

## Chapter 7

### THE EFFECTS OF THE GLOBAL FINANCIAL CRISIS AND PROPAGATION OF REAL SHOCKS IN PAPUA NEW GUINEA

By  
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#### 1. Introduction

This paper examines the propagation of real shocks, both external and internal, and the different channels and mechanisms through which these shocks are transmitted to the Papua New Guinea (PNG) economy. The increase in globalisation and the interconnectedness with the other countries for trade and, capital and financial flows have open up a lot of opportunities for PNG to import technologies and goods (capital and consumption) that otherwise would have been difficult to access. Since PNG is a small and open economy and very dependent on international trade, it has become increasingly vulnerable to external shocks. The global financial crisis in 2008 that resulted in global recession had also affected PNG mainly through the trade sector. Given the widespread effect of financial and economic losses and concerns about future shocks, this paper seeks to share some light into the propagation of real shocks in PNG through the various channels.

The rest of the paper is structured as follows. Section 2 will cover the economic landscape and developments in PNG since 1990, covering key macroeconomic variables such as GDP growth rate, inflation, saving and lending, interest rates, exchange rates, balance of payments, foreign exchange reserves and monetary variables. It will also cover globalisation and the patterns of trade interdependence. Section 3 will highlight the sub-prime financial crisis and the Asian financial crisis of 1997 and the extent to which these crises have impacted the trade sector of PNG economy and how it affected trade sector. A literature review in Section 4 will explore the current thinking and research on the impact of trade credit in international trade during the global financial crisis as well as other determinants such as price and GDP of trading partners and etc. In Section 5, the research methodology will be discussed, which will involve regression analysis of the main determinants of export performance in order to ascertain the relationships. In Section 6, policy implications are discussed to establish

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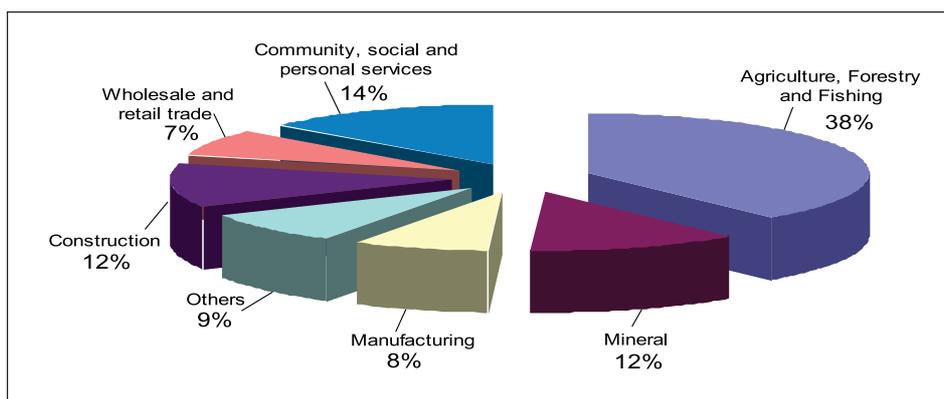
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appropriate policy framework and measures needed to minimise the impact of future financial crisis in PNG.

## 2. Economic Landscape and Developments Since the 1990s

PNG is a predominantly a primary industry economy, with the agriculture sector being the dominant one in terms of population participation. Seventy to eighty percent of the total population live in rural areas and most of them are subsistent farmers, with some involved in cash crop production. Subsistence farming is a non-market component but is an important part of economic activity in PNG as it accounts for about 25.2% of the private final consumption expenditure (Money and Banking in Papua New Guinea, 2007, pp40). The agriculture cash economy, which includes the production of export commodities including coffee, cocoa, copra, palm oil and others, is also an important source of income and foreign exchange revenue. The agriculture sector is the largest sector in terms of production (see chart 1) however, it contributes around 19% of total exports. The mineral sector is the second largest sector in the economy and contributes the largest share of about 76% of total exports. It has played a significant role in supporting economic growth over the years and will continue to be a major play in the years to come as new mines come on stream and further discoveries are made. Also with the current huge liquidified natural gas (LNG) project which commenced construction in 2010, GDP is expected to grow significantly over the next 10–20 years. Other export sectors such as the forestry and fisheries sectors are relatively small, contributing 3.4% and 2.0% of total exports, respectively (see chart 1).

**Chart 1: Share of GDP by Sector**

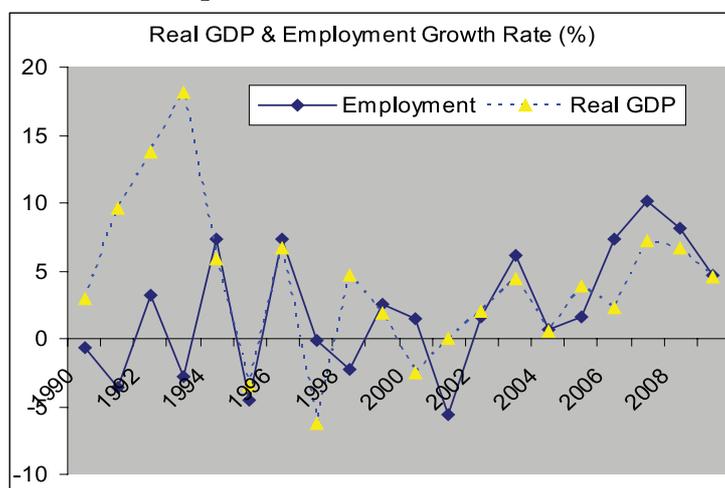


Source: NSO & Treasury.

