

## **Papua New Guinea: Selected Issues and Statistical Appendix**

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PAPUA NEW GUINEA

**Selected Issues and Statistical Appendix**

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Approved by the Asia and Pacific Department

February 27, 2009

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## I. THE GLOBAL FINANCIAL TURMOIL: THE IMPACT ON PAPUA NEW GUINEA'S FINANCIAL SECTOR<sup>1</sup>

### A. Introduction

1. **Despite rapid growth in the last few years, Papua New Guinea's financial system is likely to remain relatively immune from the turmoil in global financial markets.** Since 2000, a favorable external environment and the introduction of financial sector reforms provided a strong foundation for financial sector expansion. This chapter examines the potential vulnerabilities in Papua New Guinea's expanded financial sector given the current state of global capital markets. In particular, it focuses on liquidity and asset quality, the areas that have proven to be most vulnerable in other financial systems, and concludes that Papua New Guinea's financial system is relatively well positioned to ride out the current storm.

### B. Overview of the Financial Sector

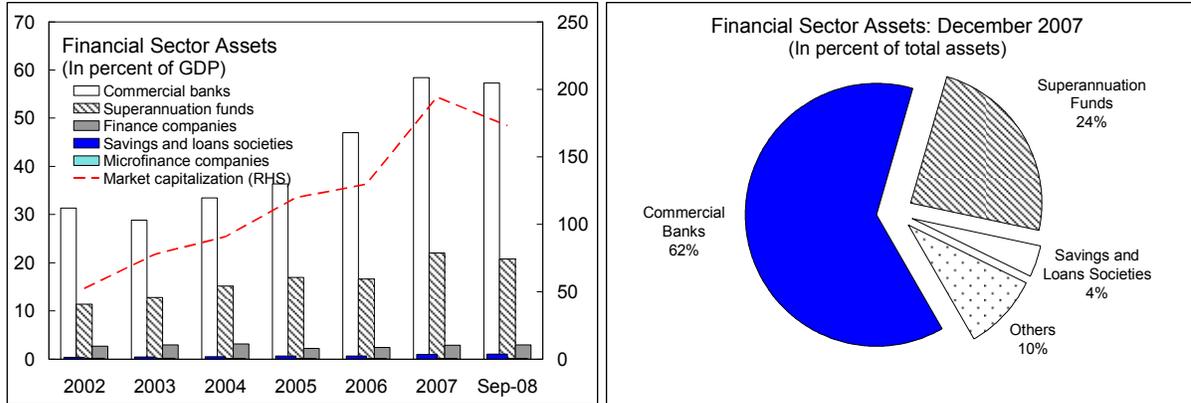
2. **Legislative reform has led to a significantly larger and sounder financial system.** Financial sector reforms, in conjunction with the economic recovery driven by high commodity export prices, helped spur the development of the financial sector. The introduction of several new Acts<sup>2</sup> gave the Bank of Papua New Guinea (BNPG) an independent role as the monetary authority, financial regulatory, and supervisory authority. Subsequently, the BPNG introduced prudential rules consistent with international best practices, covering banks, superannuation funds, and other financial institutions. These changes elevated the overall performance of the financial sector. Since 2000, total financial sector assets have almost quadrupled to kina 19 billion, with banking sector assets comprising more than 60 percent of the total. Bank asset quality has also improved dramatically. The ratio of nonperforming loans to total loans declined from 16.9 percent in 2000 to 1.3 percent in September 2008. Return on assets rose from 1.2 percent in 2000 to 1.6 percent in September 2008. As of September 2008, the return on equity was 61.4 percent.

3. **Total financial sector assets have grown to roughly 90 percent of GDP and are held by a wide range of institutions.** Currently, there are 4 commercial banks, 10 superannuation funds, and a number of other nonbank financial sector institutions licensed and regulated by BPNG. Also, there are general insurance companies regulated by the Insurance Commission and a stock exchange, regulated by the Securities Commission.

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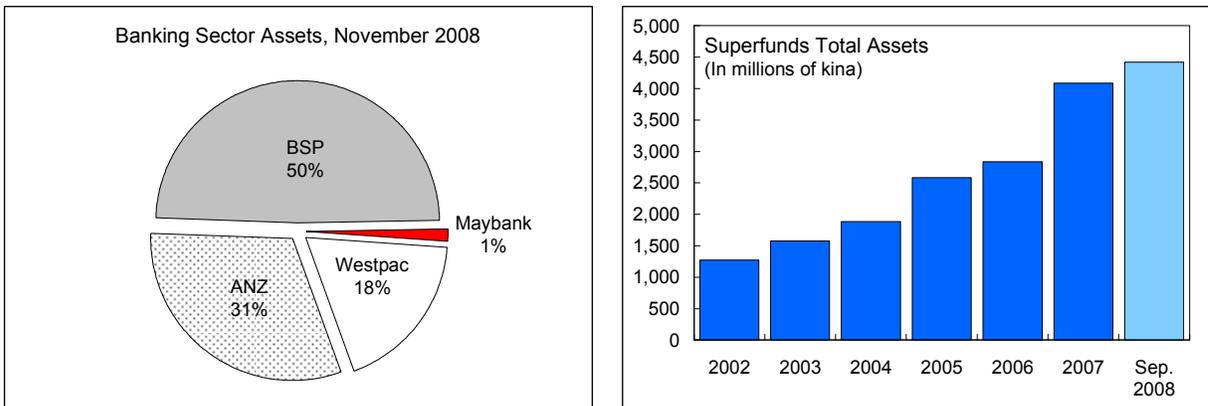
<sup>1</sup> Prepared by Erdembileg Ochirkhuu (Asia and Pacific Department).

<sup>2</sup> These included the Central Banking Act, the Banks and Financial Institutions Act, and the Superannuation and Life Insurance Act.



Sources: Bank of Papua New Guinea; Kina Securities Ltd.; and Fund staff calculations.

4. **Banks and superannuation funds dominate the financial sector.** Since the reforms, banking sector assets more than tripled, reaching kina 12 billions. The nationally owned Bank of South Pacific (BSP) is the largest, followed by subsidiaries of two Australian banks, Australia and New Zealand Banking Group Limited (ANZ) and Westpac Banking Corporation (Westpac), and a Malaysian bank, Maybank. In addition, there is the state-owned, non-deposit taking National Development Bank, which has the primary function of providing accessible credit to people in rural areas (assets of about ½ percentage point of total banking assets). The nonbank sector is the second largest with roughly kina 6 billion in assets. The authorized superannuation funds (ASFs) are the largest, holding about 65 percent of total nonbank financial assets. Among the ten licensed ASFs, Nasfund and Nambawan stand out with kina 1.2 billion and kina 2.3 billion in assets respectively (together holding approximately 87 percent of total superannuation fund assets). ASFs, in terms of assets size, are followed by the savings and loans societies, insurance companies (including general, life, and broker), and finance and microfinance companies.



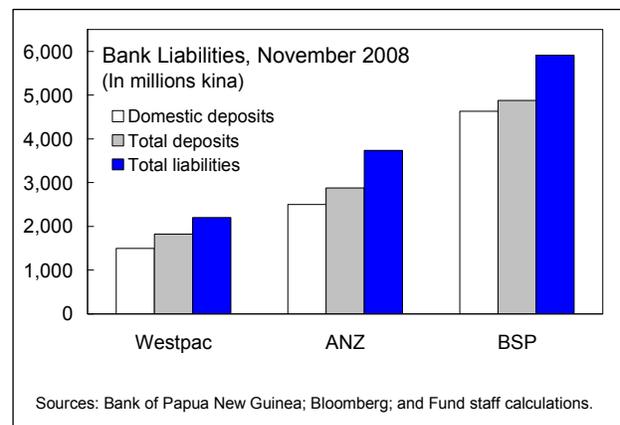
Sources: Bank of Papua New Guinea; and Fund staff calculations.

### C. Vulnerability of the Financial System to the Global Turmoil

5. **Two key areas of vulnerability have been exposed in some countries' financial sectors, liquidity and asset quality.** As the financial crises evolved and credit conditions tightened in global financial markets countries with financial sectors heavily dependant on wholesale funding, such as Iceland, have come under considerable stress. Further, many countries have been forced to introduce public guarantees to ensure their banks have continued access to international wholesale funding. In addition, a prolonged period of low interest rates and easy credit led to rapid growth in low quality lending in many countries, such as the United States, and the recent rapid rise in credit defaults has forced many governments to directly inject funding to stabilize their financial institutions. The sharp deterioration in equities markets has also undermined the balance sheets of many nonbank institutions around the world.

#### Liquidity Vulnerabilities

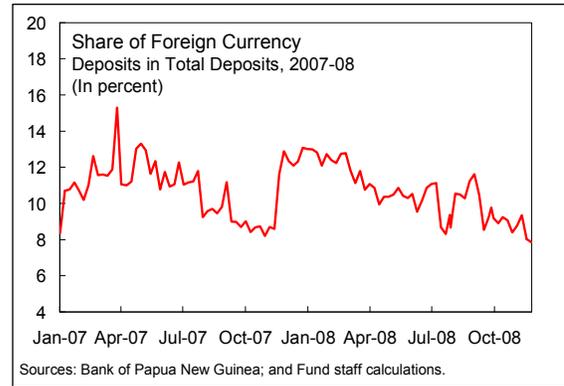
6. **Banks are funded primarily by deposits and have been unaffected by tight global capital markets.** Papua New Guinea's banking system is isolated from the international capital markets with deposits accounting for more than 80 percent of liabilities. BSP holds over 50 percent of total deposits with the bulk of the remainder held by the two Australian subsidiaries. About 95 percent of total BSP deposits are denominated in kina, with most of the rest denominated in either U.S. dollars or Australian dollars. Both of the Australian subsidiaries also rely primarily on domestic funding, with local currency deposits of more than 80 percent of total deposits.<sup>3</sup> In addition, banking sector liquidity in Papua New Guinea is very high. As of November 2008, roughly 60 percent of total assets were liquid (55 percent for BSP, and 60 percent for ANZ and Westpac).



<sup>3</sup> These subsidiaries are small relative to their parent banks as they comprise less than 1 percent of their respective banking groups' total activity. Unlike their Papua New Guinea subsidiaries, the parent banks are heavily dependant on international wholesale funding which represent 58 percent of GDP (IMF Country Report No. 08/311).

**7. Foreign currency deposits are a small and relatively stable share of total deposits.**

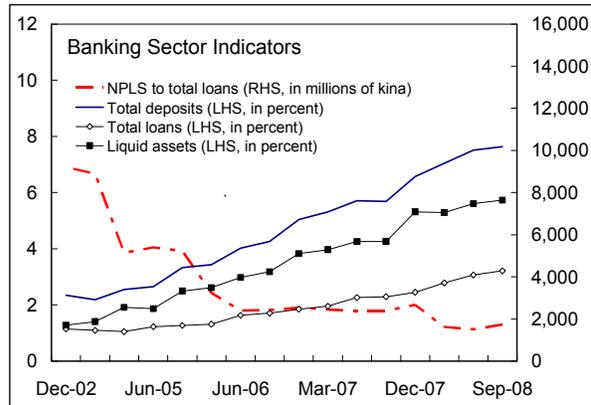
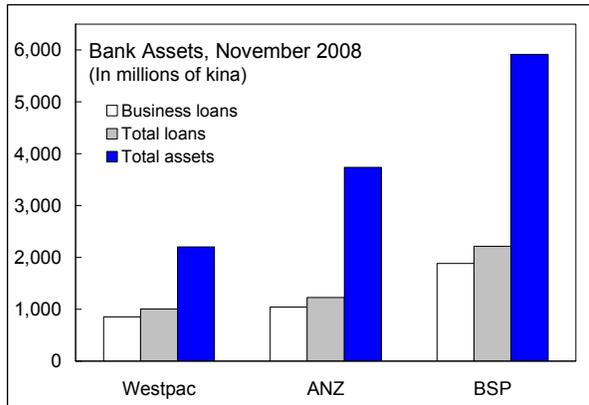
The largest share of foreign currency deposits is held by ANZ (56 percent) with Westpac and BSP roughly sharing the balance. In contrast to Australia, the government has not guaranteed deposits nor are the deposits of the two Australian subsidiaries guaranteed by the Australian government. But this does not appear to have triggered significant transfer of foreign currency deposits toward the parent banks in Australia.



**Asset Quality Vulnerabilities**

**8. Lending comprises a relatively small share of banks assets and nonperforming loans have been declining.**

Even though lending increased to 20 percent of GDP from about 15 percent over the last eight years, its represents only 35 percent of total bank assets. The ratio of nonperforming loans to total loans has also decreased considerably, falling to its current level of 1.3 percent from 16.9 percent in 2000. In addition, the ratio of provisions to nonperforming loans has increased dramatically from 16 to 150 percent. However, nonperforming loans are a lagging indicator and loan quality could decline looking ahead as the deterioration in the external environment impacts borrowers' debt-servicing capabilities. Of the 60 percent of total assets that are liquid, about 70 percent are government securities and 10 percent are deposits with the BPNG.



