The National Research Institute
PAPUA NEW GUINEA

DISCUSSION PAPER

REVIEW AND FORECAST OF THE PNG ECONOMY: JULY 2016 ISSUE

Theo Levantis
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First published in January 2017

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ISBN 9980 75 240 8 National Library Service of Papua New Guinea

ABCDE 20209876

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Acknowledgements

The authors wish to acknowledge and thank Associate Professor John Asafu-Adjaye for his helpful feedback and comments on an earlier draft of this report. Any shortcomings of the paper rest with the authors.

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Abbreviations & Acronyms

BAU	Business As Usual
GDP	Gross Domestic Product
IMF	International Monetary Fund
K	Kina
KPHL	Kumul Petroleum Holdings Limited
LNG	Liquefied Natural Gas
MMBTU	Million British Thermal Units
MTDP	Medium Term Development Plan
MYEFO	Mid-year Economic and Fiscal Outlook
NSO	National Statistical Office (PNG)
OPEC	Organization of the Petroleum Exporting Countries
PNG	Papua New Guinea
PNG DSP	Papua New Guinea Development Strategic Plan
PNG NRI	Papua New Guinea National Research Institute
PNGGEM	Papua New Guinea General Equilibrium Model
SOE	State-Owned Enterprise
SWF	Sovereign Wealth Fund
US	United States

Executive Summary

This is the third in the series of economic modelling reports by the Papua New Guinea National Research Institute (PNG NRI) focusing on the review and forecast of the PNG economy. This series looks at developments since the 2016 Budget was handed down in November 2015 and provides a 10-year forecast (2016–2025) of key economic variables. Two scenarios are modelled: (1) business-as-usual (BAU) case using assumptions consistent with the key government development plans of Vision 2050, the PNG Development Strategic Plan 2010–2030, and the Medium Term Development Plans, where key enablers (health, education, transportation, utility infrastructure, law and justice, and land) are funded well; and (2) austerity conditions, which are reflected in the 2016 Budget, the Mid-Year Economic and Fiscal Outlook and the Supplementary Budget.

The paper first provides the context by discussing background information on global commodity markets and PNG's resource sector and policy developments. It then discusses policy developments and analyses the mystery that shrouds liquefied natural gas revenue. Analysis is also provided of the implications of the major revision in gross domestic product (GDP) statistics. The paper then provides 10-year forecasts for key economic variables using the Papua New Guinea General Equilibrium Model (PNGGEM) under two scenarios - BAU and austerity.

The key results of the forecasts are:

GDP growth under the BAU scenario is expected to average about 4.3 percent annually for 2016–2020 and higher at 6.4 percent for the remaining 5 years of the forecast period (2021–2025). In contrast, under austerity conditions, the likely GDP growth rate is only 2.6 percent for 2016–2020 and 5.4 percent for 2021–2025.

- Non-mining GDP, which is a proxy for broad-based economic growth, is expected to grow at an annual average of 4.8 percent and 2.7 percent under BAU and austerity conditions, respectively, for the period 2016–2020. For 2021–2025, the respective average growth rates are 6.4 percent and 5.0 percent.
- The mining, oil and gas sector is expected to be one of the best performing sectors for the 2016–2025 period, with an expected annual average growth rate of 4.6 percent, which is a result of new projects that are expected to commence production (e.g. Frieda, Wafi-Golpu). The forecast is the same for both the BAU and the austerity scenarios given that the differences in government fiscal and investment policies between the two scenarios are unlikely to affect the production levels of the new mines.
- The rural sector is expected to grow strongly under the BAU scenario at an annual average of 6.2 percent, while it is only expected to grow at 3.3 percent under the austerity scenario. This reflects the important role of the key enablers in boosting growth in the rural sector.
- For the fiscal outlook, as might be expected, the forecast results differ markedly between the two scenarios for the forecast period. In terms of spending, for the BAU case, government spending is expected to increase by 147 percent from PNG kina (K) 13.9 billion in 2016 to K34.3 billion in 2025. In contrast, under austerity conditions, spending would only increase by 85 percent (to K25.7 billion). For revenues,

under the BAU scenario, a growth of 157 percent is expected between 2016 and 2025 (K12.9 billion to K33.1 billion); while under the austerity scenario, growth would be lower at 129 percent (to K29.5 million). The differences imply that the BAU scenario is better able to address the key enablers than the austerity case is.

- For employment, the PNGGEM analysis finds that employment prospects depend on the policy approach of government. With the austerity approach, about 212,000 jobs will be created during the forecast period. On the other hand, under BAU conditions, employment prospects will double to 429,000 jobs. Employment in rural areas will be the largest beneficiaries of funding the key enablers under BAU conditions.

In summary, the analysis finds that PNG's economic prospects would benefit substantially from policy under BAU conditions, in the spirit of the government's plans of Vision 2050, PNG Development Strategic Plan, and the Medium Term Development Plans, which adequately address the key enablers. Growth would be close to that of PNG's developing country neighbours of South-East Asia. However, under austerity conditions, which follow the Budget approach in the 2016 Budget and the Supplementary Budget, growth and development would be dragged down to the low levels seen in the first three decades after independence. This re-emphasises the need to maintain adequate funding for the key enablers in the midst of external and domestic market challenges. Although balancing this with the need to avoid accumulating excessive debt is tricky.

Ch. 1 Introduction

This Discussion Paper is the third in the series of biannual economic modelling reports by the Papua New Guinea National Research Institute (PNG NRI), focusing on the review and forecast of the PNG economy. The two previous issues were published as NRI Discussion Papers in July and December 2015 (see Levantis and Sanida, 2015 and 2016).

This issue looks at developments since the 2016 Budget was handed down in November 2015 and provides a 10-year forecast (2016–2025) of key economic variables. The nature of the forecasts, using the Papua New Guinea General Equilibrium Model (PNG-GEM), is similar to that employed in the previous two issues of the series. That is, two scenarios are modelled and compared for their likely impacts. The reason for adopting two forecast scenarios is to address the confusion around government policy. The 2016 Budget and Mid-Year Economic and Fiscal Outlook (MYEFO) point to an emphasis on austerity. However, government policy is also directed by its planning documents — Vision 2050, the PNG Development Strategic Plan (PNG DSP) 2010–2030, and the Medium Term Development Plans (MTDPs). These documents advocate an upshift in public spending to finance the development of the key enablers (health, education, transportation, utility infrastructure, law and justice, and land).

The business-as-usual (BAU) forecast scenario assumes that the intentions under the key government planning documents continue to be implemented, as has been the case since 2011. The second forecast scenario assumes the austerity conditions advocated in the 2016 Budget and MYEFO.

The rest of the paper is organised into five sections. Section 2 provides an overview of the global economy and markets for PNG's key export commodities to provide the global context. Section 3 discusses the policy developments to date, in particular issues relating to: the 2016 Budget and the subsequent MYEFO and Supplementary Budget; the mystery of the liquefied national gas (LNG) revenues; and issues surrounding the gross domestic product (GDP) calculations. Section 4 provides an update of the resources sector in PNG, in the context of challenges facing the economy in terms of revenue generation. Section 5 then provides the results and discussion of forecasts for the period 2016–2025 using the PNGGEM. The key areas discussed include: methodology for the 10-year forecasts; macroeconomic growth forecasts; sectoral growth performance; and the fiscal and employment outlook. Section 6 concludes the paper.

