices fell with the global financial crisis. While some fall in resource revenues was expected, their almost complete disappearance was a surprise, especially given high gold prices.



**Figure 5.27: Non-resource revenue, resource revenue and aid (% GDP), 1976–2019.**

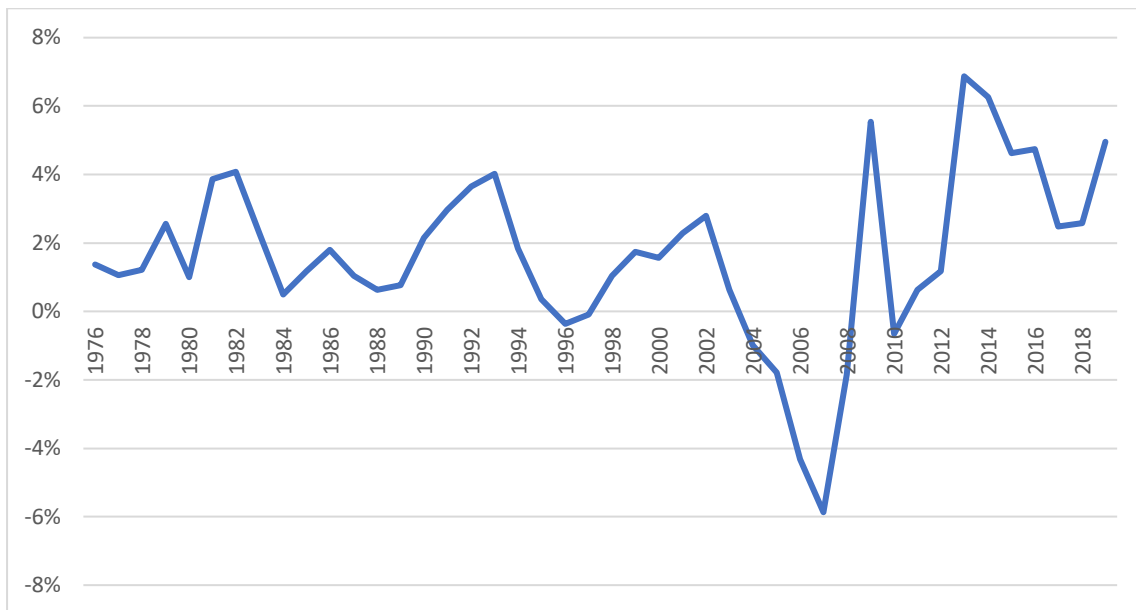
The picture is even starker if we show resource revenue as a percentage of resource value added or GDP, and non-resource (own) revenue as a percentage of non-resource GDP (Figure 5.28). The former, albeit volatile, is on a declining trend and the latter is on an increasing trend. Whatever the reason, PNG has become less effective at raising revenue from the resources sector and, therefore, is having to tax the non-resource sector more to meet expenditure needs.



**Figure 5.28: (Non) resource revenue as a percentage of (non) resource GDP, 1980–2019.**

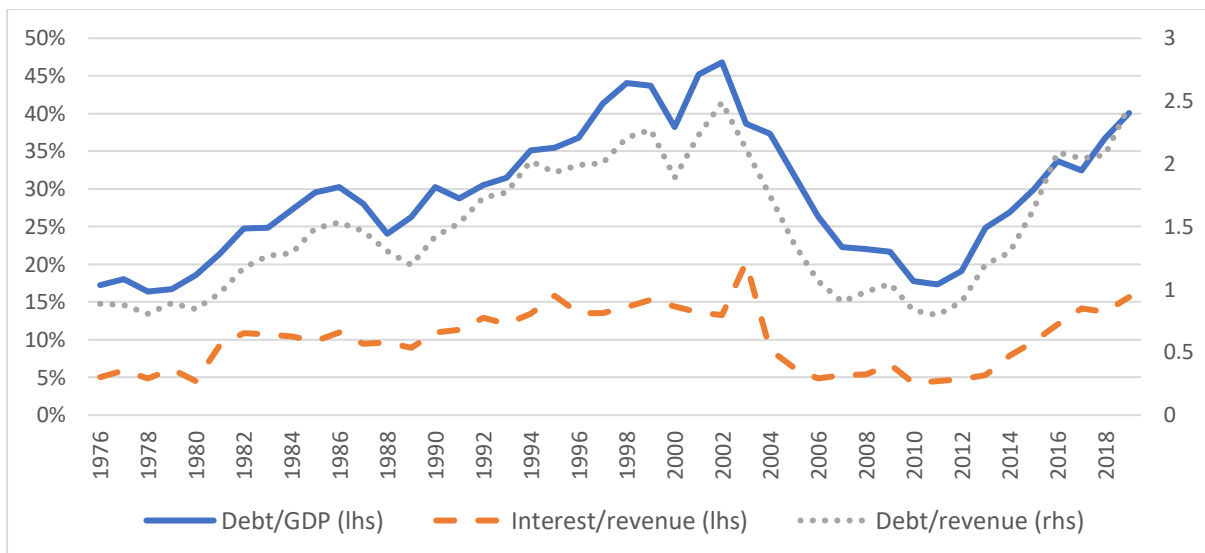
Poor revenue performance has no doubt been a factor behind PNG’s tendency to run deficits: as seen from Figure 5.29, they are observed in 36 of the 44 years for which we have data. However, the deficits have mainly been mild: 19 of the 36 have been below 2 per cent of GDP, and only eight have been above 4 per cent. Most of the surpluses (six of the eight) were in the boom years, between 2004 and 2010. However, these surpluses were modest, just 2.6

per cent on average. In hindsight, PNG should have run much larger surpluses in the boom period to avoid the fiscal squeeze it is currently experiencing. In more recent years, we have seen record high deficits: of the eight above 4 per cent of GDP, five have been after 2012.