Sources: Bank of Papua New Guinea; and Fund staff calculations.

**9. There are almost no direct exposures to troubled international financial institutions.**

Further, the funding structure of the Australian subsidiaries rules out the possibility of any exposure via the Australian parent banks, both of which also have AA ratings (See Table 1).

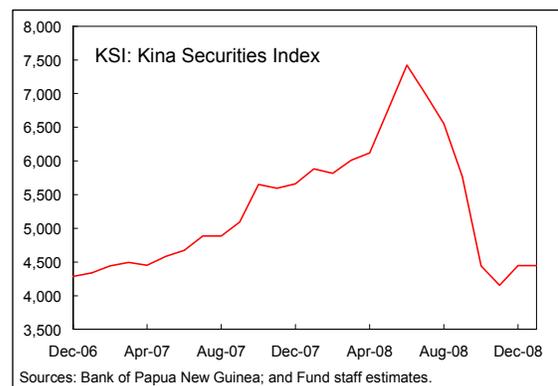
Table 1. Commercial Banks' Credit Ratings

Bank	Credit Rating
Bank of South Pacific	B+ / Stable / B
ANZ Bank	AA / Stable / A-1+
Westpac Bank	AA / Stable / A-1+
Maybank	A- / Stable / A-2

Source: Standard and Poor's, <http://www.standardandpoors.com>

**10. Although the equity market has declined along with global equity markets, the impact has been limited.** Stock market

capitalization jumped from about 50 percent of GDP in 2002 to almost 200 percent of GDP in the first half of 2008. Since the peak in late-June 2008, the Kina Securities Index (KSI) has dropped by more than 40 percent. This decline along with declines in foreign equity markets will have an impact on the balance sheets of the superannuation funds. For the two biggest funds, investment in equities is the largest exposure in their investment portfolio and accounted for the bulk of their returns in 2007. Mining, oil, and gas industries dominate among the domestic and internationally listed equities. As of end-September 2008, the investment portfolios of both funds show a decline in the equity share, in line with the drop in KSI and foreign equity markets. However, these funds expect returns in 2008 to remain positive, albeit significantly lower than returns in 2007.<sup>4</sup>



Nambawan Super: Investment Guidelines  
(In percent)

Asset Allocation	Minimum	Maximum
Equities (Listed and Unlisted)	30	50
Fixed interest	15	35
International	15	25
Cash	0	5
Property	10	30

Source: Nambawan Super Superannuation Fund.

Nambawan Super: Portfolio Value

Asset Class	(In million of kina)		Percent	
	Sep-08	Dec-07	Sep-08	Dec-07
Fixed Interest	634	260	25.6	13.5
Equities	1,286	1,083	52.0	56.4
Property	256	248	10.4	12.9
International	298	330	12.0	17.2
Equities	211	248	8.5	12.9
Fixed	87	82	3.5	4.3
<b>Total</b>	<b>2,475</b>	<b>1,920</b>	<b>100</b>	<b>100</b>

Sources: BPNG; Nambawan Super; and Fund staff estimates.

Nasfund: Investment Guidelines  
(In percent)

Asset Allocation	Minimum	Maximum
Equities (Domestic & International)	30	60
Government Securities & State Grants	10	30
IBD & Treasury notes	5	30
International fixed interest	0	10
Property	10	20

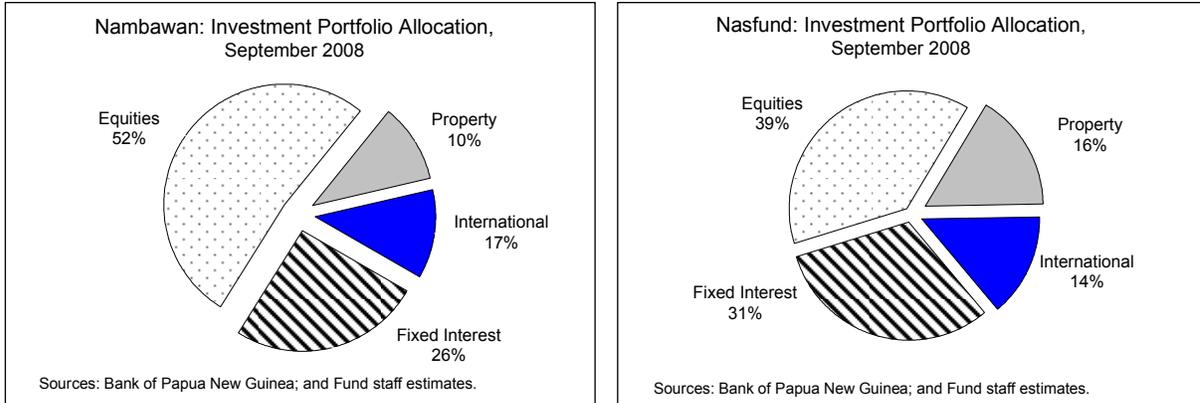
Source: Nasfund Superannuation Fund.

Nasfund: Portfolio Value

Asset Class	(In million of kina)		Percent	
	Sep-08	Dec-07	Sep-08	Dec-07
Fixed Interest	481	256	31.5	21.3
Equities	587	476	38.4	39.6
Property	246	168	16.1	14.0
International	216	301	14.1	25.0
Equities	193	247	12.6	20.6
Fixed	23	54	1.5	4.5
<b>Total</b>	<b>1,530</b>	<b>1,200</b>	<b>100</b>	<b>100</b>

Sources: BPNG; Nasfund; and Fund staff estimates.

<sup>4</sup> Nasfund reported after tax net surplus of kina 74 million in 2008, compare to kina 321 million in 2007. Nambawan has not yet reported 2008 results.



## D. Conclusions

11. **Papua New Guinea's financial system has weathered the global turmoil well and appears positioned to continue to do so.** The reforms introduced and implemented in the past have brought positive results and elevated financial sector performance. The primarily-domestic-deposit-based funding arrangement, the level of liquidity, and financial soundness indicators suggest a stable banking sector. The largely domestic-deposit-base liabilities significantly limit the risks of liquidity pressures arising from tight international credit markets and the large holdings of liquid assets imply the banks could withstand sizable reductions in domestic liquidity. Nonperforming loans have also fallen to historical lows, however, the rapidly deteriorating external environment is expected to reduce borrower's debt-servicing abilities and loan quality will likely deteriorate. Fortunately, provisioning against default is substantial. The superannuation funds exposure to equities markets will notably reduce their returns in 2008 relative to previous years, however, returns appear poised to remain positive in 2008.

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## II. DETERMINANTS OF THE CURRENT ACCOUNT AND EXCHANGE RATE ASSESSMENT FOR PAPUA NEW GUINEA<sup>1</sup>

### A. Introduction

1. **Papua New Guinea is a small commodity exporting economy, and its current account and exchange rate are highly dependent on commodity prices.** Its current account surpluses widened in the past few years until mid-2008, as commodities prices soared. However, the recent collapse in commodity prices is expected to lead to a substantial deterioration in its external accounts. Thus, the question is whether the current level of the real exchange rate is in equilibrium or whether some further adjustment will be required to restore consistency between internal and external balances over the medium term.
2. **Against this background, this chapter explores the medium-term determinants of the current account balance in Papua New Guinea and provides an assessment of the exchange rate.** In particular, it aims to answer the following questions: is the level of the kina in line with medium-term fundamentals? And how important are the terms of trade in determining the equilibrium exchange rate of the kina?
3. **This chapter is organized as follows:** Section B presents some background on recent exchange rate developments. Section C uses two dynamic panel regression models to estimate the current account and exchange rate determinants across 55 countries. Section D applies the estimation results to Papua New Guinea's data and presents the exchange rate assessment for the kina under a baseline scenario and a terms-of-trade-shock scenario. It also discusses how the current methodology could be modified to more fully account for characteristics of commodity-exporting countries, such as Papua New Guinea. Section E draws some policy implications and conclusions. Data sources and the model specifications are reported in the Appendix.

### B. Exchange Rate Developments: Some Stylized Facts

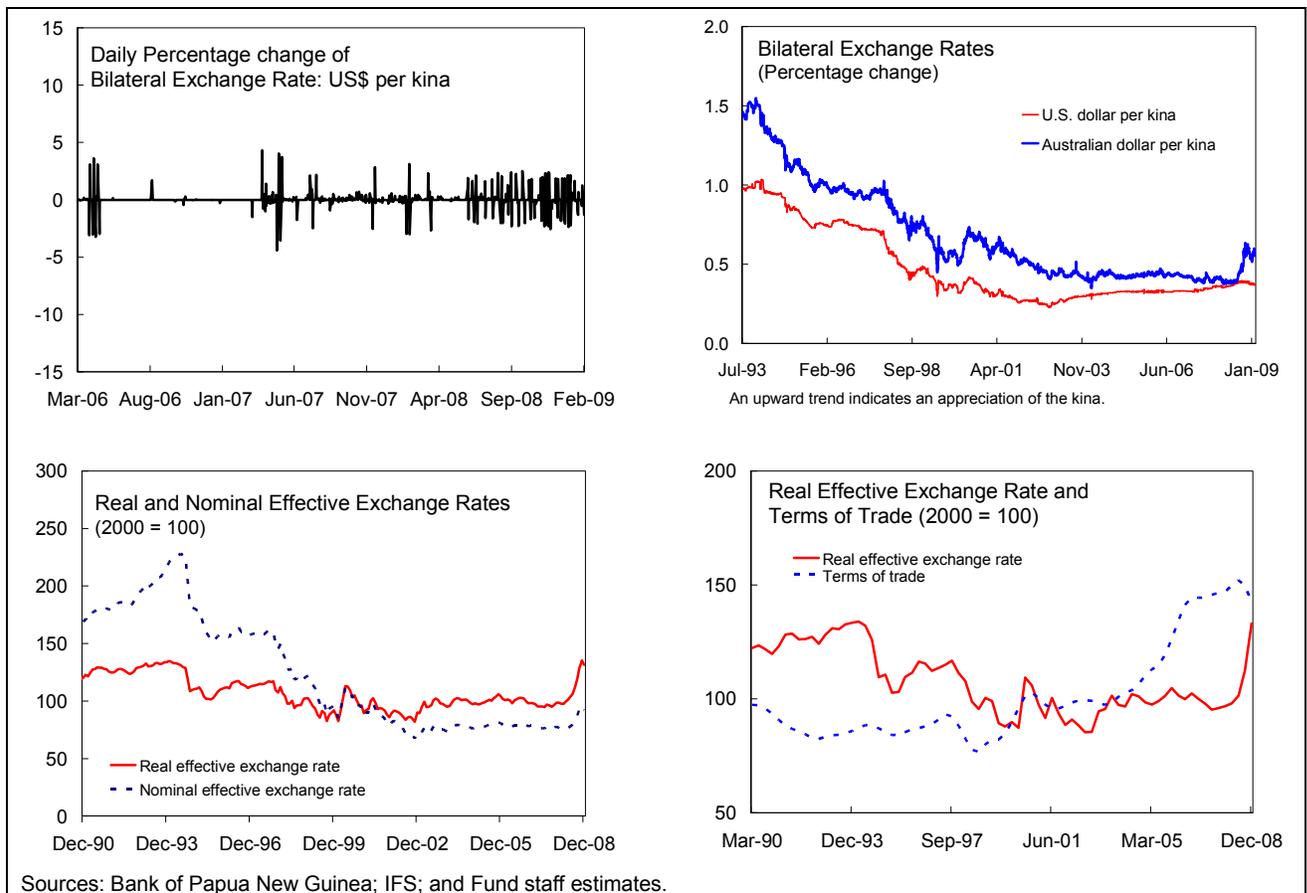
4. **Nominal exchange rate flexibility has increased in recent months.** The volatility of the kina bilateral exchange rate against the U.S. dollar has intensified significantly since the beginning of 2007. This reflects both the effect of the removal of some capital account controls that took place during the first half of 2007, as well as the recent turbulence in the foreign exchange markets.
5. **Taking a longer view, on a bilateral basis, the kina depreciated substantially during 1993–2002, against the US and the Australian dollars, but more recent developments have in part reversed this trend.** During 2003–September 2008, the kina appreciated by 54 percent against the U.S. dollar, before depreciating by about 6 percent over

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<sup>1</sup> Prepared by Patrizia Tumbarello (Asia and Pacific Department).