## 2.1 Economic Growth

In the 1990s, the PNG economy entered a new era of significant mineral boom with new mining and petroleum projects coming on stream, especially in the early part of the 1990s, and significant economic growth rates were recorded. Between 1991 to 1994 PNG experienced its best ever growth with GDP averaging around 11.9%, and recording the highest growth rate of 18.2% in 1993. This was attributed to the mineral boom as well as increased activity in the agriculture/forestry/fisheries sector. However, economic growth was not sustained in 1995, reflecting the balance of payment crisis due to irresponsible macroeconomic management. The economy recovered to a growth rate of 7.7% in 1996 associated with the construction of a huge gold mine and tightening of the fiscal and monetary policies. However, the deterioration of economic environment in 1997 associated with the Asian Crisis and the El Nino drought resulted in a negative growth of 3.9%. Since 1997 to 1999, irresponsible government spending combined with the Asian financial crisis and the drought almost brought the country to near collapse (Money & Banking in Papua New Guinea, 1998). The 1990s was a lost decade of economic growth and development despite the opportunity given by a boom in the mineral sector and its spill-over effects to the rest of the economy. Even in the early part of 2000s, economic growth remained subdued, partly due to lower production from the mineral sector as some of the projects reached their maturity stage.

**Graph 1: Real GDP Growth Rate**



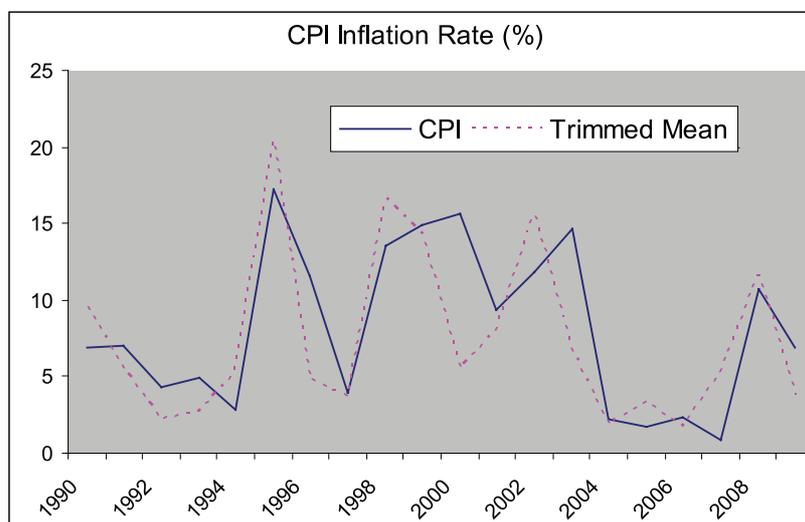
Source: NSO, Treasury Department & BPNG.

From 2006 to 2008, economic growth picked up strongly, mainly associated with higher commodity prices of mineral and agriculture/forestry/fishing exports combined with increase in the volume of most of the export commodities. Increased activity in the building and construction, transport & communication and manufacturing sectors also contributed to this growth. The estimated real GDP growth reached a high of 7.2% in 2007, and then subsided to 6.7% in 2008 and 4.5% in 2009, due to the financial crisis in 2008 and the subsequent economic recession in 2009. The fall in international commodity prices, due to the decline in global demand, adversely affected the prices of PNG's major export commodities and resulted in low export revenue and growth in most of the sectors.

## **2.2 Inflation**

In the early 1990s (see graph 2) inflation came down to low levels until end of 1994 when inflationary pressures began to pick up. Annual inflation was 6.9% in 1990 which came down to 2.9% at the end of 1994. The scenario however, changed in 1995 following the floating of the kina in 1994 when the hard kina policy collapsed. The depreciation in the kina exchange rate partly resulted in high domestic inflation latter part of the 1990s, combined with the effect of drought in 1997. From 2004 to 2007, inflation came down significantly to some of the lowest annual domestic inflation rates in history. In a few instances, negative quarterly inflation rates were recorded, partly due to strengthening of the kina exchange rate associated with high international commodity prices. However, the trend reversed again in 2008 when international crude oil and food prices increased and led to increased domestic prices. By the end of June quarter of 2008, inflation had peaked around 13.5% before easing to 11.2% at the end of 2008. Inflation came downward further in 2009 as the global recession intensified in the developed countries dampening global demand and bringing down inflation in PNG's major trading partners. The feed through effect of lower global inflation to the domestic economy and the lower export revenue for PNG's major export commodities reduced domestic demand and resulted in a lower inflation rate of 5.7% in 2009. One thing for sure was that the impact of the financial crisis and the global recession helped reduce inflation in PNG.