**Figure 5.29: Deficits/GDP (%), 1976–2019.**  
A negative deficit is a surplus.

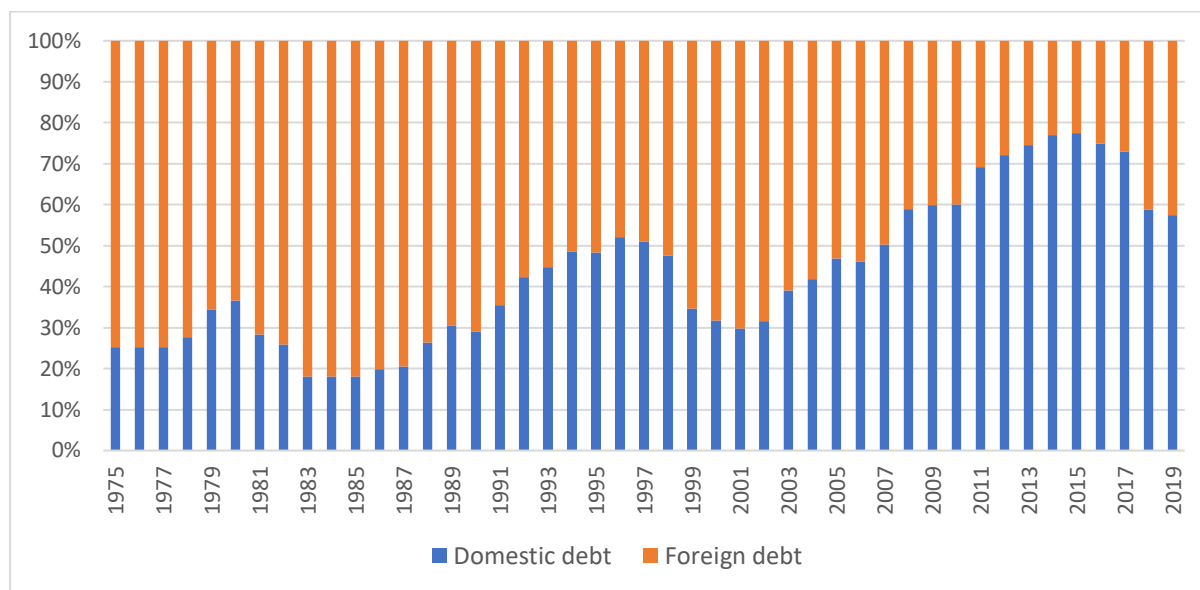
As a result of large recent deficits, debt/GDP is now almost back at its record pre-boom level. However, since revenue is falling, it is more useful to measure either debt/revenue or interest/revenue, which are also shown in Figure 5.30. Debt/revenue is back at a record level, while interest/revenue is at its second highest ever.



**Figure 5.30: Debt/GDP, debt/revenue and interest/revenue (%), 1976–2019.**

Not only has government debt doubled as a share of GDP since independence, but also its composition has greatly changed. For the first decade of independence, only about 20 per cent of PNG’s government debt was domestic. By the mid-1990s that figure had reached 50

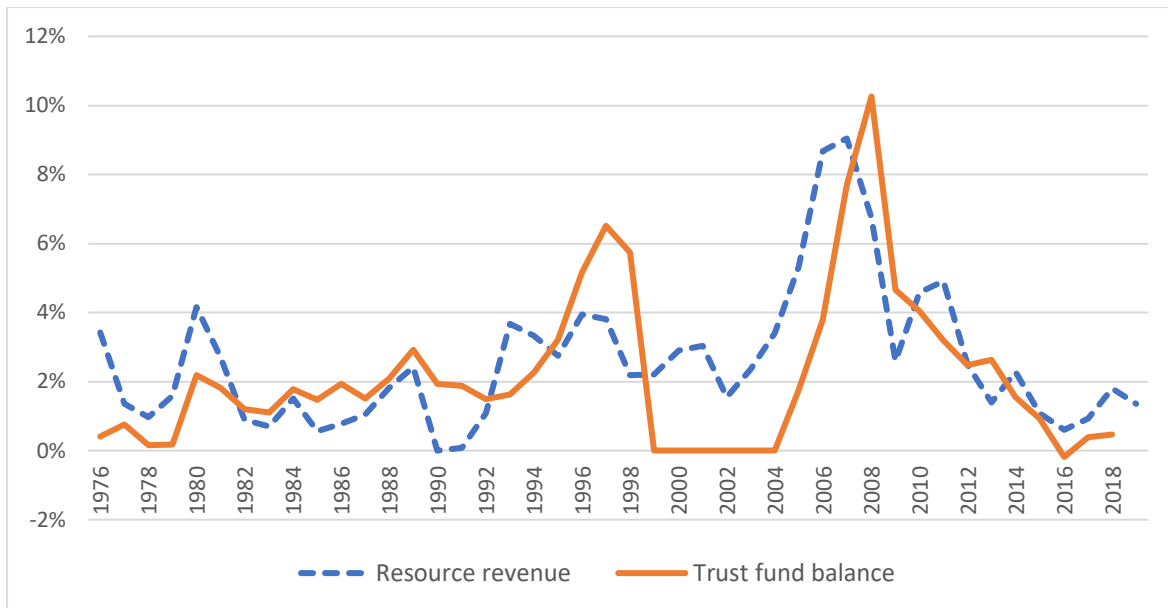
per cent, and, by 2012, around 70 per cent. That shift reflected major changes in the PNG banking sector, as discussed in the next section.