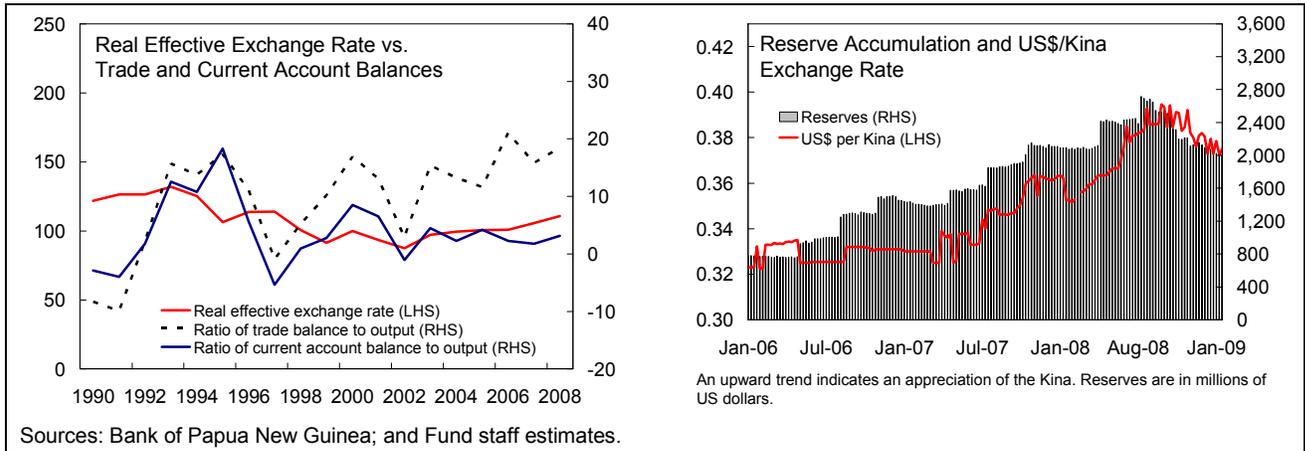
October 2008–February 2009. The kina/Australian dollar exchange rate remained stable during 2003–June 2008. Since then, the kina has appreciated dramatically (about 40 percent) against the Australian dollar, mainly reflecting the recent weaknesses of the latter currency.

6. **Despite nominal bilateral volatility, in effective terms, the kina has remained relatively stable since 2002, although it started to appreciate significantly since July 2008.** The stability of the kina in effective terms in recent years occurred despite significant improvements in the terms of trade. During July–December 2008 the kina appreciated by 20 percent in nominal effective terms, and even more so (27 percent) in real effective terms. The nominal effective exchange rate appreciation primarily reflected the weakness of the Australian dollar, while the difference between nominal and real effective exchange rates reflected the inflation rate differential relative to trading partners, in particular Australia.



7. **Improved terms-of-trade propelled by the global commodity boom delivered a sequence of current account surpluses, and foreign official reserves increased through August 2008.** The commodity price boom and the related large revenue inflows compounded with the appreciation of the kina against the U.S. dollar until August 2008 resulted in a large increase in foreign official reserves to US\$2.8 billion by August 2008. However, since then, reserves have been drawn down to about US\$2 billion at end-2008, reflecting both efforts in

resisting depreciation pressures in the kina/U.S. dollar rate owing to falling commodity prices, as well as valuation effects as the dollar strengthened in the second half of 2008.



### C. Methodologies and Econometric Results

8. **Two complementary methodologies are used to assess the equilibrium exchange rate:** the macro-balance approach and the reduced-form equilibrium real exchange approach.

9. **The dataset consists of an unbalanced panel comprising 55 countries and annual observations covering the period 1973–2007.** The models are estimated using ordinary least squares (OLS), and generalized methods of moments (GMM), using lagged explanatory variables as instruments, when appropriate.<sup>2</sup> Both estimations include country fixed effects and are corrected for cross-section specific unconditional heteroskedasticity.

#### Macroeconomic balance approach

10. **The macroeconomic balance (MB) approach determines the change in the real effective exchange rate that is needed to close the gap between the underlying current account balance and its equilibrium level (i.e., norm).** In line with the CGER methodology, the explanatory variables include: the fiscal balance as a percent of GDP; demographic variables such as: the old-age dependency ratio (i.e., the ratio of retirement age population to working age population), and population growth rate; the growth rate of income per capita; and the ratio of oil balance to GDP. In addition we also add multiplicative dummies on oil-exporting countries to gauge the different impact of the oil balance on the current account of this sub-group of countries, to control for the large cross-country heterogeneity of the sample. All variables are measured in deviation from the average of the trading partners.

<sup>2</sup> See Edison and Vitek (2009) for methodological issues related to different specifications. In order to achieve a consistent decomposition of the exchange rate misalignment estimate into contributions from different explanatory variables, the GMM is required, while the OLS is not applicable because it does not consistently estimate coefficients due to endogeneity among variables.

### *Econometric results*

11. **The estimated coefficients are statistically significant, have expected signs and plausible magnitudes, in line with previous studies (Table 1). In particular:**

- The coefficients on the fiscal balance are positive. A 1 percentage point increase in the government budget balance in terms of GDP, relative to trading partners, leads to 0.14–1.8 percentage point increase in the current account balance in percent of GDP, depending on the estimation techniques used. The magnitude of the coefficients is consistent with previous studies.

Table 1. MB Approach: Panel Estimation Results 1/

	OLS	GMM
Fiscal Balance to GDP 2/	0.18 ***	0.14 *
Old-age dependency ratio 2/	-0.73 ***	-0.89 ***
Population growth 2/	-1.06 ***	-5.34 *
Oil trade balance to GDP	0.36 ***	0.28 *
Oil trade balance to GDP (oil exporters)	0.55 ***	0.74 ***
Output growth 2/	-0.16 **	-0.58 ***
Observations	1,090	1,036
Adjusted R <sup>2</sup>	0.59	0.46

1/ Dependent variable: the current account balance/GDP. The regressions include country-fixed effects. \*, \*\*, \*\*\* indicate significance at the 10, 5 and 1 percent level, based on standard errors robust to serial correlation.

2/ Relative to trading partners.

- As expected, a higher dependency ratio reduces the current account balance. A 1 percentage point increase in the old-age dependency ratio relative to trading partners deteriorates the current account balance by about 0.7 to 0.9 in percent of GDP.
- The coefficients on population growth are negative, as expected, but their magnitude varies widely across econometric techniques, also in line with previous studies. A 1 percentage point increase in the population growth rate relative to trading partners deteriorates the current account norm by 1 percent to 5 percent of GDP.
- The coefficients on the oil trade balance are positive. For oil-exporting countries, such as Papua New Guinea, this implies that that an increase of the oil trade balance leads to an increase in the current account norm; while for oil-importing countries the positive coefficient suggest that a widening of the oil trade deficit would lead to a decrease in the current account norm. Regarding the magnitude of the coefficients, for oil exporting countries a 1 percentage point increase in the oil trade balance in terms of GDP would result in a 0.9 percentage point increase in the current account balance in percent of GDP.<sup>3</sup> This high coefficient seems to reflect a precautionary saving motive by oil-exporting countries which results in an improvement of the current account balance almost equal to the improvement in the trade balance, as oil prices increase. Oil importers compress their imports when the oil price increases. A 1 percentage point increase in the oil trade deficit would lead only to a 0.28–0.36 percentage point increase in the current account deficit in terms of GDP.

<sup>3</sup> The coefficient for oil-exporting countries is equal to  $0.9=(0.55+0.36)$  under the OLS estimates.

- The coefficients of the output growth are negative, with their size varying considerably across the OLS and the GMM estimations. A 1 percentage point increase in real GDP growth reduces the current account balance relative to trading-partners average by 0.16 to 0.58, depending on the estimation method.

### Equilibrium real exchange rate approach

12. **The reduced-form equilibrium real exchange rate directly estimates an equilibrium real exchange rate as a function of medium-term fundamentals.**<sup>4</sup> The exchange rate adjustment needed to restore equilibrium over the medium term is simply calculated as the difference between the estimated equilibrium real exchange rate and its current value. The explanatory variables or medium-term fundamentals include the following: the terms of trade; real output per worker; government consumption relative to GDP and relative to trading partners; and net foreign assets (NFA).

### Econometric results

13. Most of the estimated coefficients are statistically significant and positive (Table 2):<sup>5</sup> an increase in any variable would lead to an appreciation of the exchange rate. For example, a 10 percent increase in the terms of trade implies an equilibrium appreciation of about 4 percent, in line with estimates in previous studies (Lee and others, 2008). An increase in government consumption relative to GDP of 1 percentage point is associated with an appreciation of the equilibrium real exchange rate of about 2 percent.

Table 2. EREER Approach: Panel Estimation Results 1/

	OLS	GMM
Terms of trade 2/	0.35 ***	0.40 ***
Real output per worker 2,3/	0.23	0.20
Government consumption to GDP 4/	1.67 ***	1.01 **
Net foreign assets to GDP	-0.10 **	-0.13 ***
Observations	710	666
Adjusted R <sup>2</sup>	0.50	0.53

1/ Dependent variable: real effective exchange rate. The regressions include country-fixed effects. \*, \*\*, \*\*\* indicate significance at the 10, 5 and 1 percent level, respectively, based on standard errors robust to serial correlation.

2/ Logarithm.

3/ In terms of purchasing power.

4/ Relative to trading partners.

### D. Exchange Rate Assessment for Papua New Guinea

14. **The estimates of the MB and the EREER approaches are applied to Papua New Guinea's data to calculate the equilibrium exchange rate.** In the case of the MB approach, in order to estimate the change in the real effective exchange rate that is needed to close the gap between the underlying current account balance and its equilibrium level, we use the

<sup>4</sup> See Luca Ricci and others, 2008, on the determinants of the real exchange rate.

<sup>5</sup> The coefficient on NFA is negative—a different result compared to other analysis, with the exception of Edison and Vitek, 2009. While in the long run the intertemporal budget constraint will require that debtor countries depreciate their currency to service their liabilities through high trade surplus, this condition may not hold within the short time period of the sample.

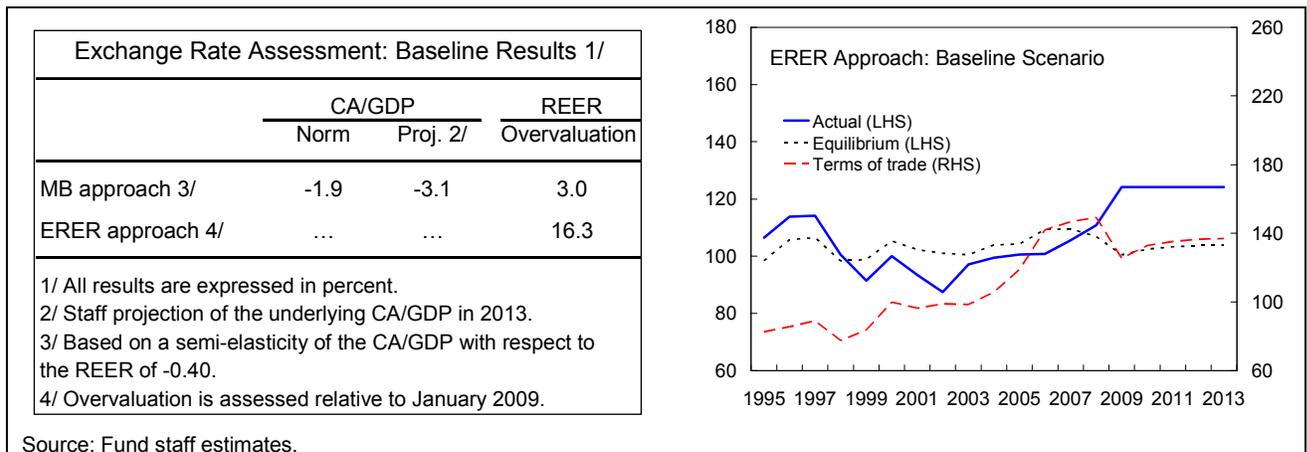
projected current account for 2013 as the underlying current account<sup>6</sup> and we calculate the norm for Papua New Guinea using the GMM estimates developed above. Thus, we divide the current account gap (i.e., the difference between the estimated current account norm and the current account projection for 2013) by the semi-elasticity of the current account with respect to the real effective exchange rate—which in the case of Papua New Guinea is estimated to be -0.4. In the case of the EREER approach, the exchange rate adjustment needed to restore equilibrium over the medium term is simply calculated as the difference between the estimated equilibrium real exchange rate using the coefficients of the GMM panel estimates and its current value.<sup>7</sup>

### Baseline scenario

15. **On balance, the baseline estimates point to some evidence of mild overvaluation of the kina.** However, these estimates vary across the MB and the EREER approach.

16. **According to the MB estimates, the kina is broadly in line with fundamentals.** Although the exchange rate adjustment that would close the gap between the normal current account and the underlying current account is 3 percent, this overvaluation is not significantly different from zero, given the amount of statistical uncertainty.