**Graph 2: CPI Inflation Rate**



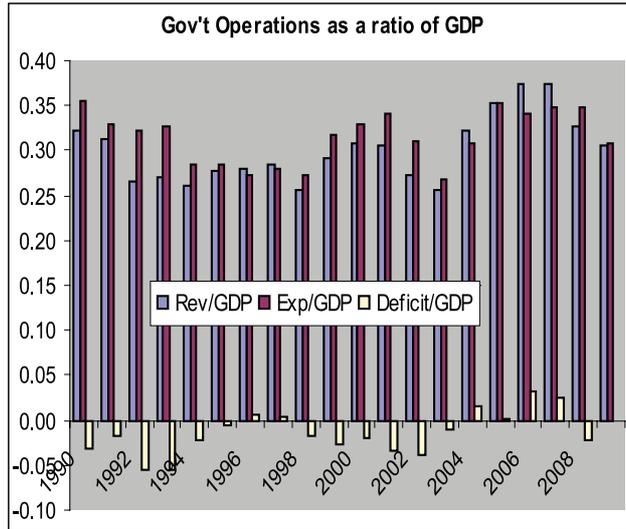
Source: NSO & Bank of PNG

### 2.3 Fiscal Operations and Public Debt

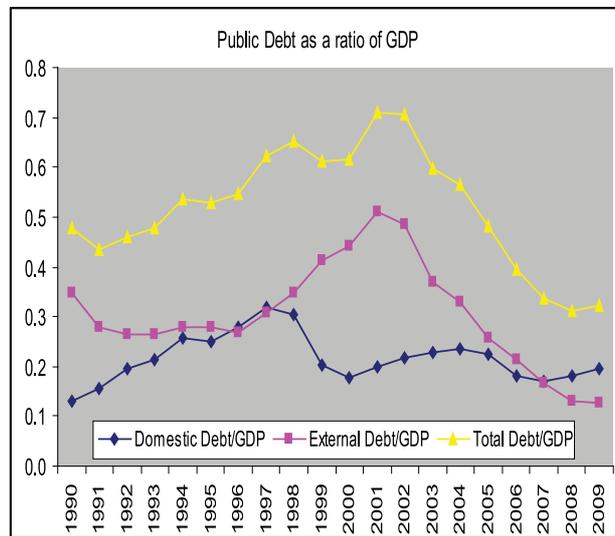
The fiscal operations of the Government in the 1990s and early part of 2000s have been disappointing with deficits recorded for most of the years mainly due to a lack of fiscal discipline and foresight. The high expectation of huge mineral revenue inflows to the economy resulted in the Government making huge expenditure overruns and budget deficits over the years. As shown in graph 3 below, the growth in expenditure as a ratio of GDP has been higher compared to revenue as a ratio of GDP. During this period, the Government borrowed domestically as well as externally under the IMF Structural Adjustment Programme to promote sustainable economic growth. The increase in domestic debt by the Government to fund its expenditure combined with falls in export commodity prices resulted in a huge depreciation of the kina, which led to a significant increase in the ratio of public debt to GDP, especially in the early part of 2000s (see graph 4). Economy growth started to pick up again in 2003 and Government revenue improved as well. Between 2006 and 2008, international commodity prices for PNG's major exports increased significantly, and the government recorded huge budget surpluses. Consequently, the revenue/GDP ratio increased while debt/GDP ratio declined reflecting significant increases in nominal GDP growth, combined with declines especially in foreign debt. Following the financial crisis in 2008 and global recession, PNG exports were severely affected, due to low commodity prices and Government revenue was significantly

reduced. However, with the significant savings from the commodity export revenue windfall in the previous years, the Government was able to maintain budget expenditures and stimulate the economy.

**Graph 3: Government Fiscal Operations**



**Graph 4: Public Debt**



Source: Treasury Department & NSO.