Ch. 2 The Global Economy and Markets for PNG's Commodities

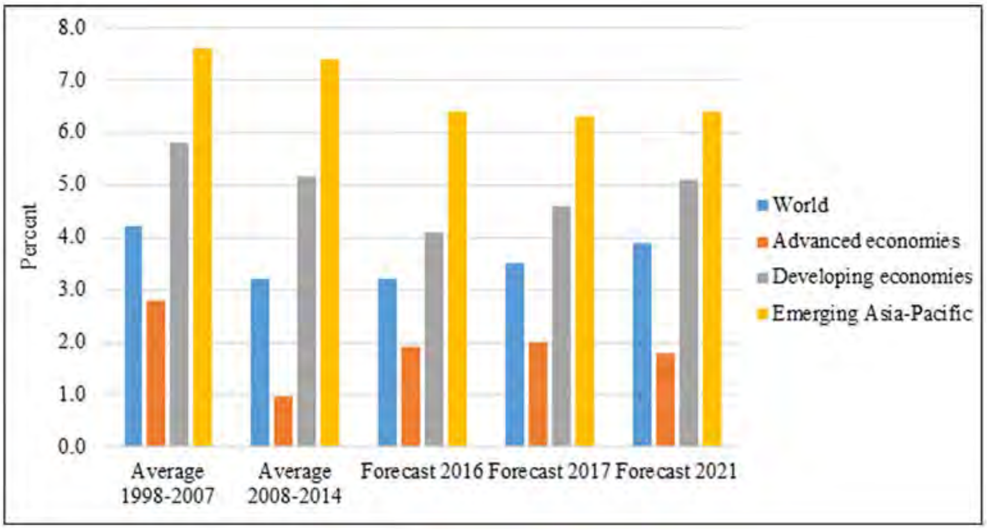
The global economy continues to be subdued in 2016 with the International Monetary Fund (IMF) expecting growth of 3.2 percent following an outcome of 3.1 percent in 2015. Growth is expected to pick up to 3.5 percent in 2017 and converge back toward the long-term average of about 4 percent by the end of the decade.

The pattern of global growth in 2016 and beyond is expected to be broadly unchanged from the experience of the past two decades, with the Asia-Pacific region being the growth hub of the World (Figure 1). Importantly, the distribution of growth in the Asia-Pacific is broad with India and China expected to reach 7.5 percent and 6.5 percent respectively, and most East Asian countries achieving growth rates above 5 percent. The Pacific Island countries are expected to continue to languish with growth outcomes broadly within the 2.5 to 4.5 percent range. Looking forward to 2017 and through to 2021, much of the same is expected, apart from a small uptick in growth in developing countries driven by recovery in Latin America and Western Asia.

For advanced economies, little is expected to change despite the alarmist commentary that surrounded "Brexit" – the referendum outcome of the United Kingdom leaving the European Union. Brexit will take about two years to implement and it is highly likely that an open economic relationship will be negotiated for the post-Brexit era, meaning that little will change from an economic perspective. The risk is that Brexit could pave the way to a disintegration of the European Union at some time in the future, as growing discontent among member countries could see others following Britain's example. If this happens, there may be consequences for the stability of financial markets. However, given the poor growth outcomes of European Union countries over the past two decades, changes in the European Union arrangement might not be such a bad thing, from an economic perspective at least.

The subdued global growth of 2016 has come as a surprise for economic commentators, including the IMF. The collapse in oil prices was anticipated to provide impetus to consumption and growth due to the flow through benefits for industry costs and household budgets. However, these benefits have been offset by the immense drag on the fiscal budgets of oil exporting countries, including PNG, and the financial risks associated with exposure to large multinational companies in the oil and mining industries. These key issues are weighing heavily on the confidence of financial markets.

Figure 1: Global economic growth (%), 1998–2021



Source: IMF, World Economic Outlook: April 2016

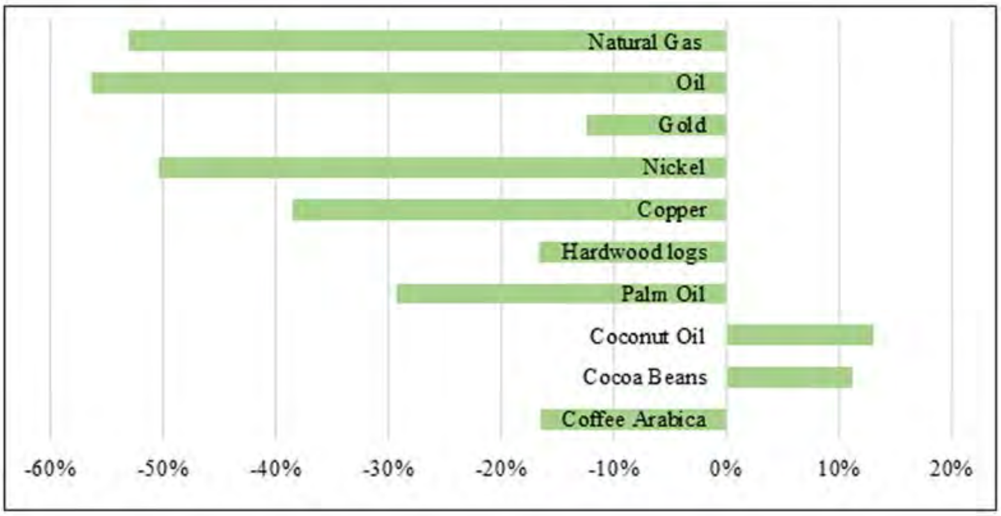
Note: Emerging Asia-Pacific incorporates all East Asia and Pacific countries apart from the advanced economies of Australia, New Zealand, Korea, Japan and Singapore

Prices for the commodities that PNG exports have collapsed dramatically over the last three years. Natural gas prices for the East Asian market are now less than half of their average over the period 2010–2014 (Figure 2). Oil, copper, and nickel prices have all suffered a similar fate. For agricultural exports, the story is more mixed with coffee, palm oil, and log prices facing sharp falls, but cocoa and coconut oil prices staging a recovery.

Natural gas prices in the East Asian market are expected to average US$7.10 per MMBTU (million British thermal units) in 2016 after already falling to US$10.70 in 2015 from a peak of US$17.40 in 2012 (Table 1). Unfortunately for PNG, the timing of the collapse in gas prices has coincided with the commissioning of the landmark LNG Project. However, the viability of the LNG Project should not be in question as it is a low-cost operation that was established in the late 2000s when prices were similar to current levels. The unusually high prices experienced from 2011 to 2014 were unexpected and a direct result of the nuclear power plant disaster at Fukushima in Japan early in 2011. This resulted in the temporary shutdown of the nuclear power industry in Japan with gas filling the void. Now that nuclear generation is recommencing in Japan, demand pressures for gas have abated.

Also weighing heavily on gas prices is a ramping up of supply capacity as new LNG ventures are being commissioned. This is especially happening in Australia, which is expected to be the world's largest exporter of LNG by 2020, but also the United States. Although China will provide a source of continued growth in demand for LNG in East Asia, the rapid growth in supply is expected to result in sustained low prices until the end of the decade followed by a modest recovery through to 2025. With China and India becoming more vigilant about tackling greenhouse gas emissions, the longer-term outlook for the gas market is positive as these superpowers shift away from coal-fired electricity generation and toward gas generation as a result of the much lower emission intensity of gas.

Figure 2: Price collapse for PNG's commodities — 2016 prices against the average for 2010–2014



Sources: Calculated from data on the Commodity Markets page of the World Bank (2016) website and Primary Commodity Prices page of the IMF (2016) website. The 2016 forecasts are averages of the two sources, except for gold and coconut oil for which forecasts are only available from the World Bank.

The collapse in global oil prices can be traced back to the rapid increase in capacity in the United States. According to World Bank data, in 2015, the United States became the World's leading producer of crude oil at 12.7 million barrels a day.[1] Between 2012 and 2015, global demand rose by 4.3 million barrels a day from 90.7 million barrels to 95.0. Over the same period, production in the United States rose by 3.8 million barrels a day — almost matching the increase in global demand. In response, the Organization of Petroleum Exporting Countries (OPEC) adopted a strategy of ramping up its own supply to force the collapse in prices we see today. The purpose of the strategy was to knock out capacity in the high cost operations seen in the United States. This strategy has been successful with production falling in the United States by about 10 percent in 2016. The floor in the market looks now to have been established with prices forecast to recover moderately to US$51 a barrel in 2017, US$61 a barrel in 2020 and US$76 a barrel by 2025 (Table 1).