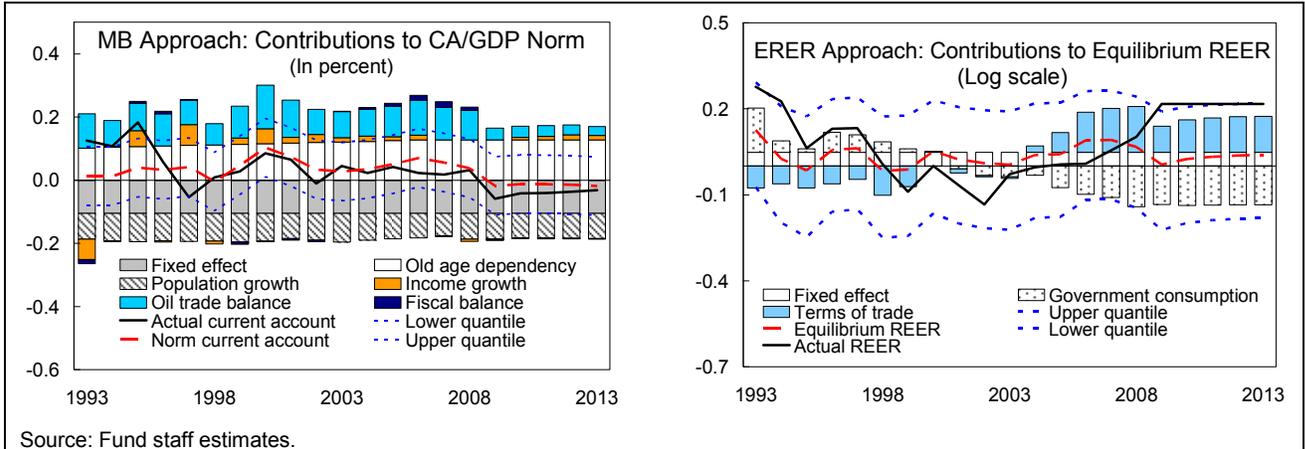
17. **The estimates based on the EREER approach suggest that the kina is overvalued by 16 percent.** This medium-term overvaluation reflects the recent appreciation of the exchange rate as a result of the increased inflation differential between Papua New Guinea and its trading partners.



<sup>6</sup> This corresponds to -3.1 percent in 2013 consistent with the macroframework in the staff report.

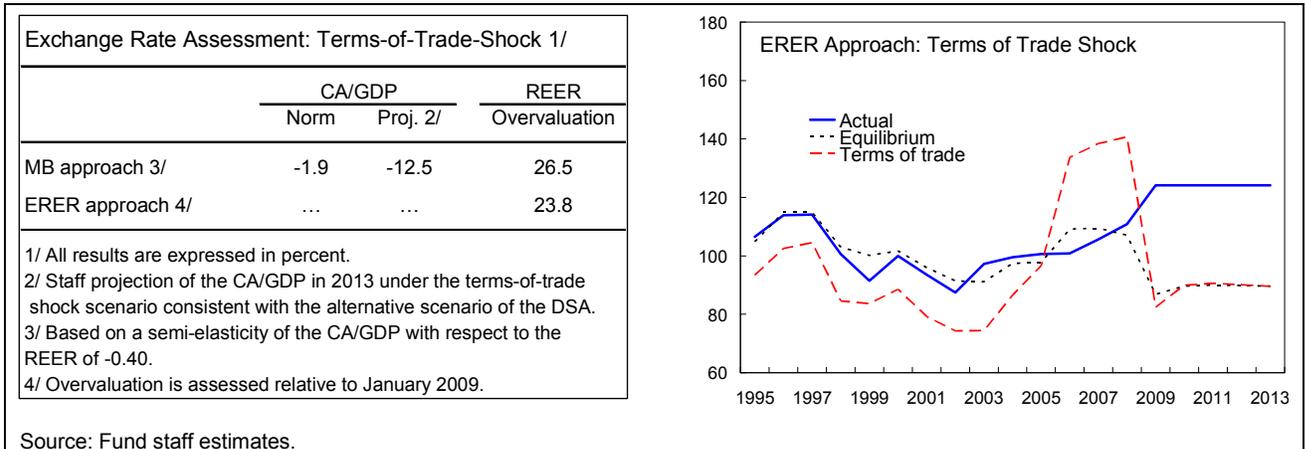
<sup>7</sup> The IMF projects constant real effective exchange rate. Thus, the expected REER in 2013 is equal to its current value (i.e., January 2009, in this exercise, being the latest available monthly REER data).

18. The decomposition of the point estimates into time varying contributions of the explanatory variables points to demographic factors and high trade oil surpluses as the main determinants of the equilibrium current account under the MB approach whereas the change in the terms of trade and government consumption are the key factors in determining the equilibrium exchange rate.



**Scenario with weaker terms of trade**

19. We now consider an alternative scenario, by assuming a 20 percent decline in commodity prices over the medium term. The estimates based on the MB and ERER approach indicate a much larger overvaluation. In particular, the MB approach suggests an overvaluation of about 26 percent, while the ERER approach suggests an overvaluation of 24 percent.



### **Caveats and possible extensions**

20. **These results should be interpreted with caution.** Given the amount of uncertainty surrounding the medium-term projections as well as the wide range of the estimates across models, this analysis should be viewed as a diagnostic tool rather than as a precise yardstick to assess the appropriate level of the exchange rate.

21. **The models may need to be modified to better fit Papua New Guinea's economic characteristics.** The standard model specifications are not tailored for exhaustible-resource-rich countries, nor for low-income countries, such as Papua New Guinea. Some modifications may include: the use of non-mineral fiscal balance as the relevant fiscal variable, in order to separate the effects of mineral revenues and nonmineral fiscal balance on the current account; and some measure of mineral wealth. These two measures may have a large impact on the determination of the current account and on the equilibrium exchange rate. Because the exported natural resources are nonrenewable, intertemporal saving decisions are particularly important as the income derived from nonrenewable resources is expected to fall in the future. Given the expected decline in income, consumption smoothing suggests that the current account may need to register larger surpluses for an extended period in order to finance the accumulation of net foreign assets needed for future consumption.

### **E. Policy Implications and Conclusions**

22. **The exchange rate assessment suggests that the kina is somewhat above its equilibrium value.** The results suggest that, given the sharp decline in commodity prices, the currency should be allowed to adjust to help offset the impact on export incomes. Papua New Guinea may need to increase the flexibility of the exchange rate regime while ensuring the maintenance of a credible anchor for monetary policy. This policy would also help to safeguard official foreign currency reserves. Greater exchange rate flexibility should also help cushion the impact of falling external demand.

23. **This analysis confirms the importance of the terms of trade in determining the equilibrium exchange rate as well as in explaining the main determinants of the current account.** However, high volatility in commodity prices amplifies the uncertainty surrounding the exchange rate assessment.

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## Appendix. Data set and Model Specifications

### Country coverage

Algeria, Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Croatia, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong SAR, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Norway, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Portugal, Russia, Saudi Arabia, Singapore, Slovak Republic, South Africa, Spain, Sweden, Switzerland, Taiwan POC, Thailand, Tunisia, Turkey, United States, United Kingdom, Venezuela.

*Sub-group of oil-exporting countries includes:* Algeria, Egypt, Indonesia, Malaysia, Papua New Guinea, Russia, Saudi Arabia, and Venezuela.

### Data Sources

*IMF World Economic Outlook Database:* Current account balance, fiscal balance, real GDP at purchasing power parity, oil trade balance, real per capital GDP growth; and population growth.

*World Bank World Development Indicators Database:* Population over 65 years, and economically active population, i.e., population between 15 and 64 years old.

### Macroeconomic Balance Approach<sup>8</sup>

The basic building blocks of the macro-balance approach are:

- first, to estimate an equilibrium relationship between the current account balance and a set of macroeconomic fundamentals;
- second, to use the coefficients and the medium-term values of the fundamentals (i.e., the WEO projections for 2013) to compute an estimated *equilibrium* current account balance (i.e., norm);
- and third, to calculate the real exchange rate adjustment needed to close the gap between the estimated current account norm and the underlying current account balance projected over the medium term—a horizon over which domestic and partner-country output gaps are closed and the lagged effects of past exchange rate changes are fully realized—at prevailing exchange rates. The degree of exchange rate misalignment is calculated by

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<sup>8</sup> Peter Isard and Hamid Faruqee, 1998, for the MB approach, and Jaewoo Lee and others, 2008, for a review of CGER methodologies.

dividing the difference between the underlying current account and the estimated current account norm, by country-specific elasticities of the current account with respect to the real exchange rate.<sup>9</sup>

The MB estimated equation derived from a panel regression model is:

$$CA_{i,t} = \beta_{0,i} + \beta^T x_{i,t} + \varepsilon_{i,t},$$

where  $CA_{i,t}$  is the current account as a share of GDP;  $\beta_{0,i}$  represent the country fixed effects;  $x_{i,t}$  denotes the vector of explanatory variables; and  $\varepsilon_{i,t}$  is the error term.

The interpretations of the variables as determinants of the current account are as follows:

- *Fiscal Balance*: A higher government budget balance raises national savings and therefore increases the current account balance.<sup>10</sup>
- *Demographic variables*: a higher old-dependency ratio (i.e., a higher share of inactive old dependent population) and a higher population growth rate (i.e., a higher share of inactive young dependent population) reduce national savings and decrease the current account balance.
- *Oil balance*: Higher oil prices increase the current account balance in oil exporting countries and decrease the current account balance in oil-importing countries.
- *Economic growth*: Economies that are in the early stage of development have a greater need for investment, thus their current account balance tends to be in deficit. As they develop, their current account balance should improve. Among countries at similar stages of development, the stronger economic growth is relative to trading partners, the lower the current account is likely to be. The deviation of the real per capita GDP growth rate from its trading-partner average is the variable used to capture relative economic growth. The current account balance is expected to decline with relative growth.

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<sup>9</sup> In the model used in this chapter, the elasticity of the current account to ERER is endogenously estimated for each country. For Papua New Guinea the elasticity of the current account to ERER is equal to -0.4.

<sup>10</sup> Only in the case of full Ricardian equivalence (i.e., the private saving fully offsets the change in public savings), there would be no link between the government fiscal balance and the current account balance.

### Equilibrium real exchange rate approach

The estimated equation takes the following form:

$$\ln \bar{Q}_{i,t} = \beta_{0,i} + \beta x_{i,t} + \varepsilon_{i,t},$$

where  $\beta_{0,i}$  denotes a country specific fixed effects;  $\ln \bar{Q}_{i,t}$  is the logarithm of the real effective exchange rate;  $x_{i,t}$  denotes the vector of explanatory variables; and  $\varepsilon_{i,t}$  is the error term.

The explanatory variables or medium-term fundamentals include the following:

- The terms of trade (expressed in logarithms). Higher terms of trade should appreciate the real effective exchange rate through real income or wealth effects.
- Real output per worker. This variable is a measure of productivity. Although this measure does not differentiate between productivity in the tradable and nontradable sectors, it is used as a proxy to capture Balassa-Samuelson effects given the strong correlation between the GDP per worker and relative productivity in tradables and nontradables production. An increase in productivity should appreciate the real effective exchange rate.
- Government consumption relative to GDP and relative to trading partners. This variable is also used as a proxy to capture Balassa-Samuelson effects. Higher government consumption is likely to appreciate the real exchange rate to the extent that such consumption falls more on nontradables than tradables, thereby raising the relative price of the former.
- Net foreign assets (NFA) to GDP. Standard intertemporal macroeconomic models predict that debtor countries will need a more depreciated real exchange rate to generate the trade surpluses necessary to service their liabilities.

Table 1. Papua New Guinea: GDP by Sector at Current Market Prices, 2003–07

	2003	2004	2005	2006	2007 Prel.
(In millions of kina)					
Nominal GDP 1/	12,567	12,652	15,195	17,132	18,716
Mineral	2,252	2,391	3,555	4,685	4,897
Non-mineral	10,316	10,261	11,640	12,448	13,819
Of which: Non-agricultural	5,496	5,710	6,024	6,542	7,334
Agriculture, forestry and fishing	4,819	4,551	5,616	5,905	6,485
Mining, quarrying, and petroleum	2,252	2,391	3,555	4,685	4,897
Manufacturing	821	848	943	1,000	1,091
Electricity, gas and water	229	264	284	302	323
Construction	1,129	1,177	1,246	1,437	1,751
Wholesale and retail trade	850	891	945	1,021	1,157
Transport, storage and communication	294	305	317	326	364
Financing, insurance, real estate and business services	423	415	449	502	553
Less: Imputed bank service charge	235	237	237	237	240
Community, social and personal services	1,403	1,395	1,427	1,521	1,630
Import duties	585	656	654	673	707
Less: Subsidies	3	3	3	3	3
(In percent of GDP)					
Memorandum items:					
Nominal GDP	100.0	100.0	100.0	100.0	100.0
Mineral	17.9	18.9	23.4	27.3	26.2
Non-mineral	82.1	81.1	76.6	72.7	73.8
Of which: Non-agricultural	43.7	45.1	39.6	38.2	39.2
Agriculture, forestry and fishing	38.3	36.0	37.0	34.5	34.7
Mining, quarrying, and petroleum	17.9	18.9	23.4	27.3	26.2
Manufacturing	6.5	6.7	6.2	5.8	5.8
Electricity, gas and water	1.8	2.1	1.9	1.8	1.7
Construction	9.0	9.3	8.2	8.4	9.4
Wholesale and retail trade	6.8	7.0	6.2	6.0	6.2
Transport, storage and communication	2.3	2.4	2.1	1.9	1.9
Financing, insurance, real estate and business services	3.4	3.3	3.0	2.9	3.0
Less: Imputed bank service charge	1.9	1.9	1.6	1.4	1.3
Community, social and personal services	11.2	11.0	9.4	8.9	8.7
Import duties	4.7	5.2	4.3	3.9	3.8
Less: Subsidies	0.0	0.0	0.0	0.0	0.0

Sources: Data provided by the National Statistical Office through 2004; Treasury Department estimates for 2005 through 2007.