**Figure 5.31: Domestic and foreign debt as percentages of total, 1975–2019.**

One of the policy challenges confronting PNG is the management of volatile resource revenue, and the need to save revenue in good times to spend in bad. From independence through to 1999, PNG used the Mineral Resources Stabilisation Fund (MRSF) to stabilise resource revenue. However, the MRSF came to be seen as ineffective in preventing macro-economic and fiscal crises, and was abolished in 1999. Then, a few years later, when the resources boom began, PNG started using a system of trust funds to park surplus revenue. Figure 5.32 summarises PNG’s experience with trust funds (including the MRSF) from independence onwards. The MRSF (the blue line up to 1999) accumulated a positive balance that increased from 2 per cent in the 1980s to 6 per cent in the late 1990s. However, this was a period of acute fiscal stress and, as mentioned, the MRSF was abolished, and the proceeds used to pay off domestic debt. The new trust funds quickly accumulated significant value, reaching 10 per cent of GDP in 2008, but those balances were spent down very quickly, and exhausted just a few years after the boom ended. Not enough was saved during the boom period. Expenditure increased from around 20 per cent pre-boom to 25 per cent of GDP in 2012–14, just a few years after revenue hit this rare high (2006 and 2007). By this time, however, revenue had already retreated to below 20 per cent. The result has been large deficits and the accumulation of arrears.

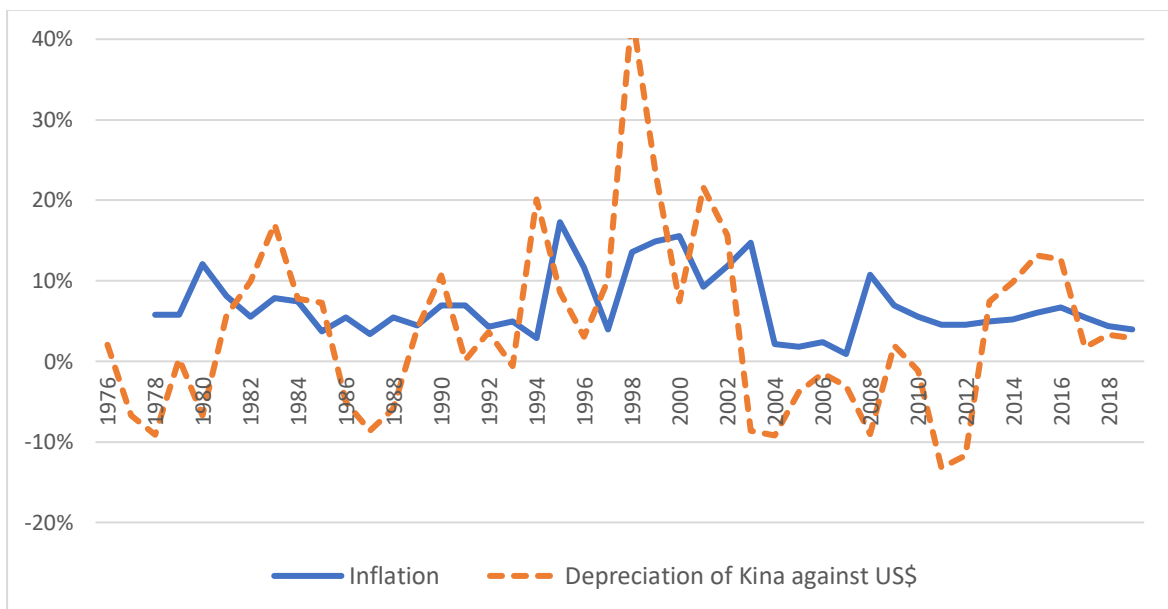
It is fair to say that stabilisation of resource revenue remains an elusive goal. While there is a new sovereign wealth fund in place, it is not active. In hindsight, the abolition of the MRSF just before the boom began was incredibly bad timing.