A downside risk for oil prices is that ongoing technological developments in motor vehicles — including hybrid technology — is seeing big gains in fuel efficiency. This will have consequences for the demand for fuel. Moreover, electric car technology is improving with electric car infrastructure starting to be rolled out in some markets, including California. Against these factors, India and China will continue to provide strong sources of growth as car ownership is increasingly taken up.

For copper and nickel, the collapse in prices is all about demand in China. Just on half of all global consumption of both copper and nickel occurs in China. Between 2010 and 2014, consumption of copper in China marched forward from 7.4 million tonnes to 11.3 million tons. However, copper consumption stalled in 2015 at 11.4 million tonnes — in line with a slowdown in construction and investment — causing the collapse in prices. Prices

[1] Commodity Markets Outlook: July 2016, (http://www.worldbank.org/en/research/commodity-markets)

for nickel and copper are expected to steadily recover over the next few years as demand growth resumes in China. The prospects for nickel prices are more promising as supply tightens up due to a reduction in global capacity in the current environment of low prices. Already, the 2016 forecast of US$9,347 a tonne looks pessimistic with prices in September 2016 going above US$10,000 a tonne (Table 1).

Table 1: Prices for PNG's commodities, 2010–2025

		Average		Forecasts			
		2010–14	2015	2016	2017	2020	2025
Coffee Arabica	US$/tonne	4,406	3,539	3,682	4,290	4,479	4,575
Cocoa beans	US$/tonne	2,798	3,135	3,112	3,056	2,928	2,630
Coconut oil	US$/tonne	1,237	1,110	1,400	1,349	1,206	1,000
Palm oil	US$/tonne	876	565	620	616	645	716
Hardwood logs	US$/M3	323	246	270	277	289	328
Copper	US$/tonne	7,703	5,510	4,733	4,913	5,309	6,537
Nickel	US$/tonne	18,837	11,863	9,347	10,244	11,875	17,646
Gold	US$/ounce	1,428	1,161	1,250	1,219	1,132	1,000
Oil	US$/barrel	97.7	50.8	42.7	51.3	61.0	76.2
Natural gas	US$/MMBTU	15.2	10.7	7.1	7.0	7.5	9.0

Sources: Calculated from data on the Commodity Markets page of the World Bank (2016) website and the Primary Commodity Prices page of the IMF (2016) website. The 2016–2020 forecasts are averages of the two sources, except for gold and coconut oil for which forecasts are only available from the World Bank.
The forecasts for 2025 are based on the percentage change forecasts for 2021–2025 of the World Bank.

Gold prices have staged a recovery in 2016. This has happened on the back of investor nervousness about Europe and the Brexit vote and the ongoing environment of low interest rates, making gold more attractive for investors. However, the outlook for the gold price is weak, dropping to a forecast of US$1,132 an ounce in 2020 and US$1,000 an ounce in 2025. The driver behind this weakness is an anticipation of weak demand among investors as higher interest rates draws them toward investments with better yields. Weak prices are underpinned on the supply side by continued growth in mine production, particularly in China, Canada and Mexico. PNG's share of global gold production fell from 2.6 percent in 2010 to 1.7 percent in 2015.

East Asian hardwood log prices dipped in 2015 to US$246 a cubic metre — the lowest levels seen since 2006. This in part may be explained by subdued demand in China and Japan. Another key factor behind weaker prices is the collapse in oil prices, which has lowered production and transport costs. The outlook for 2016 and beyond is a steady recovery in prices as investment growth resumes in China and oil prices edge back up. Increased attention on environmental issues and greenhouse gas emissions provides some further upside risk on the value of hardwood logs in the future.

Palm oil prices have recovered in 2016 following the low levels of 2015 as a result of the impact of the El Niño weather phenomenon on global production — especially in Malaysia and India. With much palm oil being used as a biofuel, low oil prices have weighed heavily on palm oil prices. Another key headwind for palm oil is the increased recognition of the poor environmental impacts of palm oil production as a result of the clearing of tropical rainforests. Marketing is emerging in some markets advertising "palm oil free" products.

Ch. 3 Policy Development

Given the context of this modelling work, this section presents a summary of the fiscal policy developments since the beginning of 2016, focussing on funding and policies for the key enablers. Since the handing down of the 2016 National Budget in November 2015, two key developments have occurred: the release of the 2016 MYEFO and a Supplementary Budget. Table 2 provides a summary of the changes in the budget since the 2016 Budget was handed down in November 2015.

Table 2: Budget Summary – 2016 original, 2016 MYEFO and Supplementary Budget

Item	2016 BUD	2016 MYEFO	2016 SUP	SUP & BUD (Variation)	SUP & MYEFO (Variation)
Total revenue (K million)	12,650.1	10,764.1	11,722.1	-928.0	958.0
Percentage change (%)		-15%	9%	-7.3%	8.9%
Total expenditure (K million)	14,762.6	14,762.6	13,834.6	-928.0	-928.0
Percentage change (%)		0%	-6%	-6.3%	-6.3%
Deficit/surplus (K million)	-2,112.5	-3,998.5	-2,112.5	0.0	1,886.0
Percentage change (%)		89%	-47%	0.0%	-47.2%
Deficit/surplus as % of GDP	-3.1%	-5.9%	-3.1%	0.0	0.0
GDP (K million)	68,261.0	68,261.0	68,261.0	0.0	0.0

Source: 2016 Budget, 2016 MYEFO, and 2016 Supplementary Budget.
Note: BUD: budget; K: PNG kina; SUP: Supplementary Budget

3.1. 2016 Budget and MYEFO

In the 2016 Budget, the total revenue was expected to be K12.7 billion and the total expenditure and net lending was K14.8 billion. The deficit of K2.1 billion was 3.1 percent of GDP (K68.3 billion). For assumptions of the 2016 Budget see Levantis and Sanida (2016). In July 2016, the MYEFO was released by the Department of Treasury. Estimated total revenue was revised downwards by 15 percent (or K1.89 billion) to K10.8 billion, while total expenditure was expected to be maintained at the original 2016 Budget level (K14.8 billion). Given this, under the MYEFO, the budget deficit is expected to be about K4 billion (89 percent increase from the original budget), which is 5.9 percent of GDP.

The decline in total revenue reflects expected falls in tax revenue (K1.7 billion) and grants (K290.2 million), which more than offset an increase in other revenues of K103.4 million. The MYEFO claims that the fall in tax revenue is due to subdued economic developments in 2015, which were expected to continue into 2016. These include lower commodity prices (particularly oil and copper); shutdown of some business operations; and the prolonged issue of foreign exchange shortages (Department of Treasury 2016).

The expected decline in grants (by K290.2 million from K1,531.2 million) is attributed to a decline in Sovereign Wealth Fund (SWF) transfers to the budget. This is a departure from the assumption in the modelling in the PNGGEM where SWF are counted as revenues to government even if not transferred to the budget, as the money belongs to the state. All other grants are expected to be as per the original budget.

Other revenues, which increased by about 17 percent (from K611.3 million to K714.7 million), are mainly from dividends: K100 million from statutory authorities and K3.4 million from state-owned enterprises (SOEs).[1] These other revenues are not enough to offset the decline in tax revenue and grants, hence the overall fall in total revenue. It is interesting to note that within this "other revenues" category, there is a dividend payment to the State by Kumul Petroleum Holdings Limited (KPHL)[2] of K300 million, which is unchanged from the 2016 Budget. This amount is the balance after K249.2 million is deposited into the SWF. Again, this amount to the SWF is revenue to the state whether it is put in the budget or saved in the SWF. Moreover, given the fall in commodity prices, it is questionable if this amount should even be in the SWF, as it could be included in the budget to fund the key enablers. This case again exemplifies the austerity approach/policy of the 2016 Budget.

3.2. Supplementary Budget 2016

Given the forecasted fall in total revenues and unchanged total expenditure under the MYEFO, the Treasury Department cautioned the Government to maintain fiscal discipline and recommended that savings were found and an expenditure review was implemented to cut low priority expenditures. Following the MYEFO, the Government handed down a Supplementary Budget on 25th August 2016 (Pruaitch, 2016), re-emphasising the reasons contained in the MYEFO and the slowdown in the global economy and the United Kingdom's decision to leave the European Union ("Brexit").