1/ Sum of industries less imputed bank service charge, plus import duties less subsidies.

Table 2. Papua New Guinea: GDP by Sector at 1998 Constant Prices, 2003–07

	2003	2004	2005	2006	2007 Prel.
	(In millions of 1998 kina)				
Real GDP 1/	7,896	8,111	8,402	8,619	9,180
Mineral	969	972	1,020	959	961
Non-mineral	6,927	7,139	7,382	7,660	8,220
Of which: Non-agricultural	3,999	4,077	4,246	4,500	4,940
Agriculture, forestry and fishing	2,927	3,062	3,136	3,160	3,280
Mining, quarrying, and petroleum	969	972	1,020	959	961
Manufacturing	587	600	660	694	735
Electricity, gas and water	121	126	130	134	139
Construction	849	876	918	1,028	1,192
Wholesale and retail trade	539	556	579	613	675
Transport, storage and communication	210	215	222	233	329
Financing, insurance, real estate and business services	313	303	318	345	362
Less: Imputed bank service charge	175	174	174	174	176
Community, social and personal services	1,133	1,106	1,124	1,152	1,199
Import duties	425	471	472	478	487
Less: Subsidies	2	2	2	2	2
	(Annual percentage change)				
Memorandum items:					
Real GDP	2.2	2.7	3.6	2.6	6.5
Mineral	2.8	0.3	5.0	-5.9	0.2
Non-mineral	2.1	3.1	3.4	3.8	7.3
Of which: Non-agricultural	0.1	1.9	4.2	6.0	9.8
Agriculture, forestry and fishing	5.0	4.6	2.4	0.8	3.8
Mining, quarrying, and petroleum	2.8	0.3	5.0	-5.9	0.2
Manufacturing	4.8	2.3	10.0	5.0	6.0
Electricity, gas and water	13.4	4.3	2.7	3.0	4.0
Construction	5.4	3.2	4.8	12.0	16.0
Wholesale and retail trade	2.6	3.2	4.0	6.0	10.0
Transport, storage and communication	2.1	2.6	3.0	5.0	41.3
Financing, insurance, real estate and business services	-3.4	-3.4	5.0	8.5	5.0
Less: Imputed bank service charge	17.7	-0.7	0.0	0.0	1.0
Community, social and personal services	-3.5	-2.4	1.7	2.5	4.0
Import duties	-5.2	10.9	0.3	1.2	2.0
Less: Subsidies	-4.5	0.0	0.0	0.0	0.0

Sources: Data provided by the National Statistical Office through 2004; Treasury Department estimates for 2005 through 2007.

1/ Sum of industries less imputed bank service charge, plus import duties less subsidies.

Table 3. Papua New Guinea: Production of Major Commodities, 2004–08

	2004	2005	2006	2007	2008 Sept.
<b>Production volumes</b>					
Crude oil (millions of barrels)	12.6	13.3	14.5	13.8	8.6
Copper (thousands of tonnes)	173.9	226.1	216.7	199.4	142.6
Gold (tonnes)	67.3	70.5	56.7	57.5	44.0
Cocoa (thousands of tonnes)	41.5	44.2	44.0	47.8	27.8
Coffee (thousands of tonnes)	63.0	72.1	52.3	54.6	50.3
Tea (thousands of tonnes)	8.1	6.9	6.6	6.4	4.8
Copra (thousands of tonnes)	19.2	22.3	12.7	12.6	21.7
Copra oil (thousands of tonnes)	45.1	54.4	41.5	51.3	45.9
Palm oil (thousands of tonnes)	339.0	345.6	362.3	368.3	325.7
Rubber (thousands of tonnes)	3.8	4.8	4.4	4.1	3.7
Logs (millions of cubic meters)	2.0	2.3	2.7	2.8	2.0
(In millions of U.S. dollars)					
<b>Production values</b>					
Crude oil	513	735	967	1,018	1,002
Copper	479	806	1,414	1,424	1,110
Gold	862	914	998	1,254	1,258
Cocoa	68	64	66	88	69
Coffee	88	152	145	190	149
Tea	7	7	7	6	5
Copra	5	6	3	4	11
Copra oil	25	30	23	28	59
Palm oil	136	126	150	263	284
Rubber	4	6	8	8	9
Logs	110	131	180	215	134

Sources: Data provided by the Papua New Guinea authorities.

Table 4. Papua New Guinea: Employment by Sector, 2004–08

	2004	2005	2006	2007	2008 Sept.
(March 2002=100, annual average)					
Total	109.2	111.0	119.1	131.2	143.5
Retail	93.1	93.7	97.8	115.1	122.6
Wholesale	123.8	130.7	145.7	158.0	163.9
Manufacturing	117.7	127.5	132.7	142.4	162.3
Building and construction	107.9	98.4	119.2	135.4	169.7
Transportation	106.8	106.1	108.2	115.2	130.2
Agriculture, forestry, and fisheries	112.9	112.9	123.3	139.1	147.3
Financial and business services	104.7	105.7	112.5	114.4	123.1
Mineral 1/	95.6	101.5	111.1	128.5	136.9
(Change from corresponding period of previous year, in percent)					
Total	0.6	1.6	7.3	10.2	4.6
Retail	-3.9	0.6	4.4	17.7	5.7
Wholesale	9.3	5.6	11.5	8.4	13.7
Manufacturing	6.1	8.3	4.1	7.3	25.6
Building and construction	-13.1	-8.8	21.1	13.6	12.7
Transportation	0.7	-0.7	2.0	6.5	6.8
Agriculture, forestry, and fisheries	-1.1	0.0	9.2	12.8	7.3
Financial and business services	3.9	1.0	6.4	1.7	9.3
Mineral 1/	-2.0	6.2	9.5	15.7	0.3

Source: Bank of Papua New Guinea, Quarterly Economic Bulletin.

1/ Not included in overall index; excludes subcontractors; includes both mining and petroleum.

Table 5. Papua New Guinea: Consumer Price Index by Expenditure Group, 2004–08

	All Groups Total	Drinks, Tobacco, Food and Betelnut	Clothing and Footwear	Rents, Fuel, and Power	Household Equip. and Operations	Trans. and Comm.	Misc.	
(1977 = 100)								
2004								
March	778.0	753.9	946.9	486.1	287.1	600.3	1,246.9	529.4
June	781.0	767.4	926.1	494.0	291.2	607.0	1,225.1	533.5
September	779.3	763.1	906.3	492.6	304.9	608.3	1,250.0	536.0
December	788.1	747.7	981.5	488.9	320.6	602.0	1,246.7	533.6
2005								
March	778.7	764.6	970.4	479.1	312.3	579.1	1,143.5	552.8
June	787.6	778.2	948.1	483.8	339.5	612.6	1,177.6	545.9
September	791.9	788.9	955.1	480.0	325.2	594.3	1,178.9	546.7
December	825.3	804.8	1,091.0	479.1	337.4	579.8	1,176.5	545.1
2006								
March	800.8	791.1	988.0	485.8	350.7	558.3	1,187.8	546.4
June	807.0	815.1	957.8	492.3	355.4	571.1	1,193.7	550.2
September	833.6	861.1	999.4	478.3	371.5	576.0	1,190.6	541.0
December	817.5	836.7	931.9	466.8	369.4	567.6	1,248.3	558.8
2007								
March	809.3	812.0	932.7	504.1	363.7	526.4	1,247.0	587.6
June	815.1	824.2	918.9	509.1	366.0	527.6	1,259.9	606.9
September	820.2	834.0	913.2	519.3	373.3	539.6	1,260.9	610.7
December	844.0	854.9	968.1	524.0	393.6	546.8	1,275.6	613.7
2008								
March	870.3	894.2	996.0	534.4	413.7	552.2	1,291.9	615.5
June	902.4	949.7	1,017.8	510.4	444.0	561.0	1,321.3	616.5
September	930.9	1,007.1	1,038.4	521.0	462.3	572.5	1,308.0	616.7
Memorandum item:								
Weights (percent)	100.0	40.9	20.0	6.2	7.2	5.3	13.0	7.5

Sources: National Statistical Office; and Bank of Papua New Guinea, Quarterly Economic Bulletin.

Table 6. Papua New Guinea: Central Government Budget 2004–07

(In percent of GDP)

	2004	2005	2006	2007
Revenue and grants	34.1	34.9	36.7	37.3
Tax	25.4	24.6	28.9	31.3
Mineral taxes	5.8	7.6	11.7	12.8
Non-mineral taxes	19.6	17.1	17.2	18.5
Nontax	1.9	1.8	2.5	2.2
<i>Of which:</i> Mineral nontax revenue	0.5	0.9	1.6	1.2
Grants	6.7	8.4	5.3	3.9
Project Grants	6.7	8.4	5.3	3.9
Expenditure	32.4	31.2	30.0	29.2
Recurrent	22.4	20.1	17.6	19.3
Noninterest recurrent expenditures	19.5	17.9	15.8	17.3
National departments	12.5	12.1	9.7	11.8
Salaries and wages	5.4	4.5	4.1	4.5
Arrears payments	0.3	0.6	0.6	0.4
Education funding	0.3	0.3	0.2	0.8
Goods and services	5.9	5.9	4.6	6.1
Structural adjustment payments	0.5	0.7	0.2	0.0
Provinces	5.4	4.5	4.7	4.2
Salaries and wages	4.7	3.6	3.9	3.3
Goods and services	0.5	0.4	0.4	0.3
Conditional Grants	0.2	0.5	0.5	0.6
Statutory authorities	1.6	1.4	1.4	1.3
Interest	2.9	2.2	1.8	2.0
Domestic	1.9	1.4	1.1	1.3
Foreign	1.0	0.8	0.7	0.6
Development budget and net lending	10.1	11.2	12.4	9.9
Development budget	10.1	11.2	12.4	9.9
Project grants	6.7	8.4	5.3	3.9
Project concessional Loans	0.6	0.9	0.8	0.5
Nonconcessional loans	0.2	0.0	0.0	0.0
Domestic Funds	2.6	1.8	6.2	5.5
o/w "Additional Priority Expenditures"	0.0	0.0	3.4	2.9
Net Lending	-0.1	0.0	0.0	0.0
Overall balance (from above the line)	1.7	3.7	6.7	8.2
Errors, omissions, and discrepancy	-1.7	0.1	-1.1	-1.0
Overall balance (from below the line)	0.0	3.8	5.6	7.2
Financing	0.0	-3.8	-5.6	-7.2
Foreign financing (net)	-1.8	-1.1	-1.3	-2.1
Domestic financing	0.6	-2.7	-4.3	-4.4
Memorandum items:				
Nominal GDP (in millions of kina)	12,652	15,195	17,132	18,716
Nonmineral fiscal balance	-6.3	-4.7	-7.6	-6.8

Sources: Data provided by the Papua New Guinea authorities; and Fund staff estimates.

Table 7. Papua New Guinea: Central Government Revenue and Grants 2004–07

(In millions of kina)

	2004	2005	2006	2007
Total revenue and grants	4,315	5,307	6,288	6,986
Tax revenue	3,220	3,744	4,945	5,854
Taxes on income and profit	2,223	2,771	3,824	4,491
Personal tax	827	841	907	1,007
Company tax	437	517	551	724
Dividend withholding tax	123	155	201	199
Mineral and petroleum taxes	634	1,077	1,947	2,334
Other direct	79	72	92	111
Interest withholding tax	33	18	22	19
Gaming tax	91	92	104	97
Indirect taxes	997	973	1,121	1,363
Excise tax	203	256	324	342
VAT plus mining levy	417	399	457	614
VAT	316	326	401	558
Mining levy	101	73	56	57
Other indirect	1	2	3	2
Taxes on international trade	376	316	337	404
Import duties	151	101	90	136
Export duties (logs)	102	136	163	155
Import excises	123	79	84	113
Import levy	0	0	0	0
Nontax revenue	245	279	429	411
Property income	165	188	339	291
Dividends	105	50	68	65
Mining and petroleum	60	138	271	226
Interest and fees	3	1	1	1
Other	78	91	89	120
Asset sales costs	0	0	0	0
Infrastructure tax credit	35	20	23	21
Foreign grants	850	1,283	915	721

Sources: Data provided by the Papua New Guinea authorities; and Fund staff estimates.