**Figure 5.32: Resource revenues and trust fund balances (% GDP), 1976–2019.**  
Trust fund balance only to 2018.

## Monetary policy and banking

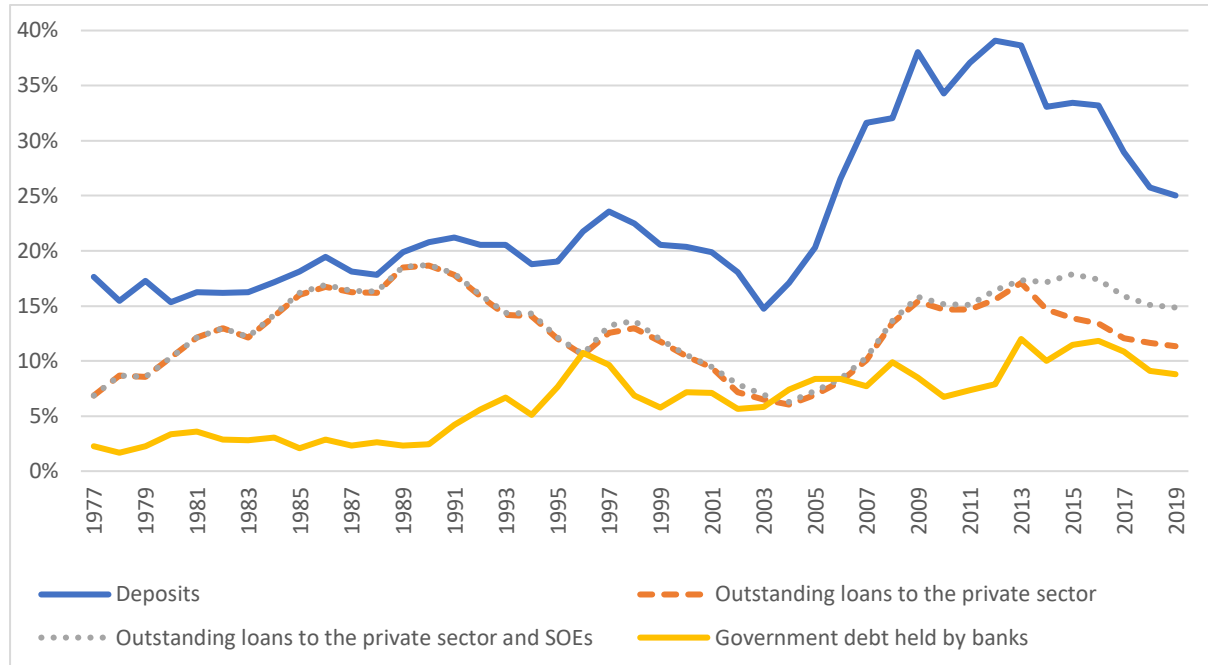
Inflation has generally been moderate in PNG. Average annual CPI growth from 1977 to 2019 is 7 per cent. However, inflation did increase in the 1990s in the context of rapid currency depreciation (Figure 5.33).



**Figure 5.33: Inflation and currency depreciation, 1976–2019.**

In terms of deposits, the banking sector is close to twice the size it was at independence relative to GDP (Figure 5.34). At independence, deposits were 15 per cent of GDP. They reached 24 per cent in 1997 but fell back to 15 per cent in 2003. Then, with the resource boom, deposits reached 39 per cent of GDP in 2013, before falling to their current level of 25 per cent of GDP. The main beneficiary of this growth in deposits has been the government.

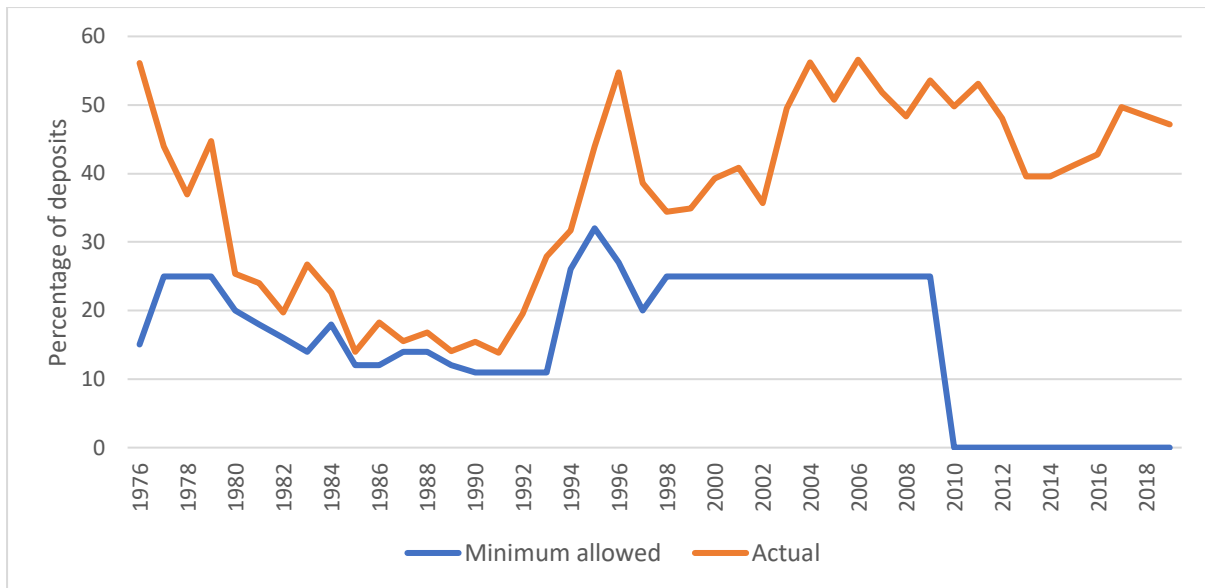
Bank government debt has increased from 2 per cent in 1980 to 10 per cent in 2019. The outstanding stock of debt to the private sector is little changed relative to GDP: 10 per cent in 1980 and 11 per cent in 2019. State-owned enterprises have become significant debtors in recent years with outstanding bank debt (and resultant significant debt distress) of some 4 per cent of GDP, up from zero prior to 2012.