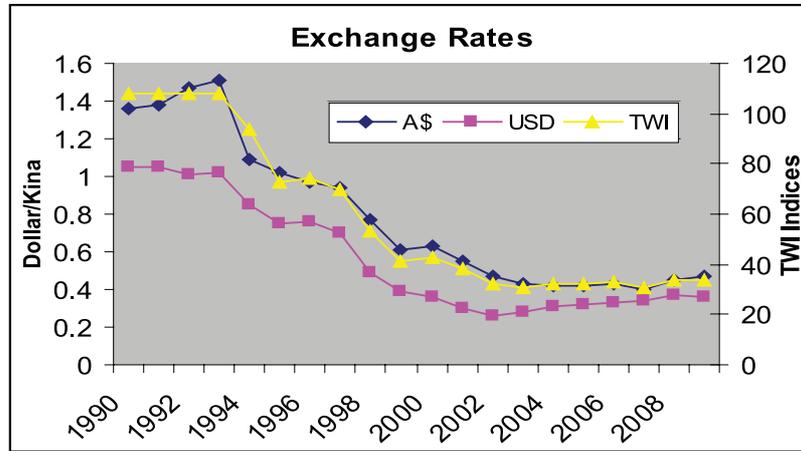
## 2.4 Exchange Rate

Up to 1994 PNG maintained a hard kina policy (or a fixed exchange rate regime)<sup>2</sup> and the kina exchange rate was fixed against the US dollar. Following the irresponsible macroeconomic management that resulted in the depletion of the foreign reserves and the inability of the Central bank to support the fixed exchange rate regime, the kina was floated in 2004. Some critics have argued that the hard kina policy (fixed exchanged rate) was an overly conservative stabilisation policy which hindered economic growth. The hard kina policy has been blamed for the overvalued real exchange rate, which reduced international competitiveness and potential growth (Money & Banking in Papua New Guinea, 1998). Since 1994 kina was allowed to float freely based on market fundamentals and the free fall to find its real value suggest that the kina exchange rate was overvalued against the US dollar and other major currencies. With the floating regime, the kina has now become more vulnerable to both external and internal shocks. Study carried out by Gae and Thompson (2009) found that international commodity prices is one main determinant of the kina exchange rate and concluded that kina can be influenced significantly by movements in commodity prices. This implies that a dramatic fall in commodity export prices can result in the depreciation of the kina exchange rate and increase in domestic inflationary pressures. Thompson. T., et al. (2006) also found that the kina exchange rate is an important determinant of domestic inflation and therefore, significant movements in the exchange rate can have a big impact on domestic inflation.

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2. The hard kina policy which was adopted since independence in 1975 was at the heart of PNG Government's stabilisation policy aimed at maintaining the external value of the kina exchange rate against the major currencies, especially the US dollar. The reasoning behind this policy is to minimise the impact of imported inflation and thereby, maintaining low and stable domestic prices. This policy was to be supported by sufficient international reserves and appropriate internal policies including prudent fiscal management. However, irresponsible fiscal management by the Government, declining international commodity prices and depletion of the international reserves resulted in the collapse of the regime in 1994.

**Graph 5: Kina Exchange Rate**



Source: Bank of PNG.

Following the floating of the kina exchange rate in 1994, the kina exchange rate fell significantly and trended downward to the lowest rate of 1 Kina to 0.25 US dollar in 2002 and 0.42 Australian dollar in 2004. Since then the kina appreciated and stabilised around 0.36 US dollar and 0.44 Australian dollar in 2008. Prior to 2009 financial crisis, international commodity prices were very favourable and the kina exchange rate strengthened as a result of significant inflows of foreign currency. However, when commodity prices fell significantly by end of 2008 and 2009, foreign exchange inflows declined, and the kina exchange rate came under pressure. In pursuit of price stability, the Bank of PNG intervened quite heavily in the foreign exchange market to stabilise the kina exchange rate. Without this support, the kina exchange rate would have fallen significantly against the US and Australian dollars. At the end of 2009, the kina was trading around 0.36 US dollar and 0.46 Australian dollar, stronger than the pre-crisis rate of 0.34 US and 0.40 Australian dollars respectively, in 2007.

### 3. The Impact of Sub-Prime Financial Crisis

#### 3.1 Financial Sector

The domestic financial sector in PNG has gone through significant reforms following the enactment of the Banking and Financial Institution Act in 2000. The Act brought all the commercial banks, other non-bank financial institutions,

superannuation funds and life insurance in PNG under the supervision of the central bank. This has brought about stability in the whole financial system. Since 2000, all commercial banks improved and maintained very strong balance sheet positions with their asset base growing significantly. The financial stability indicators such as the capital adequacy ratio, foreign currency exposure, non-performing loans, lending exposure to various sectors were all above or within the prudential standards set by the Bank of PNG. Under this framework, the commercial banks were made to observe prudential standards while continuing to lend to the private sector, enabled by excess liquidity in the banking system.

**Table 1: Monetary Aggregates and Other Key Indicators**

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	1996	1997	1998	1999	2006	2007	2008	2009
Broad Money Supply (M3) (%)	32.3	13.3	3.6	9.0	38.9	27.8	11.2	19.1
Narrow Money (M1*) (%)	33.9	6.3	11.1	20.8	25.6	29.9	11.9	7.6
Net Foreign Assets (%)	190.1	-7.7	-36.5	36.2	58.7	52.2	-12.3	31.6
Private Sector Credit Growth (%)	-3.7	23.7	9.7	6.8	38.3	34.3	39.4	18.8
Liquid Asset Ratio (%)	54.8	43.6	34.4	34.9	56.6	51.8	48.5	52.6
Weighted Average Lending Rate (%)	10.2	10.6	20.2	18.2	10.2	9.3	8.8	10.2
30 Days Deposit Rate (%)	n/a	n/a	n/a	n/a	2.0	3.0	5.6	4.0
Total Deposit Rate (%)	4.0	5.1	8.7	8.5	1.0	1.6	1.6	2.2

Source: Bank of PNG.