Table 8. Papua New Guinea: Central Government Domestic Debt, 2004–08

(In millions of kina; end of period)

	2004	2005	2006	2007	2008
Central government domestic debt: by creditor					
Bank of Papua New Guinea					
Net credit to central government	-26	-538	-659	-1,134	-1,742
Securities	76	106	143	203	195
Treasury bills 1/	0	0	0	0	195
Inscribed stock 2/	76	106	143	203	0
Temporary advance	3	2	1	0	0
Less: Deposits	105	646	803	1,337	1,937
Other Depository Corporations					
Net credit to central government	1,320	1,652	1,625	1,305	156
Securities	1,593	2,013	2,241	2,324	1,556
Treasury bills 1/	1,157	1,118	1,012	907	1,556
Inscribed stock 2/	436	895	1,229	1,417	0
Loans	1	1	11	0	2
Less: Deposits	275	361	627	1,019	1,402
Nonbanks					
Net credit to central government	1,511	1,275	684	658	3,997
Securities	1,465	1,246	654	628	3,967
Treasury bills 2/	1,079	679	139	74	1,635
Inscribed stock 2/	386	567	515	555	2,333
Loans	46	30	30	30	30
Central government net domestic debt: total	2,804	2,390	1,649	829	2,412
Total gross domestic debt					
Securities	3,134	3,364	3,038	3,155	5,719
Total treasury bills	2,236	1,797	1,151	980	3,386
Total inscribed stock 2/	898	1,568	1,887	2,175	2,333
Loans	49	33	42	30	32
Less: Central government deposits	380	1,008	1,430	2,355	3,339

Sources: Data provided by the Bank of Papua New Guinea; and Department of Treasury.

1/ Discount value.

2/ Face value.

Table 9. Papua New Guinea: Monetary Survey, 2004–08

(In millions of kina; end of period)

	2004	2005	2006	2007	2008
Net foreign assets	2,165	2,929	4,648	7,073	6,204
Bank of Papua New Guinea	1,869	2,367	4,319	5,908	5,317
Foreign assets	2,072	2,368	4,326	5,919	5,322
Less: Foreign liabilities	203	1	6	11	4
Other Depository Corporations	296	562	329	1,165	887
Net domestic assets	1,750	2,141	2,392	1,922	3,813
Domestic credit	3,066	3,329	3,975	4,194	4,065
Net credit to central government	1,293	1,114	966	171	-1,585
Bank of Papua New Guinea	-26	-538	-659	-1,134	-1,742
Claims on central government	79	108	144	203	196
Less: Central government deposits	105	646	803	1,337	1,937
Other Depository Corporations	1,320	1,652	1,625	1,305	156
Claims on central government	1,594	2,014	2,252	2,324	1,558
Securities	1,593	2,013	2,241	2,324	1,556
Loans	1	1	11	0	2
Less: Central government deposits	275	361	627	1,019	1,402
Claims on other sectors	1,773	2,215	3,009	4,023	5,651
Claims on the private sector	1,724	2,133	2,947	3,961	5,584
Claims on official entities	48	81	60	61	66
Claims on nonmonetary financial institutions	1	1	1	1	0
Other items, net	-1,316	-1,188	-1,582	-2,272	-253
Broad money	3,915	5,069	7,041	8,995	10,017
Narrow money	2,232	3,017	3,792	4,923	5,520
Currency outside banks	400	445	520	608	605
Demand deposits	1,832	2,572	3,272	4,316	4,916
Quasi money	1,683	2,052	3,249	4,072	4,496
Memorandum items:					
Narrow money growth rate 1/	30.8	35.2	25.7	29.8	12.1
Broad money growth rate 1/	14.8	29.5	38.9	27.8	11.4
Private sector credit growth rate 1/	0.9	23.7	38.2	34.4	41.0
Nominal non-mineral GDP/broad money	2.6	2.3	1.8	1.5	1.6

Sources: Data provided by the Papua New Guinea authorities; and Fund staff estimates.

1/ Year-on-year percentage change.

Table 10. Papua New Guinea: Balance Sheet of the Central Bank, 2004–08

(In millions of kina; end of period)

	2004	2005	2006	2007	2008
Net foreign assets	1,869	2,367	4,319	5,908	5,317
Foreign assets	2,072	2,368	4,326	5,919	5,322
Less: Foreign liabilities	203	1	6	11	4
<i>Of which: Non-IMF liabilities</i>	1	1	6	11	4
Net domestic assets	-998	-1,432	-3,181	-4,067	-3,697
Domestic credit	7	-502	-601	-1,103	-1,711
Net credit to government	-26	-538	-659	-1,134	-1,742
Securities	76	106	143	203	195
Treasury bills	0	0	0	0	195
Inscribed stock	76	106	143	203	0
Advances	3	2	1	0	0
Less: Central government deposits	105	646	803	1,337	1,937
Credit to other sectors	34	36	58	32	31
Claims on the private sector	9	11	32	7	7
Claims on deposit money banks	24	24	26	24	24
Claims on nonmonetary financial institutions	1	1	1	1	0
Other items net	-1,006	-929	-2,580	-2,964	-1,986
Reserve money	871	935	1,138	1,842	1,621
Currency in circulation	531	606	693	823	851
Deposits of other depository corporations	332	322	442	1,016	767
ESA deposits	231	184	246	754	464
CRR deposits	101	138	196	262	303
Other deposits	8	8	3	3	3
Memorandum items:					
Reserve money growth 1/	30.2	7.4	21.7	61.8	-12.0
Use of fund credit (millions of U.S. dollars)	64.3	0.0	0.0	0.0	0.0
Gross international reserves (millions of U.S. dollars)	663.1	764.9	1,427.5	2,086.6	2,092.6

Sources: Data provided by Papua New Guinea authorities; and Fund staff estimates.

1/ Year-on-year percentage change.

Table 11. Papua New Guinea: Consolidated Balance Sheet of Other Depository Corporations, 2004–08

(In millions of kina; end of period)

	2004	2005	2006	2007	2008
Net foreign assets	296	562	329	1,165	887
Foreign assets	364	658	430	1,301	1,003
Foreign liabilities	69	96	101	136	116
Reserves	332	322	442	1,016	767
CRR accounts	101	138	196	262	303
ESA accounts	231	184	246	754	464
Currency	131	160	173	215	246
Domestic credit	3,788	4,655	7,038	8,727	9,033
Net credit to central government	1,320	1,652	1,625	1,305	156
Claims on central government	1,594	2,014	2,252	2,324	1,558
Securities	1,593	2,013	2,241	2,324	1,556
Treasury bills	1,157	1,118	1,012	907	1,556
Inscribed stock	436	895	1,229	1,417	0
Inscribed stock of maturity < 3 years	278	572	785	905	0
Inscribed stock of maturity > 3 years	157	323	444	512	0
Loans	1	1	11	0	2
Less: Central government deposits	275	361	627	1,019	1,402
Claims on other sectors	2,469	3,003	5,413	7,422	8,876
Claims on BPNG	706	800	2,437	3,406	3,233
Claims on the private sector	1,715	2,122	2,916	3,954	5,577
Claims on official entities	48	81	60	61	66
Claims on NFPE's	44	79	57	60	63
Claims on provincial governments	4	2	3	1	4
Claims on nonmonetary financial institutions	0	0	0	0	0
Other items, net	-1,019	-1,062	-1,443	-2,718	-1,504
Deposits	3,505	4,614	6,516	8,382	9,405
Demand	1,781	2,513	3,224	4,176	4,776
Term	1,724	2,101	3,292	4,205	4,629
Central bank credit	24	23	24	24	24
Memoranda items:					
Deposits subject to reserve requirements	3,720	4,917	7,115	9,335	10,740
Implied cash reserve ratio (percent)	3	3	3	3	3
Kina facility borrowings (-deposits)	0	0	0	0	0
Liquid assets	1,798	2,034	2,216	2,781	2,266
Excess ESA balances	231	184	246	754	464
Total ODC assets	4,960	6,351	8,872	11,821	14,016
Claims on central government/total assets (percent)	32	32	25	20	11

Sources: Data provided by Papua New Guinea authorities; and Fund staff estimates.

Table 12. Papua New Guinea: Commercial Bank Loans by Sector, 2004–08

	2004	2005	2006	2007	2008 Sept.	2004	2005	2006	2007	2008 Sept.
	(In millions of kina; end of period)					(In percent of total credit; end-period)				
Total	1,421	1,797	2,515	3,253	4,217	100.0	100.0	100.0	100.0	100.0
Business	1,223	1,548	2,185	2,661	3,633	86.1	86.2	86.9	81.8	86.2
Agriculture, forestry, and fishing	64	74	141	121	189	4.5	4.1	5.6	3.7	4.5
Coffee	1	2	6	3	7	0.1	0.1	0.3	0.1	0.2
Cocoa	24	10	10	5	3	1.7	0.5	0.4	0.2	0.1
Coconut products	1	0	0	0	3	0.0	0.0	0.0	0.0	0.1
Palm oil	0	2	2	24	0	0.0	0.1	0.1	0.7	0.0
Fisheries	19	22	23	3	4	1.4	1.2	0.9	0.1	0.1
Forestry	8	18	37	27	26	0.5	1.0	1.5	0.8	0.6
Other 1/	12	21	63	59	147	0.8	1.1	2.5	1.8	3.5
Manufacturing	95	114	124	275	349	6.7	6.4	4.9	8.5	8.3
Engineering and metal processing	3	25	28	24	23	0.2	1.4	1.1	0.7	0.6
Food, drink, and tobacco processing	45	45	53	171	220	3.2	2.5	2.1	5.3	5.2
Textile, leather, and wood products	10	5	10	15	32	0.7	0.3	0.4	0.5	0.8
Chemicals, paints, and gases	0	4	12	9	9	0.0	0.2	0.5	0.3	0.2
Other 2/	36	36	21	57	64	2.5	2.0	0.8	1.7	1.5
Transport and communication	72	123	202	251	395	5.1	6.8	8.0	7.7	9.4
Finance	25	28	60	17	31	1.7	1.6	2.4	0.5	0.7
Commerce	384	438	479	770	986	27.0	24.4	19.0	23.7	23.4
Retail trade	214	280	134	498	657	15.1	15.6	5.3	15.3	15.6
Buyers, processors, and exporters	94	113	42	133	140	6.6	6.3	1.7	4.1	3.3
Wholesale trade	76	45	303	139	189	5.3	2.5	12.1	4.3	4.5
Building and construction	66	106	125	207	264	4.7	5.9	5.0	6.4	6.3
Mining and quarrying	6	14	144	50	101	0.4	0.8	5.7	1.5	2.4
Metals and other mining	6	14	141	49	100	0.4	0.8	5.6	1.5	2.4
Petroleum and natural gas	0	0	4	1	1	0.0	0.0	0.1	0.0	0.0
Other business 3/	511	652	911	972	1,318	36.0	36.3	36.2	29.9	31.3
Government	5	3	15	8	8	0.3	0.2	0.6	0.2	0.2
Central government 4/	1	1	11	0	4	0.1	0.1	0.5	0.0	0.1
Provincial government	2	1	3	3	3	0.1	0.1	0.1	0.1	0.1
Local government	2	1	1	5	0	0.1	0.1	0.0	0.2	0.0
Persons	193	246	315	583	576	13.6	13.7	12.5	17.9	13.7
Advances for housing	121	145	176	199	299	8.5	8.1	7.0	6.1	7.1
Other personal loans	73	101	140	385	276	5.1	5.6	5.5	11.8	6.6

Source: Bank of Papua New Guinea, Quarterly Economic Bulletin.

1/ Includes rubber, tea, and cattle.

2/ Includes printing and packaging.

3/ Includes hotels and restaurants, real estate, renting and business services, electricity, and gas and water supply.

4/ Excludes short-term government debt instruments and other deposits.

Table 13. Papua New Guinea: Reserve Requirements, March 1997–December 2008

(In percent)

Period	Cash reserve requirement	Minimum liquid assets ratio	Total requirement
March 1997–July 1998	0	20	20
August 1998–November 1998	0	20	20
December 1998–January 12, 1999	0	0	0
January 15, 1999–February 1999	10	0	10
March 1999–May 1999	5	15	20
June 1999–August 1999 1/	5	20	25
September 1999–December 2002	5	25	30
October 2003–September 2007	3	25	28
October 2007–December 2008	3	25	28

Source: Bank of Papua New Guinea.

1/ From June 1999, CRR deposits at the central bank were excluded from the definition of liquid assets.