**Figure 5.34: Deposits and lending ratios (% GDP), 1976–2019.**

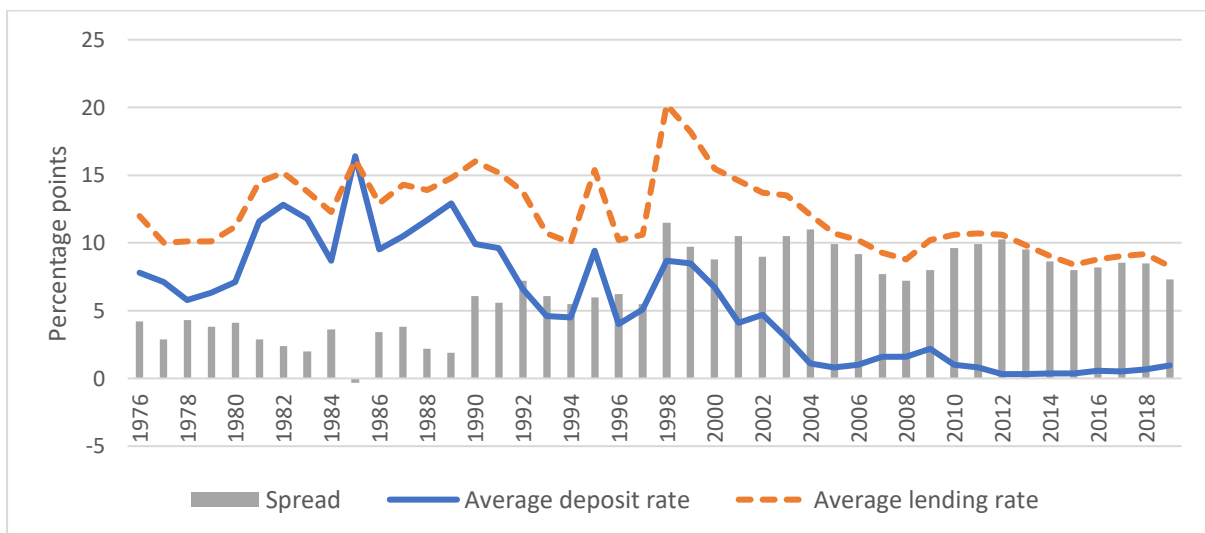
As a result in this shift in lending behaviour, the banks' average liquid asset ratio has grown above 50 per cent (government securities are counted as liquid assets, even though they are not actually very liquid). In the 1980s, BPNG used the minimum liquid asset ratio as a regulatory instrument to influence bank behaviour, and, as Figure 5.35 shows, for much of this period it was binding. However, that is no longer the case, and the ratio is no longer targeted by the authorities. There is still a cash reserve requirement, but that is also not binding. BPNG uses the kina facility rate as its primary monetary policy lever, but it seems to have limited sway over lending rates, since banks fund their loans from their deposits.





**Figure 5.35: Banks' liquid asset ratios: Actual and statutory minimum, 1976–2019**

At independence, the banking sector was highly regulated. The main effect of deregulation seems to have been a decline in deposit rates to virtually zero. The spread between deposit and lending rates has risen from well under 5 per cent to close to 10 per cent, meaning that lending rates have not fallen by nearly as much as deposit rates. PNG's banks have become among the most profitable in the world. That they are able to maintain such a spread is testimony to their monopoly power.<sup>7</sup>



**Figure 5.36: Weighted average lending and deposit rates and spreads, 1976–2019.**

## Conclusion

The purpose of this chapter has been to introduce a new data set, the PNG Economic Database, with basic time series for PNG since independence. The data notes at the end of the

<sup>7</sup> PNG's biggest bank, the Bank of the South Pacific estimates that it has a 65 per cent market share (*Post-Courier*, 2020).

chapter provide additional information on the data compiled, which are available online. Further data should be added over time.