The contagion effect of the sub-prime financial crisis on PNG financial system was small compared to other economies including some in the South East Asia region. Unlike many of these economies whose financial systems were linked to the toxic assets of the sub-prime market in the US, PNG did not have exposure to troubled financial institutions. Most of the financial institutions especially commercial banks invested and raised capital locally. The banking system had sufficient liquidity for the commercial banks to carry out their domestic operations and there was no need to raise capital in international financial markets, even before and during the crisis. The banks were managed prudently and had strong financial positions with little exposure to international markets, even the two Australian-owned banks. The major local bank that has branches in other South Pacific island countries was also not affected because it had little exposure outside of the Pacific region. Furthermore, a significant part of lending by the commercial banks were on long term basis with only a small portion in short term loans, especially overdrafts. The Government of PNG also had little

exposure to international markets with commercial borrowing at K108.8 million at end of 2008. Most of its outstanding loans of K2.7 billion were contracted through bilateral or multilateral arrangements with fixed terms and very low interest rates, repayable over longer terms.

The 2008 global financial crisis on monetary aggregates (see table 1) had broadly affected all monetary aggregates not directly through the credit channel but through international commodity prices via the exchange rate channel. The growth rates of the broad money (M3) and narrow money supply (M1\*) was lower in 2008/2009 mainly due to significant declines in net foreign assets. The private sector credit growth was lower as lending by commercial banks declined to affected sectors like agriculture and manufacturing (BPNG QEB, December quarter 2009). Liquidity in the banking system was affected during the crisis resulting in a lower liquid asset ratio (LAR), while interest rates generally increased in 2008/2009 reflecting tightening in liquidity conditions. Although liquidity declined, there were still sufficient funds with the commercial banks to lend to the private sector. For PNG, the effects of the financial crisis were more indirect through the decline in commodity prices and depreciation of the kina exchange rate, which resulted in the diffusion of net foreign assets of the commercial banks to meet foreign exchange obligations. Some of the liquidity of the commercial banks were also diffused through the central bank's intervention in the foreign exchange market, resulting in the decline of the total liquidity of the banking system.

### **3.2 Private Sector**

The institutions that were mainly affected were the two large employees' superannuation funds, Nasfund Ltd and Nambawan Superfund Ltd and private companies that are listed in the local and overseas stock markets. The Nasfund Ltd had about 5% of its assets and Nambawan Superfund Ltd had about 17% of its assets in offshore equity investments (Navigating the Global Storm, 2009, ADB). The remaining assets were invested in mineral and other commodity-based stocks that are dual listed locally and in overseas stock markets. The fall in stock market prices and commodity markets resulted in significant losses of share values in 2008. In the second half of 2009, the stock prices and values improved as confidence in the global financial system was restored through concerted efforts by Central banks and Governments of major economies.

The channel through which the financial crisis significantly affected the economy was through the international commodity prices via the exchange rate. As shown in Graph 1, GDP growth fell in 2009, mainly due to the contraction

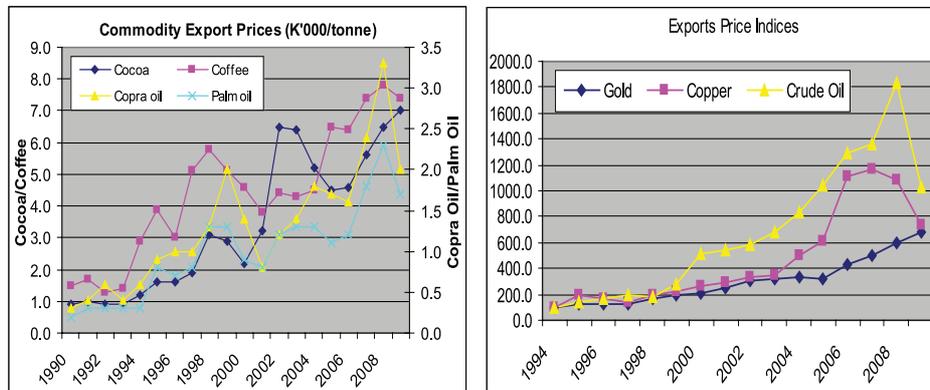
in the mineral and agricultural exports reflecting lower commodity prices. Results of the Bank of PNG's business liaison and employment surveys support this slowdown in private sector activity. The total annual level of employment increased by 4.7% in 2009, down from 8.2% in 2008. The slowdown started in the September quarter of 2008 to March quarter of 2009, with significant declines of 15.3% in the December quarter of 2008 and 12.0% in the March quarter of 2009. The lower employment rate was mainly in the agriculture, mineral, manufacturing and the wholesale sectors. Similarly, the total value of sales by the private sector increased by 4.2% in 2009, lower than the increase of 6.3% in 2008. The slowdown in sales was mainly in the wholesale/retail, manufacturing, agriculture and minerals sectors.

### **3.3 Export Sector**

In terms of its impact on export commodities, the resultant global recession and lower demand significantly reduced international commodity prices and volume of production of PNG's major exports. The average weighted export price for agricultural commodity exports declined by around 17.9% in 2009, compared to an increase of 18.8% in 2008 (see graph 6). The decline in both the weighted average price and volume resulted in the agricultural export declining by 25.0% from K2,969 million in 2008 to K2,225.7 million in 2009.