Table 14. Papua New Guinea: Interest Rates, 2004–08 1/

Kina Facility Rate	Weighted Average Auction Yield										Commercial Banks						
	Central Bank Bills			Treasury Bills				Weighted Average Deposit Rate	Weighted Average Lending Rate	Indicative Overdraft Rate	Passbook Accounts	Term Deposits (less than K50,000)					
	28-day	63-day	91-day	28-day	63-day	91-day	182-day					365-day	3-6 Months	6-12 Months	12-24 Months		
	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	
2004 (December)	7.00	-	-	-	3.14	3.44	3.70	4.57	-	1.1	12.1	8.00	1.75-2.00	0.65-8.00	0.65-4.85	1.00-9.00	
2005																	
January	7.00	-	-	-	3.20	3.14	4.11	4.56	-	0.9	12.0	8.00	1.75-2.00	0.65-4.85	0.65-4.85	1.00-8.00	
February	7.00	-	-	-	3.14	3.32	4.13	4.73	-	0.9	12.2	8.00	1.50-2.25	0.65-4.85	0.65-4.85	1.00-9.00	
March	7.00	-	-	-	3.54	-	4.09	4.37	-	0.9	11.9	8.00	1.50-2.26	0.65-4.85	0.65-4.85	1.00-9.00	
April	7.00	-	-	-	4.11	-	4.24	4.66	-	0.9	11.6	8.00	1.25-2.00	0.65-4.00	0.65-4.85	0.65-9.00	
May	7.00	-	-	-	3.75	-	4.28	4.50	-	0.9	11.6	8.00	1.25-2.00	0.65-4.00	0.65-4.00	0.65-9.00	
June	7.00	-	-	-	4.06	-	3.95	4.47	7.13	1.0	11.8	8.00	1.00-2.00	0.65-4.00	0.65-4.00	0.65-9.00	
July	7.00	-	-	-	3.97	-	4.24	4.53	7.30	0.9	11.4	8.00	1.00-2.00	0.65-4.00	0.65-4.00	1.00-1.25	
August	7.00	-	-	-	2.84	-	2.77	3.05	5.55	0.9	11.4	8.00	1.00-2.00	0.65-4.00	0.65-5.25	1.00-2.50	
September	6.00	3.71	-	-	-	-	0.84	1.14	2.25	0.8	11.1	8.00	1.00-2.00	0.35-4.00	0.50-2.82	0.75-2.50	
October	6.00	3.31	-	-	-	-	0.95	2.00	3.88	0.7	10.9	8.00	1.00-2.00	0.25-4.00	0.35-2.50	0.50-2.85	
November	6.00	3.07	-	-	-	-	1.48	2.78	3.65	0.7	11.0	7.20	1.00-2.00	0.35-5.25	0.50-2.50	0.50-1.25	
December	6.00	2.99	-	-	-	-	3.84	4.91	5.69	0.8	10.7	7.20	1.50-2.00	0.35-2.85	0.50-1.55	0.75-1.25	
2006																	
January	6.00	2.99	-	-	-	-	2.64	4.29	5.45	0.8	10.5	7.20	1.50-2.00	0.25-2.85	0.35-1.25	0.50-1.25	
February	6.00	2.99	-	-	-	-	2.00	3.85	4.82	0.8	11.0	7.20	1.50-2.00	0.25-2.85	0.35-1.25	0.50-1.25	
March	6.00	2.94	-	-	-	-	1.99	3.13	4.55	0.8	11.3	7.20	1.50-2.00	0.25-1.25	0.35-1.35	0.50-1.25	
April	6.00	3.28	-	-	-	-	2.97	2.86	3.00	0.8	11.0	7.20	1.50-2.00	0.25-1.25	0.35-1.25	0.75-1.25	
May	6.00	3.46	3.78	-	-	-	-	-	-	0.9	10.4	7.20	1.50-2.00	0.35-1.25	0.25-2.00	0.75-1.25	
June	6.00	3.49	3.77	-	-	-	-	-	-	1.0	10.5	7.20	1.50-2.00	0.20-0.65	0.25-2.00	0.75-1.25	
July	6.00	3.90	-	-	-	-	-	-	-	1.0	10.5	7.20	1.50-2.00	0.20-0.75	0.25-2.00	0.75-1.25	
August	6.00	4.00	3.97	-	-	-	-	-	-	1.1	10.5	6.70	1.50-2.00	0.35-0.75	0.25-2.00	0.75-1.25	
September	6.00	3.87	3.97	-	-	-	-	-	-	1.1	10.4	6.70	1.50-2.00	0.25-0.65	0.35-2.00	0.75-1.25	
October	6.00	3.95	3.66	-	-	-	-	4.00	-	1.2	10.3	6.70	1.50-2.00	0.25-2.00	0.35-1.55	0.75-1.75	
November	6.00	3.86	3.77	-	-	-	-	4.50	5.05	1.3	10.2	6.70	0.50-1.50	0.35-1.25	0.50-1.55	0.75-2.00	
December	6.00	4.02	4.04	-	-	-	-	3.30	4.49	1.0	10.2	6.70	0.50-1.50	0.35-1.25	0.50-1.50	0.75-1.75	
2007																	
January	6.00	4.06	4.01	-	-	-	-	4.00	4.26	1.0	10.2	6.70	0.25-1.50	0.35-1.25	0.50-1.00	0.75-1.25	
February	6.00	4.21	4.44	-	-	-	-	4.06	4.24	0.9	10.2	6.70	0.15-1.50	0.35-1.25	0.15-4.00	0.75-4.00	
March	6.00	4.14	4.29	-	-	-	-	4.49	5.01	1.0	10.3	6.70	0.15-1.50	0.35-0.75	0.50-1.00	0.72-1.25	
April	6.00	4.05	4.00	-	-	-	-	4.13	4.44	1.0	10.1	6.70	0.15-1.50	0.35-0.75	0.50-1.00	0.75-1.25	
May	6.00	4.03	4.23	-	-	-	-	4.18	4.33	0.9	10.0	6.70	0.15-1.50	0.35-0.75	0.50-1.00	0.75-1.25	
June	6.00	4.43	4.49	-	-	-	-	4.00	-	0.9	10.2	6.95	0.15-1.50	0.35-0.75	0.50-1.00	0.75-1.25	
July	6.00	4.59	4.71	-	-	-	-	-	-	1.0	9.9	6.95	0.15-1.50	0.35-0.75	0.50-1.00	0.75-1.25	
August	6.00	4.63	4.55	-	-	-	-	-	-	1.0	9.8	6.95	0.15-1.50	0.35-0.75	0.50-1.00	0.75-1.25	
September	6.00	4.49	4.60	-	-	-	-	-	-	1.0	9.7	6.95	0.15-1.50	0.35-2.25	0.15-2.00	0.35-1.00	
October	6.00	4.58	4.60	-	-	-	-	-	-	1.3	9.1	6.95	0.15-1.50	0.25-0.75	0.25-0.75	0.75-1.00	
November	6.00	4.39	4.53	-	-	-	-	-	-	1.3	9.3	6.95	0.15-1.50	0.25-0.75	0.35-0.75	0.75-1.00	
December	6.00	4.69	4.69	-	-	-	-	5.00	-	1.6	9.3	6.95	0.15-1.50	0.25-0.75	0.50-0.75	0.50-1.00	
2008																	
January	6.00	5.21	5.23	-	-	-	-	-	-	1.3	8.9	6.95	0.15-1.50	0.35-0.75	0.50-0.75	0.50-1.00	
February	6.00	5.30	5.00	-	-	-	-	4.88	-	1.1	9.3	6.95	0.15-1.51	0.35-0.75	0.35-0.75	0.50-1.00	
March	6.00	5.49	5.44	-	-	-	-	5.28	-	1.1	9.3	6.95	0.15-1.50	0.35-0.75	0.35-0.75	0.50-1.00	
April	6.00	5.32	5.12	-	-	-	-	-	-	1.1	9.3	6.95	0.15-1.50	0.35-0.75	0.35-0.75	0.50-1.00	
May	6.00	5.30	5.24	5.24	-	-	-	-	-	1.2	9.3	6.95	0.15-1.50	0.35-0.75	0.25-0.75	0.50-1.00	
June	6.25	5.45	5.49	5.24	-	-	-	-	-	1.2	9.2	6.00	0.15-1.50	0.35-0.75	0.50-0.75	0.50-1.00	
July	6.25	5.43	5.50	5.60	-	-	-	-	-	1.3	9.3	6.00	0.15-1.50	0.35-0.75	0.50-0.75	0.35-1.00	
August	6.50	5.58	5.74	5.82	-	-	-	-	-	1.4	9.2	6.00	0.15-1.50	0.27-0.65	0.35-0.65	0.75-1.00	
September	7.00	6.17	6.29	6.35	-	-	-	-	-	1.4	9.3	6.00	0.15-1.50	0.35-0.75	0.50-0.75	0.75-1.00	
October	7.00	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
November	7.00	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
December	8.00	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	

Source: Bank of Papua New Guinea, Quarterly Economic Bulletin.

1/ • Prior to February 2001, the kina deposit rate was determined by a weekly auction for deposits conducted by the central bank. Since then the Bank of Papua New Guinea has announced a Kina Facility rate, and the deposit rate was set 125 basis points below this rate until July 2000, when the margin was reduced to 75 basis points. The facility was abolished in April 2003.

- The Government started issuing 364 day Treasury bills on 22nd June 2005.
- Beginning 7th September 2005, the Bank started issuing the 28 days Central Bank Bills (CBB).
- The Central Bank began issuing 63 days CBB on 10th May 2006.
- The Central Bank began issuing 91 days CBB on 14th May 2008.

Table 15. Papua New Guinea: Balance of Payments, 2003–07

(In millions of U.S. dollars)

	2003	2004	2005	2006	2007
Current account balance	159	88	205	128	112
Mineral	728	866	1,072	1,401	1,368
Non-mineral	-569	-778	-867	-1,273	-1,255
Trade balance	718	760	816	1,401	1,419
Exports (f.o.b.)	2,153	2,554	3,278	4,207	4,750
Mineral	1,635	1,863	2,467	3,391	3,709
Non-mineral	518	690	811	815	1,042
Imports (c.i.f.)	-1,435	-1,794	-2,462	-2,805	-3,331
Mineral	-325	-409	-664	-722	-990
Non-mineral	-1,109	-1,385	-1,798	-2,083	-2,341
Services	-388	-485	-674	-882	-1,057
Income	-407	-368	-371	-668	-601
Current Transfers	235	182	434	276	350
Official	199	142	393	299	316
Private	36	40	41	-23	34
Capital and financial account balance	-23	59	156	504	497
Direct investment	97	26	68	193	462
Other investment	-120	33	88	311	35
Medium- and long-term loan disbursements	-151	-190	-19	135	-217
Commercial banks	-60	-1	-87	77	-273
Other	90	224	194	99	525
Net errors and omissions	52	82	-46	29	48
Overall balance	187	229	315	661	657
Financing	-187	-206	-161	-661	-657
Reserve assets	-184	-140	-102	-663	-659
Use of IMF credit	-6	-62	-59	0	0
Purchases	0	0	0	0	0
Repurchases	-6	-62	-59	0	0
Other foreign liabilities	3	-4	0	2	2
Memorandum items:					
Current account (in percent of GDP)	4.5	2.2	4.2	2.3	1.8
Mineral	20.6	22.0	21.9	25.0	21.4
Non-mineral	-16.1	-19.8	-17.7	-22.7	-19.7
Net international reserves (end-year)					
In millions of U.S. dollars	399	599	765	1,425	2,083
Gross official reserves (end-year)					
In millions of U.S. dollars	523	663	765	1,427	2,087
In months of non-mineral imports	5.7	5.7	5.1	8.2	10.7
In months of imports of goods and nonfactor services	2.7	2.8	2.4	3.8	4.8
Public external debt-service-exports ratio (in percent)	7.5	11.0	7.7	3.5	4.1
Public external debt-GDP ratio (in percent) 1/	39.0	34.9	25.4	21.1	16.7
Oil Price (average of 3 spot prices; US\$/BBL)	28.9	37.8	53.4	64.3	71.1
Copper Price (grade A, LME spot price, US\$/MT)	1,779.4	2,863.5	3,676.5	6,731.4	7,131.6
Gold Price (London 3 PM fixed price, US\$/troy ounce)	363.5	409.2	444.9	604.3	696.7

Sources: Data provided by the Papua New Guinea authorities; and Fund staff estimates.

1/ Public external debt includes central government, central bank external debt, and statutory authorities.