To conclude, we highlight 15 findings from the chapter:

1. Every year PNG's population now increases by 230,000, three times the annual absolute increase at independence.
2. PNG has become more resource dependent over time; the share of the resources sector in the economy has grown from about 10 per cent in 1980 to nearly 30 per cent.
3. Using the official GDP deflator, GDP per capita has grown at an average rate of 1.1 per cent since 1983, and the more useful indicator of non-resource GDP per capita has grown at an average rate of 0.4 per cent. CPI has grown significantly faster than the GDP deflators, and, if used as a deflator for nominal GDP, gives a result of overall negative GDP per capita growth.
4. Non-resource GDP per capita can be used to divide PNG's post-independence history into four periods: stability but stagnation (1983–88), instability (1989–2002), the resource boom (2003–13) and the subsequent bust (2014 to the current time).
5. At independence, PNG's commodity exports were divided fairly evenly between resources and agricultural commodities. Now 80 per cent are from the resources sector.
6. Outside of the resources sector, palm oil, non-traditional agricultural products, logging and marine products have shown significant growth. With the exception of palm oil, production of the traditional export cash crops is lower than at independence.
7. With the exception of the boom period, formal sector employment has overall grown slowly, and the ratio of formal sector employment to population has fallen since independence.
8. Adjusting for inflation, the minimum wage paid to urban workers is half of its independence level. (The declining absolute level of formal sector employment suggests, however, that now is not the time to raise the minimum wage.)
9. The nominal PGK–USD exchange rate is only one-quarter of its value at independence, but the real effective exchange rate is back at close to its independence level, when the kina was thought to be overvalued.
10. The import/GDP ratio is at its lowest level in the independence era, in part due to foreign exchange rationing.
11. The revenue/GDP ratio is on a downward trend. This reflects declining aid and a declining share of resource sector value added captured by the government.
12. Debt/GDP, debt/revenue and interest/revenue ratios all indicate that government debt levels are at historically high levels in PNG, following the record deficits of recent years.
13. Efforts to stabilise resource revenues have not been sustained or successful.
14. At independence, government debt was mainly financed offshore; now it is mainly financed onshore.
15. Banks have shifted away from lending to the private sector towards the role of government financiers. And lending spreads have increased. These two trends have resulted in a highly profitable banking sector.

We leave it to the reader to draw out the policy recommendations that follow from these results. We conclude by noting that, despite our best efforts, we are still far from having a comprehensive set of economic data for PNG. There are many variables – GNI, investment, savings and others – that would enrich our analysis. We also need to extend the GDP series to, or at least closer to, 1975. Nevertheless, we hope that our PNG Economic Database makes

a useful contribution towards a better understanding of PNG's economic history and prospects.

## Acknowledgements

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## Appendix: Data notes

### Population

Annual values are interpolated from decadal population figures from the Department of National Planning and Monitoring (1999) to 1990 and NSO (2002) for 2000 and projections from 2001 based on the 1981–2000 growth rate (2.7 per cent), the mid-range estimate of Bourke and Allen (2021).

### GDP: Current prices

For GDP data in current prices, 1976–80 data are available from Goodman et al. (1987), and 1980–2002 from BPNG (2007). From 1989 to 2006 we take information from the PNG Budget Database from successive budget volumes (Table 1 of Volume 1). Agricultural data 1980–2006 are taken from Asian Development Bank (ADB) PNG key indicators spreadsheets. In 2006, a new GDP series was created by NSO, increasing the 2006 GDP by 50 per cent relative to the old estimates. Data are available from NSO for the years 2006–18 in the new series. Data for 2019 use Treasury figures from the 2021 National Budget (Volume 1) GDP estimates, which are consistent with the new series. We create two series: the first using nominal growth rates from 2006 onwards to extend the pre-2007 series forwards (GDPoldc) and the second using nominal growth rates from 2006 back to 1980 to extend the post-2005 series backwards (GDPnewc). Likewise, for pre-1980 series we rebase to the old series. The same method is used for GDP by sector with the same sources (sectoral

data available from 1980, whereas GDP available from 1976). BPNG (2007) notes a break in the series from 1994; it also notes that, for the years 1994–2002, GDP excludes the imputed value for bank service charges. Unless specified otherwise, GDPnewc is used in the analysis. Note that earlier GDP data (from 1975/76 and earlier) are available from BPNG (2007). However, these show high real growth (11 per cent) in 1983, which we are unable to find other evidence for. Therefore, we use Goodman et al.'s (1987) current and constant price GDP growth data for the earlier years.

### **GDP: Constant prices**

GDP data in constant prices are available from Goodman et al. (1987) for 1976–83; BPNG (2007) from 1983 to 2002; Budget Vol. 1, 2003–2006; NSO (2006–18); and the 2021 Budget Vol. 1 for 2019. Data for GDP, non-resource GDP, agriculture and manufacturing are available (for GDP from 1976; for others from 1983). These series have different bases: 1976–83 are in 1977 prices; 1983–93 are in 1983 prices; 1994–2002 from BPNG (2007) and 2003–06 from the Budget are in 1998 prices; and 2006 onwards are in 2013 prices. The earlier years are rebased so that all GDP data are in 2013 prices (GDPnewk). To rebase, we need data for the cut-off years calculated in both old and new base prices. Goodman et al.'s (1987) constant price growth rates up to 1984 are applied to the BPNG 1983 baseline (i.e. converted from 1977 to 1983 prices). ADB statistical indicators were located that report GDP for 1994 in both 1983 and 1998 prices. This allows conversion of the entire series up to 2006 into 1998 prices. Budget documents report 2006 at 1998 prices, while NSO reports 2006 at 2013 prices. This allows for calculation of 2006 in both 1998 and 2013 prices, and thus conversion of the whole series to 2013 prices. Note that the rebasing in 2006 adjusts both for a different price base year and for the rebasing of current price GDP. The GDP deflator is the constant price GDP over the current price GDP (GDPnewc).