In the Supplementary Budget, total revenue is forecast to be 8.9 percent higher than the MYEFO forecast (i.e. by K958 million to K11.7 billion) but still 7.3 percent lower (or K928 million) than the original 2016 Budget level. The K958 million revenue increase was attributed to "additional revenue-raising measures" which include:

- dividends from SOEs and statutory authorities; and
- an asset realisation plan focused on its sale of indirect equity to the PNG LNG "Project Area Landowners".

Total expenditure and lending is expected to be reduced by 6.3 percent (or K928 million) from the MYEFO and original budget estimate to K13.8 billion. This reduction is attributed to expenditure-saving measures, particularly on operational items across all sectors (Pruaitch 2016). These include savings from the following items:

- travel;
- hotel accommodation;
- training;
- conferences;
- ar hire; and

[1] In the first part of the year K125 million in dividends was paid by KPHL (K100 million) and National Fisheries Authority (K25 million).

[2] KPHL was formerly the National Petroleum Company PNG (NPCP) Holdings Ltd.

- hiring of new foreign consultants across all central, provincial, district and local-level governments.

In terms of capital expenditure, the Supplementary Budget emphasises the need to refocus capital expenditure or the "public investment programs" and other development projects, whereby focus is placed on:

- projects with relatively high rates of disbursement; and
- projects with donor counterpart funding, as these tend to have a high rate of disbursement and are focused on the development enablers.

Given the changes in total revenue and expenditure, the revised deficit under the Supplementary Budget is K2.1 billion (3.1 percent of GDP), which is the same as in the original 2016 Budget. The GDP estimate remains unchanged. From the tone of the Supplementary Budget speech, it appears that besides the reasons given for the changes in the total revenues and expenditures, another main aim of the Supplementary Budget is to return the deficit size back to the original 2016 Budget. A positive tone of the Supplementary Budget is the intention to continue funding the key enablers.

3.3. The mystery of LNG revenue

There is a complete lack of transparency on the part of the PNG Government surrounding LNG revenues. It is not possible to ascertain from the Budget papers where the LNG money has got to. There is mention of dividends from the LNG Project under the category of "other revenue". But this refers to dividends paid by KPHL, the state company that owns the shares in the LNG Project, but not the dividends that were received by KPHL, which may well be very different. LNG revenues that flow to the SWF are also not clear and there is no information available about what the balances are in the SWF. These are overwhelming oversights on the part of the Government given the huge anticipation among the people of PNG about the LNG Project, and should be rectified as a matter of urgency.

Fortunately, the project operators are publicly listed companies and are obliged to release to the public in their home countries detailed financial records in a timely manner. In their 2015 annual report, Oil Search (which is Australian listed) reported paying US$148 million in tax in 2015. This reaffirms the profitability and competitiveness of the LNG Project in the face of the collapse in oil and gas prices. Oil Search has a 29 percent stake in the LNG Project and about three-quarters of its revenues are attributable to the project, so it may be estimated that about US$380 million in tax was paid by the project against 2015 profits — or about K1,160 million. Yet where this money went is shrouded in mystery with the MYFEO estimating K89 million in mining and petroleum taxes across all operations in PNG. Using mysterious accounting practices, another K89 million is reported under "grants" as money transferred from the SWF in one table of the MYEFO: Table 1(I), then under "property income" in another: Table 1(II).

In addition, there are the profits returned to shareholders, of which the PNG Government holds a 17 percent stake through the KPHL . This is likely to be about US$150 million (K380 million), taking reported profits for Oil Search as reference — although at least some of this is likely to go into financing costs.

For 2016, the collapse in oil and gas prices will see a sharp fall in tax and dividends from the LNG Project, although this should recover in future years. Oil Search has reported tax liabilities of only US$22 million (K70 million) for the first half of 2016.

When account is taken of the LNG tax revenues, which are mysteriously off-budget, and of revenues diverted to KPHL and the SWF discussed earlier, the bottom-line budget position looks far healthier than reported in the MYEFO and Supplementary Budget.

3.4. What is going on with GDP?

Early in 2016 the National Statistics Office (NSO) released updated GDP numbers. This is the first time GDP numbers have been produced by the NSO for a decade and is a welcome development. The Department of Treasury has until now been attempting to fill the void by providing estimates of GDP.

Unfortunately, the failure of the NSO to produce timely GDP statistics over the last decade has led to a monumental misunderstanding of what the true level of PNG's GDP is. The Treasury estimate of GDP for 2013 that has been widely relied on was K34.3 billion. However, the NSO has now revealed the true level of GDP in 2013 to be K47.5 billion.

This revision has thrown into disarray the approach toward Government debt for both the Government and for lenders. The debt-to-GDP ratio was thought to be too high, placing severe pressure on Government spending with key guidelines being breached. But with the new GDP numbers, the debt-to-GDP ratio is well within guidelines and no longer looks so bad.

The austerity approach of Government — as evidenced in the Supplementary Budget — suggests that the revised GDP and more favourable debt to GDP outlook has not swayed the Government to change course on spending. For the Government to continue this course, it may well rewrite its guidelines on what is considered to be an appropriate ceiling for the debt-to-GDP ratio. In any case, for PNG, the debt-to-GDP ratio is a highly flawed measure for assessing the Government's capacity to repay debt given that GDP can be heavily influenced by mining, oil and gas companies that work with offshore accounts, where most proceeds from their operations remain. The ratio of debt-to-non-mining GDP or to Government revenue would be far more logical measures.

Another key implication of the revised GDP numbers is that the estimates of GDP growth over the past decade have very much underestimated reality. In the December 2015 issue of this series we reported that average GDP growth over the years 2005–2014 was 7.2 percent, based on Treasury estimates. However, the revised GDP numbers suggest that the average growth over this period was closer to a world-leading 11 percent. The NSO will need to produce estimates of real GDP growth over this period to correct the record. In any case, this is a tremendous record for PNG, so it should be verified and promoted.

Based on the Treasury's growth estimates for 2014 and 2015 and the NSO GDP data for 2013, the estimate for GDP in 2015 calculated for the PNGGEM database is K66.6 billion. The revised Treasury estimate provided in the MYEFO is K64.2 billion.

Ch. 4 An update on the Resources Sector in PNG

4.1. Oil and gas

In a global environment of collapsing oil and gas prices and a scaling back of production and investment in the sector, PNG's oil and gas sector looks to be weathering the storm well. Oil Search, a key stakeholder in the LNG Project, has reported that it will continue to pursue future expansion of the project through a third (LNG) Train and development of the Total-led Papua LNG Project. Underpinning this are low production and investment costs that Oil Search reports are among the lowest in the world and 30 percent lower than equivalent projects in Australia, where a large chunk of the world's new capacity is being built. The LNG processing facility for the Papua LNG Project is expected to be located near the existing LNG facility, just outside of Port Moresby. The project may be considered highly likely to go ahead, with the Total joint venture progressing rapidly in the planning and financing of the project.

Production at the LNG facility has exceeded expectations reaching 333 million MMBTU in 2015 — equivalent to 65 million barrels of oil — delivered in 101 cargos with a small amount delivered locally for electricity generation in Port Moresby. For 2016, the LNG Project is on track to achieve similar production outcomes. Oil and liquids production is up by about 21 percent to 22 million barrels, with higher production from the LNG Project more than offsetting the slow decline of oil production from the existing fields.

4.2. Mining

IIn 2015, PNG's gold miners faced difficult financial challenges as a result of the slump in gold prices. Some relief has been provided with gold prices bouncing back in 2016 (Table 1). However, the outlook for future years is more pessimistic. A positive sign for miners is that the depreciation of the Kina against the US dollar has resulted in offsetting declines in costs in US dollar terms, helping the viability of PNG's mining. Low oil prices have also helped mining costs.