Table 16. Papua New Guinea: Exports of Major Commodities, 2003–07

	2003	2004	2005	2006	2007
<b>Copper</b>					
Value (in millions of U.S. dollars)	393.0	478.7	805.5	1,413.5	1,424.1
Volume (thousands of tons)	230.6	173.9	226.1	216.7	199.4
Unit value (U.S. dollars per ton)	1,704	2,753	3,563	6,523	6,911
<b>Gold</b>					
Value (in millions of U.S. dollars)	780.0	861.8	913.7	998.2	1,254.1
Volume (tons)	68.4	67.3	70.5	56.7	57.5
Unit value (U.S. dollars per ounce)	355	398	403	548	631
<b>Petroleum</b>					
Value (in millions of U.S. dollars)	452.5	512.6	735.5	967.4	1,017.6
Volume (thousands of barrels)	14,983.4	12,564.7	13,299.8	14,521.1	13,802.8
Unit value (U.S. dollars per barrel)	30	41	55	67	74
<b>Silver</b>					
Value (in millions of U.S. dollars)	9.3	10.1	12.4	12.3	13.1
Volume (tons)	64.2	46.7	52.1	48.0	51.0
Unit value (U.S. dollars per ounce)	5	7	7	8	8
<b>Logs</b>					
Value (in millions of U.S. dollars)	102.6	110.3	130.5	179.9	214.6
Volume (thousands of cu. meters)	2,016.0	2,012.0	2,270.0	2,653.0	2,816.0
Unit value (U.S. dollars per cubic meter)	51	55	58	68	76
<b>Coffee</b>					
Value (in millions of U.S. dollars)	82.8	88.0	151.8	145.0	190.3
Volume (thousands of tons)	68.8	63.0	72.1	52.3	54.6
Unit value (U.S. dollars per ton)	1,204	1,397	2,106	2,773	3,485
<b>Cocoa</b>					
Value (in millions of U.S. dollars)	71.5	67.6	64.1	65.7	87.8
Volume (thousands of tons)	40.3	41.5	44.2	44.0	47.8
Unit value (U.S. dollars per ton)	1,774	1,629	1,449	1,492	1,837
<b>Palm oil</b>					
Value (in millions of U.S. dollars)	116.9	136.0	126.1	149.9	262.8
Volume (thousands of tons)	326.9	339.0	345.6	362.3	368.3
Unit value (U.S. dollars per ton)	358	401	365	414	714
<b>Copra</b>					
Value (in millions of U.S. dollars)	1.8	5.3	5.6	3.0	4.0
Volume (thousands of tons)	8.4	19.2	22.3	12.7	12.6
Unit value (U.S. dollars per ton)	214	278	250	236	320
<b>Copra Oil</b>					
Value (in millions of U.S. dollars)	18.7	25.1	30.2	23.0	28.5
Volume (thousands of tons)	47.7	45.1	54.4	41.5	51.3
Unit value (U.S. dollars per ton)	392	557	555	555	555
<b>Tea</b>					
Value (in millions of U.S. dollars)	5.4	7.1	6.5	7.0	5.9
Volume (thousands of tons)	6.6	8.1	6.9	6.6	6.4
Unit value (U.S. dollars per ton)	818	877	944	1,054	924
<b>Rubber</b>					
Value (in millions of U.S. dollars)	3.4	4.3	5.8	8.0	8.1
Volume (thousands of tons)	4.2	3.8	4.8	4.4	4.1
Unit value (U.S. dollars per ton)	810	1,126	1,209	1,819	1,977
<b>Other</b>					
Value (in millions of U.S. dollars)	115.0	246.6	290.3	233.6	239.5
<b>Total exports (in millions of U.S. dollars)</b>					
Minerals and petroleum	2,153	2,554	3,278	4,207	4,750
Non-mineral	1,635	1,863	2,467	3,391	3,709
	518	690	811	815	1,042

Sources: Data provided by the Papua New Guinea authorities; and Fund staff estimates.

Table 17. Papua New Guinea: Direction of Trade, 2003–07 1/

(In percent of total)

	2003	2004	2005	2006	2007
Exports (f.o.b.) by destination					
Australia	45.7	44.5	42.7	40.5	40.0
Japan	12.8	10.7	11.4	14.3	16.8
Philippines	3.5	4.2	5.5	9.7	7.8
Germany	6.6	8.2	7.2	4.4	8.2
Korea	5.4	6.0	7.4	4.4	2.5
China 2/	6.7	4.8	3.6	3.7	3.3
Great Britain	2.5	3.6	1.8	1.5	1.6
Indonesia	1.7	1.2	0.4	1.2	0.2
United States	2.7	2.2	1.5	1.1	1.6
Italy	1.6	1.0	0.7	0.9	1.3
Spain	0.6	0.7	0.3	0.6	1.8
Singapore	2.1	2.2	1.1	0.6	1.6
Malaysia	0.4	0.9	0.7	0.6	0.4
Other	7.7	9.8	15.8	16.5	12.9
Imports (c.i.f.) by origin					
Australia	54.8	55.3	44.8	34.2	42.3
United States	9.6	8.1	13.8	21.0	19.5
Singapore	6.6	6.0	6.4	19.2	14.6
Japan	4.8	4.4	3.9	5.0	4.2
New Zealand	5.2	3.3	5.0	2.8	2.8
China 2/	4.6	3.2	2.0	2.2	3.0
Malaysia	2.3	1.7	1.7	2.1	2.0
Indonesia	2.0	1.5	1.5	1.2	1.3
Hong Kong SAR	0.9	0.8	1.2	1.1	1.2
Great Britain	1.0	0.7	0.4	0.7	0.4
Germany	0.3	0.1	0.7	0.5	0.2
Taiwan POC	0.2	0.2	0.2	0.3	0.1
Philippines	0.3	0.2	0.5	0.3	0.3
Other	7.6	14.5	18.0	9.5	8.1

Source: Papua New Guinea authorities.

1/ Ranked based on the 2006 data.

2/ Excluding Hong Kong SAR.

Table 18. Papua New Guinea: Net Services and Transfers, 2003–07

(In millions of U.S. dollars)

	2003	2004	2005	2006	2007
Services balance (net)	-388.1	-484.9	-674.1	-881.5	-1056.6
Freight, insurance (receipts)	22.4	29.8	33.5	33.8	34.2
Travel payments	-51.3	-51.7	-75.9	-33.5	-75.0
Mineral	-1.6	-2.8	-4.7	-3.5	-4.0
Non-mineral	-49.7	-48.9	-71.2	-30.0	-71.0
Other	-279.0	-398.1	-480.3	-528.5	-659.7
Receipts	208.0	175.3	199.7	238.5	270.2
Mineral	41.4	45.6	70.0	88.8	116.0
Non-mineral	166.6	129.7	129.7	149.7	154.2
Payments	-487.0	-573.4	-680.0	-767.0	-929.9
Mineral	-276.3	-344.0	-420.0	-462.0	-610.0
Non-mineral	-210.7	-229.4	-260.0	-305.0	-319.9
Other misc. services payments	-80.2	-64.9	-151.4	-353.4	-356.0
Income (net)	-406.7	-368.2	-370.8	-668.4	-600.6
Interest	-52.9	-41.9	-23.0	-115.0	-83.7
Receipts	9.6	16.0	35.4	67.2	86.3
Mineral	1.7	10.2	13.7	35.6	36.7
Non-mineral	0.7	0.8	0.7	1.3	1.4
Official	7.2	5.0	21.0	30.3	48.2
Payments	-62.5	-57.9	-58.4	-182.2	-170.0
Mineral	-12.8	-10.2	-10.1	-133.6	-120.1
Non-mineral	-0.9	-4.0	-9.1	-10.1	-11.1
Official	-48.8	-43.7	-39.3	-38.5	-38.8
Concessional	-44.5	-40.0	-37.6	-37.5	-38.2
Nonconcessional	-1.4	-0.8	-0.7	-0.6	-0.6
IMF charges	-2.9	-2.9	-1.0	-0.4	0.0
Dividends	-353.8	-326.3	-347.8	-553.4	-516.9
Receipts	6.2	2.1	0.9	2.1	2.2
Mineral	5.2	0.5	0.0	0.0	0.0
Non-mineral	1.0	1.6	0.9	2.1	2.2
Payments	-360.0	-328.4	-348.7	-555.5	-519.1
Mineral	-259.1	-222.7	-227.8	-440.0	-413.6
Non-mineral	-100.9	-105.7	-120.9	-115.5	-105.5
Current transfers (net)	235.1	181.7	434.3	276.4	350.2
Official	199.1	141.8	393.3	299.2	316.0
Receipts	199.1	141.8	393.3	299.2	316.0
Australia budgetary support	5.8	0.0	0.0	0.0	0.0
Project & commodity aid	193.3	141.8	393.3	299.2	316.0
Other grants	0.0	0.0	0.0	0.0	0.0
Payments	0.0	0.0	0.0	0.0	0.0
Private	36.0	39.9	41.0	-22.9	34.1
Receipts	116.4	117.1	122.0	80.1	130.1
Payments	-80.4	-77.2	-81.0	-103.0	-96.0

Sources: Data provided by the Papua New Guinea authorities; and Fund staff estimates.

Table 19. Papua New Guinea: External Debt Outstanding, 2003–07

(In millions of U.S. dollars)

	2003	2004	2005	2006	2007
Total external debt	2,308	2,159	2,048	2,176	1,999
Public external debt 1/	1,614	1,492	1,273	1,196	1,105
Central government	1,470	1,411	1,245	1,194	1,101
Multilateral creditors	864	861	818	801	719
Of which: World Bank Group	348	334	326	318	254
Asian Development Bank	443	452	428	416	401
Bilateral creditors	552	496	385	352	344
Of which: Australia	87	40	7	3	5
Japan	412	406	335	310	304
Commercial creditors	55	54	43	41	38
Central bank	124	64	0	2	4
Of which: IMF liabilities	120	64	0	0	0
Commercial statutory authorities	20	17	27	0	0
Private external debt	694	667	776	980	894
Of which: mineral sector	415	372	504	703	626
Memorandum items:					
Total external debt	58.6	51.8	41.2	38.6	30.7
Total public external debt 1/	39.0	34.9	25.4	21.1	16.7
Private external debt	19.6	17.0	15.8	17.5	14.0

Sources: Data provided by the Papua New Guinea authorities.

1/ Including central government, central bank external debt, and statutory authorities.

Table 20. Papua New Guinea: Public External Debt Service, 2003–07

(In millions of U.S. dollars)

	2003	2004	2005	2006	2007
Total public sector	182.7	241.1	212.1	158.3	208.2
Principal	133.9	197.4	172.8	119.8	169.9
Interest	48.8	43.7	39.3	38.5	38.3
Central government	174.3	176.0	151.9	157.9	208.2
Principal	128.4	135.2	113.6	119.8	169.9
Interest	45.9	40.8	38.3	38.1	38.3
Multilateral creditors	74.2	73.1	71.1	109.6	162.7
Principal	50.7	51.9	48.8	83.1	135.2
Interest	23.5	21.2	22.3	26.5	27.5
World Bank Group	35.4	34.2	36.5	40.8	96.0
Principal	25.8	26.1	26.4	27.5	81.1
Interest	9.6	8.1	10.1	13.3	14.9
Asian Development Bank	31.8	34.0	31.5	64.9	62.9
Principal	19.2	22.3	20.7	52.6	51.0
Interest	12.6	11.7	10.8	12.3	11.9
Other	7.0	4.9	3.1	3.9	3.8
Principal	5.7	3.5	1.7	3.0	3.1
Interest	1.3	1.4	1.4	0.9	0.7
Bilateral creditors	86.0	94.0	74.7	42.3	39.5
Principal	65.0	75.2	59.4	31.3	29.3
Interest	21.0	18.8	15.3	11.0	10.2
Australia	48.2	52.6	35.0	4.3	0.2
Principal	40.3	47.1	32.1	3.9	0.0
Interest	7.9	5.5	2.9	0.4	0.2
China	0.6	0.6	0.6	0.6	0.6
Principal	0.4	0.4	0.4	0.4	0.4
Interest	0.2	0.2	0.2	0.2	0.2
Japan	31.5	31.3	32.8	31.4	30.7
Principal	20.1	19.6	21.7	21.8	21.7
Interest	11.4	11.7	11.1	9.6	9.0
Other	5.7	9.5	6.3	6.0	8.0
Principal	4.2	8.1	5.2	5.2	7.2
Interest	1.5	1.4	1.1	0.8	0.8
Commercial creditors	14.1	8.9	6.1	6.0	6.0
Principal	12.7	8.1	5.4	5.4	5.4
Interest	1.4	0.8	0.7	0.6	0.6
Banks	6.8	4.8	0.0	0.0	0.0
Principal	6.4	4.8	0.0	0.0	0.0
Interest	0.4	0.0	0.0	0.0	0.0
Other	7.3	4.1	6.1	6.0	6.0
Principal	6.3	3.3	5.4	5.4	5.4
Interest	1.0	0.8	0.7	0.6	0.6
Central bank	8.4	65.1	60.2	0.4	0.0
Principal	5.5	62.2	59.2	0.0	0.0
Interest	2.9	2.9	1.0	0.4	0.0
Memorandum item:					
Public debt-service ratio	7.7	8.7	6.0	3.5	4.1

Sources: Data provided by the Papua New Guinea authorities; and Fund staff estimates.