### **Commodities**

Data on commodity volumes are available from BPNG (2007) from 1976 to 2005, and Quarterly Economic Bulletin (QEB) Table 8.4 for agricultural products, and Table 8.5 for logs, marine products and minerals/metals from 2006. BPNG (2007) notes a break in the series in 2001. The following commodities are covered: copra, copra oil, cocoa, coffee, palm oil, rubber, tea, marine products, logs, gold, silver, copper, nickel, cobalt, oil and condensate/LNG. Data on commodity values are available from BPNG (2007) from 1976 to 2005, and QEB Table 8.3 for agricultural exports, and Table 8.2 for logs, marine products and minerals/metals. The same commodities are covered as for quantities, except that 'other agricultural produce' and 'other forest products' are added, with data beginning in 1990. Marine products value data also begin in 1990. The total commodities value figure is the sum of all commodities covered in this database, which is equivalent to the total exports figure in QEB Table 8.2 after removing the value of refined petroleum products in QEB Table 8.3 from the total.

Other agricultural products and other forest products do not appear in BPNG (2007); they are relatively small in early years but larger in later years. Data on other agricultural products and other forest products appear in QEB tables 8.3 and 8.2, respectively, and go back to 1990. Condensate and LNG figures are added together to attain the combined condensate/LNG figure. In BPNG (2007), alluvial gold is included in the total gold figure, but from 1990 the figure for silver and alluvial gold is calculated by taking the 'total' minerals figure and subtracting the value of the other mineral resources, as per notes in QEB Table 8.2. Other

agricultural products includes a very small proportion of manufactured goods as per note (f) in QEB Table 8.3.

There is a break in series in commodity data from 2001, which reflects a reconciliation between BPNG and the commodity boards' export figures. A comparison of the two volume series in 2001 shows that copra and copra oil volume figures are around half of what they were in the old series. Other commodity volumes have differences between series in 2001 ranging from –15 per cent to 27 per cent. There are also differences in export prices series; a comparison (in 2001) between the two series shows that copra prices are around 45 per cent higher in the new series. Copra values are around 40 per cent smaller in the new series, and 50 per cent smaller for copra oil. Other value differences range between –20 per cent and 1 per cent. Metals and oil volumes and values are unchanged across series.

Commodity export terms of trade are from the IMF, using shares of exports in GDP as weights

## **Employment**

Annual formal employment data are sourced via an index from BPNG (2007) from 1978 to 2005 and BPNG QEB Table 9.7 from 2006. Employment figures are averages for the year. Where annual QEB estimates are not available or are unreliable, the geometric mean of quarterly estimates are used.

Total employment as defined by this index excludes the public service but includes SOE employment. The indices are provided by sector (retail, wholesale, manufacturing, construction, transport, agriculture, financial and mineral) as well as total.

The series was rebased in 2002 to Q1 2002 (= 100) (from Q2 1989 = 100); therefore, the earlier data required rebasing.

Employment numbers are available for 1968–91 in Connell (1997) Table 8.2 for the public sector (total, public service and SOEs) and the private sector (total, mining, agriculture from 1976 and manufacturing from 1979). These data are combined with the indices to provide numbers for these series throughout the period, except for the public service. More recent public service data are available from McGavin (1997) for 1992–95, Australian Government Department of Foreign Affairs and Trade (2004) for 1999–2002 and Treasury (2020) for 2015–19.

## **Minimum wage**

Data on the weekly rural and urban minimum wage for 1972–2014 are provided in Jones and McGavin (2015, Annex 7.1, which runs from 1972 to 2014). This is updated from 2015 using QEB Table 9.1. There are some minor discrepancies between BPNG (2007) and Jones and McGavin (2015). The latter suggests that the minimum urban and rural wages were unified in 1992, while data from the former suggests that unification occurred first in 1993. Minimum wage data are for the end of the year.

## **CPI**

BPNG reports CPI (headline and by expenditure group) for 1977–2013 with 1977 as the base year (QEB Table 9.2) and for 2010–19 with 2012 Q1 as the base quarter (QEB Table 9.4). We rebase the series, using 2012 Q1 as the link quarter to align with current QEB Table 9.2 data, and also rebase using 2010 as the link year. As a result, we have CPI from 1977 at a single base year, 2012.

The World Bank also reports annual headline CPI inflation rates from 1971 onwards as variable FP.CPI.TOTL.ZG, which are reported with 2010 as the base year. The constructed series is consistent with the WB figures.

### **Exchange rates and foreign exchange reserves**

Nominal exchange rates (USD, AUD, Yen, UKP, Euro) are available from 1975. Up to 1990, we use data from BPNG (2007); post 1990, from QEB Table 8.11. Exchange rates are averages for the year (from 1995).