The price of cocoa declined by 31.3% from a high of K7,645 per tonne in July 2008 to a low of K5,246 per tonne in December 2008 before increasing in 2009. The average price of cocoa increased by 7.7% to K6,977 per tonne in 2009 from K6,480 per tonne in 2008. The export volume fell moderately from 53.3 thousand tonnes in 2008 to 48.2 thousand tonnes in 2009. The decline in the volume more than offset the increase in the price and resulted in a lower export revenue of K337.3 million in 2009, compared to K345.6 million in 2008. Coffee prices declined from a high of K8,346 per tonne in March 2008 to a low of K6,748 per tonne in December 2008 before it increased in 2009. The average price of coffee decreased by 4.7% to K7,407 per tonne in 2009, compared to K7,772 per tonne in 2008. The volume of coffee exports declined moderately from 67.0 thousand tonnes in 2008 to 62.2 thousand tonnes in 2009. The decline in both the price and volume resulted in lower export revenue of K460.3 million in 2009, compared to K520.2 million in 2008.

**Graph 6: Commodity Export Prices**



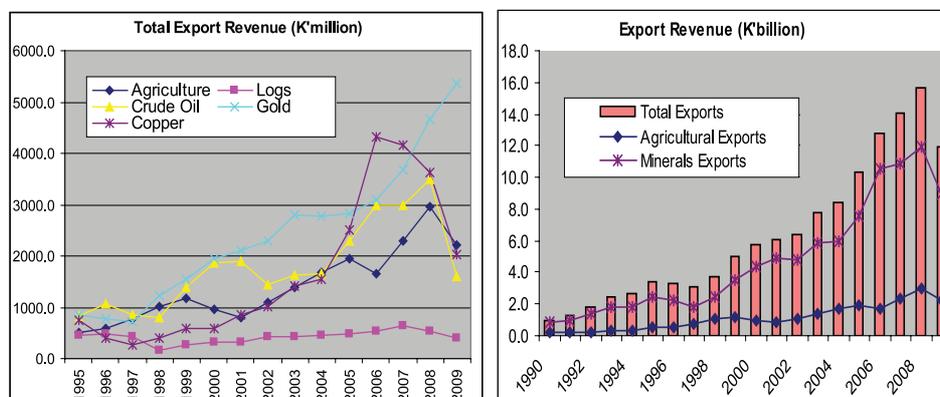
Source: Bank of PNG.

Copra prices declined from a high of K1,849 per tonne in July 2008 to a low of K956 per tonne in December 2008. The volume of copra exports declined significantly from 32.6 thousand tonnes in 2008 to 15.2 thousand tonnes in 2009. The decline in both the price and volume resulted in lower export revenue of K12.4 million in 2009, compared to K45.1 million in 2008. Copra oil prices declined from K3,272 per tonne in 2008 to K1,958 million in 2009, while the volume exported declined from 62.0 thousand tonnes in 2008 to 44.8 thousand tonnes in 2009. The decline in both the price and volume resulted in lower export revenue of K87.9 million in 2009, compared to K202.7 million in 2009.

Palm oil prices decline by 27.7% from K2,306 per tonne in 2008 to K1,667 per tonne in 2009. The volume of palm oil exports declined from 446.0 thousand tonnes in 2008 to 428.4 thousand tonnes in 2009. The decline in both the price and volume of palm oil resulted in the export revenue falling by 29.4% to K714.3 million in 2009 from K1,011.9 million in 2008.

In the mineral sector, export prices for crude oil and copper declined in 2009 except for the gold price. Based on the export price indices, crude oil prices declined by 43.8% in 2009, compared to 2008, while the price of copper decreased by 25.7% from K315 per tonne in 2008 to K234 per tonne in 2009. The export volume of crude oil declined by 16.3% from 12.2 million barrels in 2008 to 10.2 million barrels in 2009. The decline in the price and volume of crude oil resulted in the export revenue falling by 53.1% from K3,506.1 million in 2008 to K1,645.3 million in 2009, while the export revenue for copper fell by 44.0% from K3,616.7 million in 2008 to K2,025.9 million in 2009.

**Graph 7: Export Revenue**



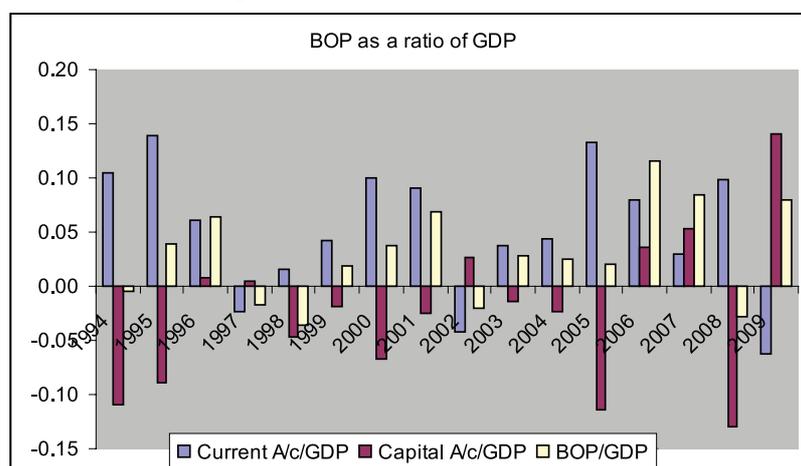
Source: Bank of PNG.