Despite the challenges of low gold prices, the Lihir gold mine returned a significant profit to its owners, Newcrest Mining, of US$199 million for the 2015/16 financial year. In principle, 30 percent of this — about US$60 million — would be retained in PNG as corporate tax revenue; however, exactly how much is paid is not reported. The 2015/16 result is a big turnaround from the US$20 million loss reported for 2015. Underpinning this are improved production processes that have lifted production from 692,000 ounces in the year to June 2015 to 900,000 ounces in the year to June 2016. Production expectation for future years is around 930,000 ounces a year.

In contrast to the progress made at Lihir, the Hidden Valley gold mine has suffered from operational issues leading to a fall in production to 148,000 ounces in 2015 from 208,000 ounces in 2014. Production in 2016 is on track to lift to 160,000 ounces, but mostly on the back of processing stockpiles with new mining scaled down. The viability of the mine is in question as a result of the combination of low gold prices and higher costs. The operators of Hidden Valley are yet to decide the future path of the mine.

The Porgera gold mine in Enga continues to perform well with production of 493,000 ounces in 2015 and 520,000 ounces expected for 2016. The viability of the mine remains healthy with costs of US$850–US$960 well below recent and projected prices for gold. However, the mine faces ongoing security issues, particularly from illegal miners. The main stakeholder in Porgera has been Barrick Gold Corporation and in 2015 it reported improved profits to US$125 million, from US$84 million in 2014 — despite lower gold prices. Late in 2015, Barrick sold half its stake in Porgera to the Chinese company Zijin.

The operational performance of the Simberi gold mine in New Ireland has strengthened with production in the year to June 2016 reaching 110,000 ounces, up from 80,000 ounces the previous year. This has turned the mine from a marginal operation to a profitable one, with about US$25 million profit reported for the year to June 2016 — although instead of a corporate tax liability to the PNG Government associated with this income, an income tax credit was reported in the operation's financial statements. This is likely due to an offset against the accumulation of past losses.

Production at the Ramu nickel mine will be lower in 2016 as a result of a three-month shutdown following an accident that caused a fatality. Full capacity production of 31,000 tonnes of nickel should be reached in 2017 following production 26,000 tonnes in 2015 and an estimated 22,000 tonnes in 2016.

Most mining operations in PNG are privately owned and listed on overseas stock exchanges. This is important for transparency because the mines are legally obliged to provide regular operational and financial updates in a timely fashion. In contrast, the Ok Tedi mine is owned by the PNG Government and operational and financial transparency is poor in comparison. The last financial reports made public are nearly two years out of date, and unlike the other mines, there are no quarterly updates on operational performance. Under these circumstances, it is difficult to provide an accurate update on the performance of Ok Tedi for this report. The El Niño drought forced a seven-month closure of the mine from late 2015 to March 2016. This will have had obvious consequences for revenue and profits. The reopening of the mine will see a return to profitability and payment of taxes and dividends that the state has relied upon.

4.3. The outlook for new mines

The proposed Wafi-Golpu copper and gold project near Lae continues to progress despite weak commodity prices. Feasibility studies have been completed and a mining lease application submitted to the Government. If the mine gets the final go-ahead, first production is likely to be seen in about 2021 with copper and gold volumes similar to the current volumes seen at Ok Tedi. The prospect of the mine proceeding is promising as a result of the low anticipated production costs, helped by the close access to Lae.

The Frieda River Copper-Gold Project is at a similar stage of development with a mining lease application recently submitted. The mine will be PNG's biggest, producing 175,000 tonnes of copper and 250,000 ounces of gold a year for an annual turnover at current prices of about K4 billion. At this stage, 2020 looks like a probable start date.

The Woodlark Island Gold Project is approved but there appears to be little progress toward the investment phase. The economics of the mine are strong, giving cause for optimism that it will see the light of day. Similarly, the recommissioning of the Bougainville copper mine is likely to come about, but not for many years. There is new uncertainty over mining rights for Bougainville Copper Limited due to legislation passed by the Bougainville

Government that cancelled its mining lease. The process for the start-up of the mine will first require clarity over mining rights and resolution of landowner issues before moving on to feasibility studies. It is unlikely that production will be seen for at least five years. The proposed Yandera copper and gold project near Madang continues to proceed with drilling underway. So far, reserves have been measured at 2.1 million tonnes of copper and 1.4 million ounces of gold. However, this project also looks to be some years away from the production stage.

In the face of low commodity prices, the Nautilus deep sea mining project has hit financial headwinds that have slowed investment. Nautilus is now facing difficulties raising finance to complete the project. So far, the original schedule to commence production in 2018 has been delayed to 2019. Whether or not there are further delays will depend on how quickly it can secure the necessary project finance.

Petromin sold the Tolukuma gold mine in Central Province to a Singaporean company in November 2015 for K80 million. In July 2016, it was announced on the Singapore stock

Table 3: Estimated production profile of mining, oil & gas in PNG, 2014–2025

			Forecasts			
	2014	2015	2016	2017	2020	2025
Gold production (ounces)						
Lihir	721,000	805,000	934,000	930,000	930,000	930,000
Porgera	520,000	520,000	515,000	515,000	515,000	515,000
Ok Tedi	241,000	154,000	154,000	220,000	220,000	220,000
Hidden Valley	208,000	148,000	160,000	160,000	160,000	160,000
Simberi	44,000	80,000	110,000	100,000	100,000	100,000
Tolukuma	50,000	25,000	0	0	0	0
Bougainville	0	0	0	0	0	500,000
Offshore Mining	0	0	0	0	115,500	350,000
Frieda	0	0	0	0	125,000	250,000
Wafi	0	0	0	0	0	180,000
Woodlark	0	0	0	0	55,000	110,000
Yandera	0	0	0	0	0	56,000
TOTAL GOLD	**1,784,000**	**1,732,000**	**1,873,000**	**1,925,000**	**2,220,500**	**3,371,000**
Copper production (tonnes)						
Ok Tedi	75,900	49,000	49,000	70,000	70,000	70,000
Frieda	0	0	0	0	87,500	175,000
Bougainville	0	0	0	0	0	150,000
Yandera	0	0	0	0	0	84,000
Wafi	0	0	0	0	0	80,000
Offshore mining	0	0	0	0	1,500	
4,000						
TOTAL COPPER	**75,900**	**49,000**	**49,000**	**70,000**	**159,000**	**563,000**
Nickel production (tonnes)						
Ramu	21,000	26,000	22,000	31,000	31,000	31,000
Oil & gas						
Oil (million barrels)	18	22	21	20	18	16
Gas (million barrels equiv.)	35	65	66	67	68	72
Gas with Papua LNG	35	65	66	67	68	130

Sources: Financial and production reports available on the websites of the respective operations (see references).

exchange that the mine is to be onsold to another Singaporean company, Lifebrandz, for US$212 million (K660 million).[1] The huge windfall profits associated with this proposed deal raises eyebrows, particularly as Lifebrandz specialises in lifestyle products and has no mining experience. In any case, K660 million would appear to be a high price for a mine that is shut and has no history of profitability. It remains to be seen whether these background deals will result in production recommencing at the mine.

[1] The information on the sale was sourced from Lifebrandz: http://lifebrandz.listedcompany.com/news.html/id/535519

Ch. 5 The 10 -Year Economic Ooutlook for PNG

5.1. Method behind the 10-year forecasts

PNGGEM is a model of the PNG economy that depicts the building blocks of the economy — including households, businesses, Government, foreign trade, employment, land and capital — and incorporates dynamics such as population growth, investment, depreciation and investment-led productivity growth. The forecasts are generated from these dynamics in the model, which is in turn influenced by the structure of the building blocks. In addition, the dynamics are influenced by some key assumptions we put into the model, including:

- commodity price forecasts from the IMF and World Bank reported in Table 1;
- forecast production profiles in mining, oil and gas reported in Table 3;
- the level of Government spending and fiscal deficits — in other words, the extent of fiscal expansion/contraction; and
- public investments in the key economic enablers of education, higher education, transport infrastructure, utility infrastructure, law and order and land.