The real effective exchange rate is available from World Development Indicators (WDI) as variable WDI.PX.REX.REER. It is an index with 2010 = 100. The variable is defined as follows:

[The real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.

Foreign exchange reserves are taken from WDI up to 2002 as variable WDI.FI.RES.TOTL.CD (in USD and converted to PGK using annual exchange rates). From 2002, they are taken from the 'total international reserves' column in QEB Table 8.10, which presents end of year data (in PGK and converted to USD using annual exchange rates). 2012 data is missing from QEB, and so WDI data are used for that year.

Foreign exchange reserves in months of imports is calculated using import figures from the balance of payments tab.

### **Balance of payments**

Merchandise exports and imports, service exports and imports ('invisible credits' and 'debits'), net transfers and the current account balance are available from 1976 to 2005 in BPNG (2007) and from QEB Table 8.1B from 2002 onwards. We use the QEB data from 2002. 'Invisible credits' and 'invisible debits' are equal to the sum of services credits/debits and income credits/debits in the QEB tables, respectively. 'Net transfers' are equivalent to 'transfers balance' in the QEB tables. Provisional balance of payments data are not used because they are subject to large revisions.

### **Fiscal data**

Data on government revenue, expenses and borrowing comes from BPNG (2007) Table A27 for 1975–88, and from the PNG Budget Database from 1989 onwards. Resource revenue equals mining and petroleum taxes plus mining and petroleum dividends.

Two expenditure variables are provided: (a) and (b). PNG switched its Government Financial Statistics (GFS) system for fiscal accounts from the 1986 to the 2014 GFS in 2016. Transfers into trust funds (see below) were included in the old GFS as spending from 2005 to 2011.

Definition (a) uses the old GFS data for as long as they are recorded, that is, until 2015.

Definition (b) uses the new GFS data from when they are available (2012) and adjusts spending from 2005 to 2011 to exclude from spending net transfers into trust funds. The deficit variable is revenue minus expenditure (b). Expenditure includes net lending.

Resource revenue data are from BPNG (2007) from 1975 to 1999 and PNG Budget Database from 2000 on. These do not include interest earned in the MRFS (see below) but capture the sum of company tax and dividend withholding tax paid by mining and petroleum firms, other mining and petroleum taxes, and mining and petroleum related dividends received by the government.

Trust fund balances are the MRSF from 1975 to 1998 (the last year with a non-zero balance) from BPNG (2007). From 2005 onwards, trust fund balances are obtained from the 2018 final budget outcomes document. 2019 trust fund figures cannot be reconciled with 2018, and are small, so the series is discontinued in 2018.

Government debt (total, domestic and foreign) is from Batten (2010) for 1970–89. This is extracted from Batten (n.d.), which is based on budget figures, QEB Table 7.3 for 1990–98 and the PNG Budget Database for 1999 onwards.

Other than as detailed for the two expenditure measures, figures using the 2014 GFS are used when both are available. Only actuals are included.

### **Monetary and financial data**

Data on the liquid asset ratio (‘total approved liquid assets’ over ‘total deposits and other prescribed liabilities’) and minimum liquid asset requirement or MLAR are available from BPNG (2007) from 1976 to 2005 and from BPNG QEB Table 3.13 from 2002 onwards. We use QEB data from 2002 onwards. (There is a discrepancy in 2002.) From June 1999, the liquid asset ratio excludes cash reserve requirement deposits held at BPNG, and in October 2010 the MLAR was reduced to zero (see the notes to QEB Table 3.13).

The lending rate (‘weighted average advances’) and deposit rate (‘weighted average deposits’) are available from BPNG (2007) for 1976–2005 and from BPNG QEB Table 6.1 from 1990 onwards. There are a few years in which the data do not match. We use BPNG (2007) up to 2005, and thereafter BPNG QEB.

Deposits, loans to the private sector (domestic), foreign currency loans to the private sector, and loans to the private sector and SOEs (domestic) are available from BPNG (2007) and QEB Table 3.6 (deposits) and Table 3.7 (loans). Monetary deposits equal ‘all deposits’ plus ‘central government liabilities’. Loans to SOEs include a small amount of loans to the central government and provincial and local governments, but are mainly loans to public non-financial corporations. Government debt held by banks is from BPNG (2007, Table A12) and QEB Table 3.3 (sum of Treasury bills and inscribed stocks). Foreign loans to the private sector are shown separately and are not included in the ‘domestic’ variables.

### **Fiscal/calendar year**

The calendar year is used unless specified here. PNG changed its accounting period in 1978. From 1 January 1978, the calendar year was used. Prior to this, the July to June financial year was used. Flows from the 1975–76 and 1976–77 years are reported as 1976 and 1977, respectively. (This method slightly exaggerates growth in 1978 since it compares January to December 1978 with July 1976 to June 1977.) Stocks at the end of 1975–76 and 1976–77 are reported as 1975 and 1976, respectively, and the end of December 1977 is used for 1977. This is used for fiscal and GDP data. It is also assumed that this is the way that commodity and balance of payments data are calculated. Monetary stocks and minimum wages are generally end of year (December) figures.