The developments in the export sector resulted in a significant decline in the trade account surplus by 41.7% to K4,192 million in 2009, compared to a surplus of K7,196 million in 2008. This was mainly attributed to a decline in merchandise exports by 24.0%. The significant fall in export revenue resulted in lower domestic demand and lower imports. The decline in imports was reflected in lower demand for food and beverages, industrial supplies and transport equipment and accessories. Other components of the current account balance were also affected, especially the income balance account, which declined by 19.3% between 2007 and 2009, which is the net outcome of the declines in income receipts by 58.7% to PNG and income payments by 24.3% to overseas recipients. In the services balance account, the impact was mainly evident in 2008 with both service receipts and payments declining by 8.3% and 12.6% respectively. However, in 2009 the economy picked up again and both the service receipts and payments increased. In the transfers balance account, it was more evident in the transfers receipts which declined more in 2008 than in 2009, while in the transfers payments, the impact was more evident in 2009. Transfers payments increased by 30.8% in 2008 but declined by 8.8% in 2009. The transfers balance account which is the net of the transfers receipts and payments declined by 35.7% between 2007 and 2009.

The significant impact of the crisis was felt in 2009 with the current account recording a huge deficit. However, this was more than offset by a huge surplus in the capital and financial accounts, associated with large mineral investment capital inflows that resulted in an overall balance of payments surplus. As indicated by the current account as a ratio of GDP, the impact of the global

financial crisis in 2009 was more severe than the combined effects of the Asian financial crisis and natural shocks in 1997 (see graph 8).

**Graph 8: BOP as a Ratio of GDP**



Source: Bank of PNG.

### 3.4 Asian Financial Crisis

In 1997, the economic environment deteriorated quite considerably as a result of both external and internal shocks that adversely affected economic activity in PNG. The external shock was the impact of the Asian financial crisis, while the internal shock comprised of a combination of a cyclone and El-Nino drought. The impact of the 1997 Asian financial crisis on PNG's financial system was very limited due to the fact that PNG had very little exposure to the Asian financial markets. Any impact on the financial system was more indirect through the export sector. In the export sector, the crisis had some impact on the prices of copper, gold and logs exports, while prices of agricultural export commodities increased. However, the decline in the volume of most of the agricultural exports was mainly associated with the drought.

Economic growth as indicated by real GDP growth declined by 6.3% in 1997, compared to an increase of 6.6% in 1996 (see graph 1). The declines were mainly in the agriculture/forestry/fishing and mineral sectors, decreasing by 8.4% and 26.2%, respectively. In the agriculture sector, the decline was attributed to the fall in the export volume of all the agricultural commodity exports, including cocoa, coffee, copra, copra oil, as well as logs and marine products.

However, most of the export prices of agricultural commodities increased except for logs, which imply that internal shocks had the most impact on production, while the decline in export volume and price of logs was attributed to the effects of the financial crisis. The increase in the prices of the agricultural exports more than offset the decline in the volume exported and resulted in the export revenue increasing by 34.3% in 1997, compared to 1996. In the mineral sector, the decline was due to lower production and export of crude oil, copper and gold. The price of gold declined in 1997, while there was a lag response in the price of copper which declined in 1998. However, the price of crude oil increased. The decline in export prices of copper and gold was attributed to the Asian financial crisis. The decline in the export volume and price of gold more than offset increase in prices of copper and crude oil and resulted in the export revenue falling by 18.1% in 1997, compared to 1996.

Given the impact of both the internal and external shocks on the export sector, the total exports declined by 7.6% and the current account recorded a deficit in 1997. The deficit in the current account was also due to increase in the invisible debits or payments which was affected partly by the depreciation of the kina exchange rate. While the Asian crisis had an impact on the real sector through the fall in the prices of gold, copper and logs, the drought which affected water levels and shipment of mineral exports also affected export revenue and resulted in the weakening of the kina exchange rate. The deficit in the current account more than offset the surplus in the capital and financial accounts and resulted in an overall deficit in the balance of payments. It appears that the impact of both the Asian Crisis and drought combined are not as severe as the global financial crisis in 2008/2009 as indicated by the fall in the magnitude of commodity prices, export revenue and BOP as a ratio of GDP (see graph 6,7 and 8).