In the December 2015 issue of this series we outlined the difficulty in predicting Government policy on spending levels and public investments. On one hand the 2016 Budget and MYEFO point to a long period of austerity with spending cut back sharply and planned public investments in the enablers also being cut back. The 2016 Supplementary Budget introduced further cuts, reinforcing the program of austerity. On the other hand, there are the development plans of Government — Vision 2050 and the PNG DSP 2010–2030 — that take an opposite approach by advocating a process of fiscal expansion to finance rapid productivity growth through a large-scale public investment program. Over the years 2010–2015, the development plans were being implemented, resulting in non-mining GDP growth reaching levels far beyond anything seen in PNG before.

There has been no official announcement from Government that the development plans are being dropped; however, the shift to austerity in 2016 and the outlook in the 2016 Budget for a more permanent shift to austerity would make this seem to be the case. Yet the Government continues to reaffirm the importance of investing in the enablers, which leads us to speculate that the austerity will be temporary. In view of this state of policy confusion, the forecasts are built upon two possible scenarios:

1. BAU forecast — assumes the Government reverts to policies of fiscal expansion and public investment in the enablers in accordance with the development plans over the rest of the forecast period 2017–2025;
2. Austerity forecast — assumes the austerity policy of 2016 will continue for the period 2017–2025.

The differences between these two scenarios are detailed in Table 4.

Table 4: Differences in modelling assumptions in the forecast scenarios for 2017–2025

	BAU forecast	Austerity forecast
Fiscal policy	Budget assumed to be brought to a deficit of 2% of GDP by 2020 inclusive of deposits into the SWF; and kept constant over 2021–2025.	Spending over 2016–2020 kept in line with Budget 2016. For 2021–2024 Budget surplus is assumed fixed at the 2020 level.
Land policy	Consistent with Vision 2050 and PNGDSP.	Unchanged and consistent with Vision 2050 and PNGDSP due to the low cost of implementation.
Law and order policy	Consistent with Vision 2050 and PNGDSP (police strength increases 4-fold by 2030 and crime rates halve).	Initiatives for improving law and order removed due to lack of funding.
Education policy	Consistent with Vision 2050 and PNGDSP (universal education by 2020).	Initiatives for improving education scaled back due to lack of funding. Universal education assumed to be delayed to 2025.
Higher education policy	Consistent with Vision 2050 and PNGDSP (215,000 tertiary graduates over 2015–2030).	Initiatives for improving higher education scaled back due to lack of funding. 135,000 tertiary graduates assumed over 2015–2030.
Electricity infrastructure	Consistent with Vision 2050 and PNGDSP (expand infrastructure to reach 70% of the population by 2030).	Public investments for expanding electricity infrastructure scaled back due to lack of funding.
Transport infrastructure	Consistent with Vision 2050 and PNGDSP (including doubling the national road network by 2025).	Public investments for expanding transport infrastructure scaled back due to lack of funding.

5.2. Macroeconomic growth forecasts, 2016–2025

PNGGEM forecasts GDP growth in 2016 of 3.6 percent, which is a little less pessimistic than the 2.2 percent growth forecast of Treasury in the MYEFO (Table 5). For the years 2017–2020, Treasury continues to be very pessimistic with growth forecasts in the range 2.0–2.7 percent. However, the PNGGEM forecasts suggest such pessimism may well be justified.

Under the austerity conditions advocated by Treasury, PNGGEM forecasts GDP growth in 2017 of just 1.4 percent (Table 5). Poor growth outcomes are expected to continue in 2018 and 2019 before shifting back up to a higher trajectory in 2020. If instead the policy was to revert to the BAU scenario with more normal fiscal deficits of 2 percent of GDP along with stronger financing of public investments, then GDP growth is forecast to be much higher at 3.8 percent in 2017. Over the years 2016–2020, GDP growth is forecast to average 4.3 percent in the BAU scenario compared with 2.6 percent in the austerity scenario (Table 6). This is expected to improve in the following 5-year period 2021–2025 to an average of 6.4 percent in the BAU scenario and 5.4 percent in the austerity scenario.

Non-mining GDP is a much more relevant measure for gauging the health of the PNG economy. Mining GDP distorts the numbers by capturing the vast levels of net output generated in mining, oil and gas. However, most of this net output is irrelevant to PNG as the beneficiaries are off-shore and not in PNG. This dilemma may be clearly understood by looking at the 2015 balance of payments data produced by the Bank of PNG. As a result of the LNG Project, commodity exports increased between 2013 and 2015 from K13.3 billion to K23.1 billion. Normally we would think of this as a K9.8 billion shot to the

PNG economy. However, this has remained outside of PNG with no discernible benefit in the way of foreign exchange earnings. This is illustrated in the financial accounts of the balance of payments, which show net investment funds leaving PNG of K14.8 billion in 2015 compared with a net gain for PNG of K0.5 billion in 2013.

Non-mining GDP is forecast to grow 3.8 percent in 2016 before slumping to just 1.5 percent in 2017 in the austerity scenario (Table 5). For the BAU scenario, things look much better in 2017 with growth expected of 4.6 percent. Over the period 2016–2020 non-mining GDP growth is expected to average 2.7 percent a year in the austerity scenario compared with 4.8 percent in the BAU scenario (Table 6). The non-mining GDP forecasts of Treasury for the period 2016–2020 average 3.3 percent a year. Given that the Treasury forecasts are generated within the confines of their proposed policy of austerity, the numbers come quite close to those produced by PNGGEM for the austerity scenario.

Table 5: Forecast of real GDP and non-mining GDP growth, 2016–2025

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
GDP growth										
BAU scenario	3.6	3.8	3.1	3.7	7.3	8.5	5.9	7.4	6.2	4.0
Austerity scenario	3.6	1.4	1.0	1.8	5.4	7.9	4.9	6.7	5.2	2.3
Budget 2016/MYEFO	2.2	2.4	2.0	2.7	2.6					
Non-mining GDP growth										
BAU scenario	3.8	4.6	4.1	4.8	6.8	7.8	6.0	7.0	6.2	4.8
Austerity scenario	3.8	1.5	1.4	2.5	4.1	6.7	4.6	6.0	4.9	2.9
Budget 2016/MYEFO	2.6	3.6	3.6	3.6	3.3					

Source: PNGGEM modelling, and Table 1 of the 2016 Budget, Volume 1 for the Budget forecasts

National income is an even better measure than non-mining GDP for gauging how well the PNG economy is faring because it takes the total GDP numbers and deducts the net proceeds of GDP that accrue to foreign beneficiaries. Average annual real national income growth for the years 2016–2020 is expected to be 4.6 percent in the BAU scenario compared with 2.2 percent in the austerity scenario (Table 6). Unsurprisingly, the pattern of growth for private consumption very much mirrors the pattern for national income with average growth expected of 4.7 percent and 1.9 percent respectively for the two scenarios during 2016–2020.

Government spending grows steadily in real terms by an average of 3.1 percent over the years 2016–2020 in the BAU scenario (Table 6). In keeping with the assumption of fiscal tightening for the austerity scenario — in accordance with the 2016 Budget — real Government spending contracts by an average of 2.7 percent a year over 2016–2020.

Export volumes are expected to grow 4.7 percent in 2016 on the back of better agricultural exports and expanded gold production (Table 6). However, import volumes are expected to fall 7.1 percent. This may be explained by the deterioration in PNG's terms of trade where lower prices are being received for PNG's exports and higher prices are paid for imports. According to PNGGEM, export prices are expected to fall by 18 percent on average in 2016 (in US$) compared with a rise in import prices of 2 percent. What this means is that less foreign currency will come into the country to finance the purchase of imports, ultimately leading to a drop in the demand for imports.

Table 6: Forecasts for key macroeconomic variables, real percentage changes										
	2016		2017		Average 2016–20		Average 2021–25		Average 2016–25	
	BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity
GDP	3.6	3.6	3.8	1.4	4.3	2.6	6.4	5.4	5.3	4.0
Non-mining GDP	3.8	3.8	4.6	1.5	4.8	2.7	6.4	5.0	5.6	3.8
National income	4.1	4.1	4.6	1.0	4.6	2.2	6.5	5.7	5.5	4.0
Consumption	1.5	1.5	5.6	1.0	4.7	1.9	6.6	5.4	5.7	3.6
Investment	4.4	4.4	3.9	0.9	5.7	4.0	7.0	6.8	6.3	5.4
Govt spending	-4.1	-4.1	5.8	-2.7	3.1	-2.7	6.1	6.9	4.6	2.1
Export volumes	4.7	4.7	2.8	3.4	3.6	3.8	7.0	5.9	5.3	4.8
Import volumes	-7.1	-7.1	7.0	-0.7	4.1	-0.1	8.3	10.0	6.2	4.9

Source: PNGGEM modelling

Among the four regions of PNG, the Islands region is expected to be the best performing economy in 2016 with forecast non-mining growth of 6.2 percent (Table 7). Behind this is a recovery in agriculture driven by healthy prices for palm oil, coconut oil and logs (Table 8). Over the 10-year forecast period 2016–2025, non-mining economic growth is expected to be relatively consistent across the four regions and in line with overall non-mining GDP growth.

Table 7: Forecasts for non-mining gross regional product										
	2016		2017		Average 2016–20		Average 2021–25		Average 2016–25	
	BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity
Southern Region	3.3	3.3	4.2	1.1	4.3	2.2	6.0	4.9	5.2	3.6
Highlands Region	3.1	3.1	4.4	1.2	4.6	2.5	6.6	5.7	5.6	4.1
Momase Region	4.2	4.2	5.1	2.0	5.1	3.0	6.1	4.4	5.6	3.7
Islands Region	6.2	6.2	4.7	1.9	5.6	3.6	6.9	4.6	6.3	4.1

Source: PNGGEM modelling

5.3. Sectoral economic performance, 2016–2025

Under the austerity scenario, the mining, oil and gas sector is forecast to be one of the best performing sectors over the period 2016–2025 with average growth of 4.6 percent (Table 8). This is a result of the new mines expected to reach production, including Freida, Woodlark, Wafi, Bougainville and off-shore mining (Table 3). If the Papua LNG Project proceeds, growth for the sector will be much higher — as will overall GDP growth. For the BAU scenario there is no difference in the mining, oil and gas sector's output, because production levels and the emergence of new mines are considered independent of Government fiscal and public investment policy.

The rural sector is expected to be one of the strongest sectors over the forecast period in the BAU scenario with average growth of 6.2 percent (Table 8). In contrast, average growth over 2016–2025 in the austerity scenario is forecast to be just 3.3 percent. It makes sense that the rural sector would show the biggest gains in the BAU scenario compared with the austerity scenario because much of the investment in the enablers will benefit the rural economy most. Strong growth is forecast in 2016 as a result of healthy commodity prices in conjunction with the boost in competitiveness provided by the depreciation of the exchange rate.

The Government sector is expected to contract in 2016 by 0.6 percent as a result of the fiscal tightening, creating a drag on the overall economy. Government spending has close links to the economic health of the private sector-led services industries. As a result, the tight Government spending is reflected in weak growth forecasts for construction and "other services" — which includes finance and business services — of 2.8 percent and 3.2 percent respectively in 2016. For the austerity scenario growth in the "other services" sector is forecast to average just 3.5 percent over the years 2016–2025, which reflects the average growth of just 1.4 percent for the Government sector. In the BAU scenario, average growth over 2016–2025 for "other services" and Government services lift to 5.6 percent and 4.0 percent, respectively.

Table 8: GDP growth by sectors

	2016		2017		Average 2016–20		Average 2021–25		Average 2016–25	
	BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity
Rural	8.3	8.3	5.3	3.0	6.1	4.3	6.4	2.3	6.2	3.3
Mining, oil & gas	2.9	2.9	1.3	1.3	2.6	2.6	6.5	6.6	4.6	4.6
Manufacturing	4.2	4.2	4.1	2.2	4.3	2.9	5.8	4.8	5.1	3.8
Construction	2.8	2.8	4.5	0.7	4.7	2.4	6.5	6.3	5.6	4.4
Commerce	3.7	3.7	5.1	2.3	5.0	3.2	6.9	6.1	6.0	4.7
Transport	4.7	4.7	6.1	2.4	6.1	3.3	9.0	6.1	7.5	4.7
Government	-0.6	-0.6	3.5	-0.9	3.0	-0.5	5.0	3.2	4.0	1.4
Other services	3.2	3.2	4.9	1.4	4.7	2.2	6.5	4.9	5.6	3.5

Source: PNGGEM modelling

5.4. The fiscal outlook, 2016–2025

As might be expected, the forecast fiscal outcomes for the years 2016–2025 differ markedly between the BAU and austerity scenarios. PNGGEM takes the assumption that in the austerity scenario, spending is in line with that outlined in the 2016 Budget and Supplementary Budget for the years 2016–2020; and then for 2021–2025, the budget surplus is kept constant at the 2020 level (Table 4). Under these conditions, Government revenue is forecast in the austerity scenario to reach K18.4 billion in 2020 and K29.5 billion in 2025 (Table 9). This would mean Government revenue would stay relatively constant at about 19 percent of GDP throughout the forecast period — which is quite low by World standards.

In contrast, the revenue forecasts in the 2016 Budget are particularly pessimistic with just K15.5 billion expected in 2020 — K2.9 billion less than what PNGGEM forecasts (Table 9). This would represent a sharp structural decline in revenue as a share of GDP to just 16 percent by 2020. There is no basis for this structural decline explained in the 2016 Budget papers. Without a major structural change in revenue formation, the Treasury forecasts are unrealistic. As a result, the forecasts of the budget surplus in 2020 provided by PNGGEM and by Treasury are far away from each other at K3.8 billion and K0.7 billion respectively.

The BAU scenario assumes a budget deficit of K1.3 billion is reached in 2020 — equivalent to 2 percent of GDP — and kept at that level for 2021–2025 (Tables 4 and 9). As a result, spending reaches K20.0 billion in 2020 — more than K5 billion higher than outlined in the 2016 Budget. This would represent a modest 20 percent of GDP — similar to current levels — on the back of a higher GDP of K103 billion forecast in the BAU scenario in 2020 compared with K97 billion in the austerity scenario. The gap in spending between the two scenarios in 2025 is forecast to grow to K8.6 billion with K34.3 billion in spending in the BAU scenario compared with just K25.7 billion in the austerity scenario.

Table 9: Fiscal forecasts, 2016–2025 (K million)

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Budget 2016/MYEFO										
Spending	13,835	14,013	14,170	14,752	14,883					
Revenue	10,764	12,667	13,270	14,618	15,465					
Budget surplus	-3,071	-1,346	-900	-134	582					
Change in SWF balance	83	79	119	124	80					
Unaccounted LNG taxes	1,160									
True revenue	12,007	12,750	13,349	14,737	15,589					
True budget surplus	-1,828	-1,263	-821	-15706						
Net Government debt	19795	21058	21879	21894	21188					
BAU scenario										
Spending	13,887	15,328	16,600	18,096	20,019	22,088	24,480	27,403	30,748	34,344
Revenue	12,949	14,390	15,681	17,029	18,749	20,818	23,209	26,133	29,478	33,074
Budget surplus	-938	-938	-919	-1,067	-1,270	-1,270	-1,270	-1,270	-1,270	-1,270
Net Government debt	18,905	19,844	20,763	21,830	23,100	24,370	25,640	26,910	28,180	29,451
Net debt % of GDP	26.4%	25.4%	24.5%	23.6%	22.5%	21.1%	20.0%	18.7%	17.5%	16.6%
Austerity scenario										
Spending	13,887	14,019	14,100	14,612	14,667	16,179	18,005	20,251	22,876	25,743
Revenue	12,949	14,455	15,723	16,894	18,453	19,966	21,791	24,037	26,662	29,529
Budget surplus	-938	436	1,623	2,282	3,786	3,786	3,786	3,786	3,786	3,786
Net Government debt	18,905	18,469	16,847	14,565	10,778	6,992	3,206	-581	-4,367	-8,154
Net debt % of GDP	26.4%	23.9%	20.3%	16.4%	11.1%	6.5%	2.7%	-0.4%	-3.0%	-5.2%

Source: Budget numbers 2016–2020 come from the 2016 Budget and MYEFO. Unaccounted LNG taxes are explained in Section 3.4. The BAU scenario assumes the budget deficit is 2% of GDP for 2017–2020 and constant for 2021–2025 (Table 4). The Austerity scenario assumes the level of spending to be broadly in line with the Budget 2016 approach and then constant for 2021–2025 (Table 4). All other numbers are derived from PNGGEM modelling. Net Government debt is inclusive of SWF balances.

For 2016, the revenue forecasts are tricky to reconcile with those produced by Treasury. PNGGEM forecasts revenue of K12.9 billion leaving a deficit of K0.9 billion. The MYEFO forecasts a much lower revenue outcome of K10.8 billion, although this was revised up to K11.7 billion in the Supplementary Budget on the back of asset sales and higher SOE dividend payments. As discussed in Section 3.4 the MYEFO revenue forecasts mysteriously exclude tax revenues generated from the LNG Project which are estimated to be about K1,160 million for 2016. Taking account of these, and taking account of revenues diverted to the SWF, the true underlying level of revenue based on MYEFO forecasts look more like K12.0 billion for a budget deficit of K1.8 billion.

Government debt looks to be under control, particularly with the implementation of austerity in the 2016 Budget and the Supplementary Budget. PNGGEM forecasts Government debt to be 26.4 percent of GDP in 2016. This outcome is in contrast to the higher levels reported in the 2016 Budget because of the major revisions to GDP that have resulted in GDP being much higher than was previously thought (see Section 3.5).

5.5. Outlook for employment, 2016–2025

PNGGEM analysis finds that prospects for employment creation over the forecast period are highly dependent on the policy approach of the Government. Under the policy conditions of the austerity scenario, PNGGEM forecasts 212,000 jobs will be created during 2016–2025 (Table 10). However, this number will more than double to 429,000 if policy was to revert to the conditions of the BAU scenario. Rural areas stand to benefit most from investment in the enablers and this is reflected in the forecast creation of 246,000 rural jobs compared with 91,000 for the austerity scenario. This rural employment creation includes self-employment in micro businesses, which is characteristic of rural PNG.

The other key area of employment creation is in services, with 142,000 new jobs from 2016–2025 in the BAU scenario, including 32,000 created in construction, 32,000 in commerce and hotels, and 24,000 in Government services. In comparison, 86,000 new service jobs are forecast to be created in the austerity scenario, just 4,000 of which will be in Government services. Employment creation in mining, oil and gas is expected to be about 25,000 in each scenario.

Table 10: Employment creation by sectors, 2016–2025

	2016	2017		Average growth 2016–20		Average growth 2021–25		Average growth 2016–25		TOTAL 2016–25	
		BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity	BAU	Austerity
Rural	30,876	19,008	3,250	22,755	11,854	26,429	6,308	24,592	9,081	245,918	90,810
Mining, oil, gas	-945	4,452	4,310	1,724	1,674	3,410	3,320	2,567	2,497	25,670	24,968
Manufacturing	685	743	289	827	542	1,140	941	983	741	9,835	7,412
Services	3,155	10,493	283	10,569	3,312	17,858	13,810	14,213	8,561	142,134	85,610
Urban informal	124	510	69	429	165	589	541	509	353	5,088	3,532
Total	33,895	35,205	8,202	36,304	17,546	49,425	24,920	42,865	21,233	428,645	212,332

Source: PNGGEM modelling

Ch. 6 Conclusion

This third issue of the review and forecast of the PNG economy has provided relevant background information on global commodity markets and PNG's resource sector and policy developments.

Key messages

- The lower commodities prices will continue to be a challenge for the government in terms of revenue potential.
- The Government is presenting confused and mixed messages about fiscal and development policy with an austerity approach outlined in the 2016 Budget and Supplementary Budget working in conjunction with the Government's development planning agenda that emphasises the financing of spending in the enablers to boost productivity.
- The whereabouts of the LNG revenue remains somewhat of a mystery, given the lack of transparency in its treatment in the budget.
- The long overdue revision and update in GDP estimates by the NSO has had important implications for the debt-to-GDP ratio that is so important for fiscal and Government debt policy, as well as other key ratios that depend on GDP.
- Many new/planned resource projects are likely to come on stream, which will help the revenue side of the budget.

To provide the numbers, the paper has provided 10-year forecasts for key economic variables using the PNGGEM. The forecasts were made under two scenarios: (1) BAU, which is based on the intentions of key development plans, the Vision 2050, PNG DSP 2010–2030 and the MTDPs to fund the key enablers; and (2) austerity scenarios, where the intention for funding the key enablers is mentioned but in reality the budget is cut for the key enablers.

Key results of the forecasts

- GDP growth under the BAU scenario will average about 4.3 percent a year for 2016–2020 and higher at 6.4 for the remaining five years of the forecast period (2021–2025). In contrast, under austerity conditions, the likely average GDP growth is only 2.6 percent for 2016–2020 and 5.4 percent for 2021–2025.
- Non-mining GDP, which is a proxy for broad-based economic growth, is expected to grow at an annual average of 4.8 percent and 2.7 percent under the BAU and austerity conditions, respectively, for the period 2016–2020. For 2021–2025, the respective average growth rates are 6.4 percent and 5.0 percent.
- The mining, oil and gas sector is expected to be one of the best performing sectors for the 2016–2025 period, with an annual growth rate of 4.6 percent, which is a result of the commissioning of new projects such as Frieda, Wafi-Golpu and offshore mining. The forecast is the same for both the BAU and austerity scenarios given that government fiscal and investment policy are unlikely to affect the production levels of the

new mines.

- The Papua LNG Project is highly likely to proceed but has not been confirmed. The modelling excludes the impact of this project, so the GDP growth forecasts under both scenarios may be considered to be conservative.
- The rural sector is expected to grow strongly under the BAU scenario at an annual average of 6.2 percent while only growing at 3.3 percent under the austerity scenario, which reflects the important role of the key enablers in boosting growth in the rural sector.
- For the fiscal outlook, as might be expected, the forecast results differ markedly between the two scenarios. For the BAU case, government spending is expected to increase by 147 percent from K13.9 billion in 2016 to K34.3 billion in 2025. In contrast, under the austerity conditions, spending will only increase by 85 percent for the same period (to K25.7 billion). For revenues, under the BAU scenario, a growth of 157 percent is expected between 2016 and 2025 (K12.9 billion to K33.1 billion); while under the austerity scenario, the growth is lower at 129 percent (to K29.5 million). The differences imply that the BAU scenario will create a feedback into higher revenues as a result of addressing the key enablers thereby boosting productivity and growth.
- For employment, the PNGGEM analysis finds that employment prospects depend on the policy approach of government. If the austerity approach is the norm then about 212,000 jobs will be created during the forecast period. On the other hand, under BAU conditions, employment creation will double to 429,000 jobs. Rural employment will be the main beneficiary of funding the key enablers under the BAU conditions.

In summary, the analysis finds a significant boost to economic development under BAU conditions, in the spirit of the government's plans of Vision 2050, PNG DSP, and the MTDPs — plans that focus on addressing the key enablers. However, under austerity conditions, which follow the budget approach in the 2016 Budget and the Supplementary Budget, economic development looks like moving at the slow pace that characterised the first three decades of independence. On one hand, this re-emphasises the need to maintain adequate funding for the key enablers in the midst of external and domestic market challenges. But as ever, it is a tricky balancing act to deliver proper financing of the enablers without going into excessive debt. At present, the debt-to-GDP ratio is quite low at well under 30 per cent, which points to an excessive bias towards reigning in debt and away from financing enablers.

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