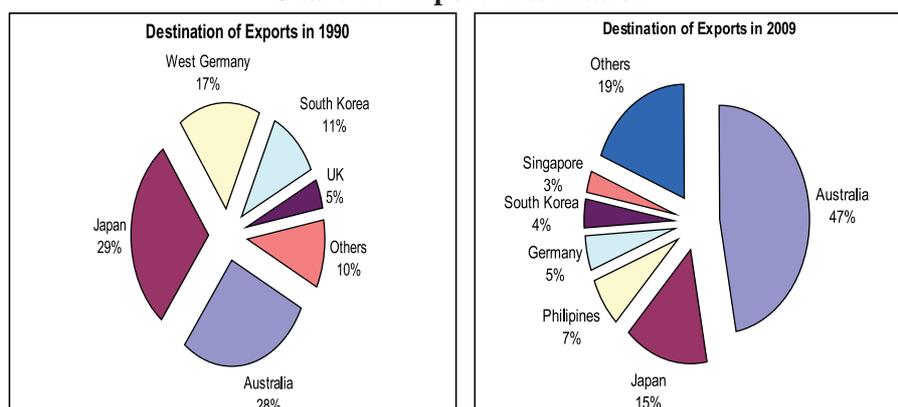
On monetary aggregates, the effects of the shocks on the level of net foreign assets, liquidity in the banking system, money supply and credit to the private sector were significant. The decline in net foreign assets by 7.7% in 1997 was associated with the decline in exports and increase in imports. This resulted in a lower growth in the money supply and liquidity as the central bank intervened to diffuse liquidity and provide foreign exchange to the market. The deficit on the current account led to pressures on the exchange rate and the kina weakened by 3.0% against the Australian dollar and 7.7% against the US dollar. During that time, PNG continued to meet its debt repayment obligations to international lending agencies, although its public debt outstanding increased as a result of the

exchange rate losses. While the level of liquidity declined, it was still sufficient to meet the credit needs of the private sector as well as the financing requirements of the Government.

### 3.5 Pattern of Trade and Openness

According to the Comparative Advantage Theory, a country would produce and export certain products or commodities in which it has comparative advantage in terms of factor endowments and available resources (Atkinson. B, et al.,1996). The relative factor endowments in a country play a vital role in governing the pattern of trade. While PNG is endowed with rich natural resources, its human capital is still under developed and investment capital is also lacking (Papua New Guinea Development Strategic Plan 2010 – 2030, 2010). PNG is, therefore an exporter of raw materials of agricultural and mineral commodities and net importer of manufactured/processed products. Over the period 1990 to 2009, the direction of trade of PNG's merchandise exports has shifted mainly in favour of Australia, which now constitutes a significant share of about 47.1% of total exports, compared to 28% in 1990. However, exports to Japan fell by almost half from 29% in 1990 to 15% in 2009, while it fell significantly from 17% to 5% for Germany and dropped from 11% to 4% for South Korea. In 1990, exports were concentrated mainly to five economies which accounted for 80% of total exports. By 2009, the trend in export destination is more diversified and declining in most of its traditional export countries except Australia. Australia expanded its trade and has become PNG's most significant export destination in recent years. All the other countries such as Japan, West Germany, South Korea and UK have declined quite significantly.

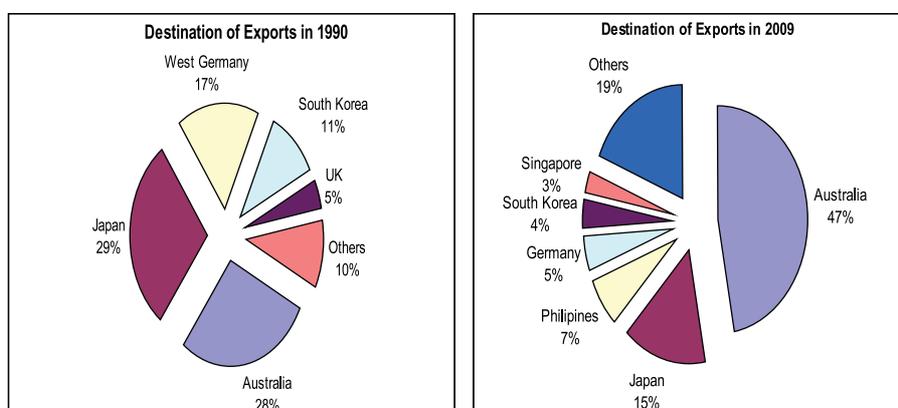
**Chart 2: Export Destination**



Source: Bank of PNG.

Similarly, in 1990 imports by PNG from its major trading partners were also concentrated in four countries including Australia, Japan, USA and Singapore which accounted for more than 80% of total imports. Of these four trading partners, Australia accounts for 51% of total imports, Japan 14%, USA 10% and Singapore 9%. By the end of 2009, there were some changes in the composition and share of imports with Australia now accounting for 42%, USA 21% and Singapore 11%. Japan cannot be regarded now as a major source for imports with a share of 3%.

**Chart 3: Origin of Imports**



Source: Bank of PNG.

The fact that PNG is a small and open economy trading with its trading partners implies that there is a degree of openness. The degree of openness of PNG economy to the rest of the world would depend on how much it is able to export and import from its trading partners. This is estimated as a ratio of total trade (which includes total exports and imports) to nominal GDP. In PNG, the degree of openness is estimated to be around 70% in 1990 and gradually increased over the years. In 2007, it reach a peak of 116% reflecting a significant increase in trade associated with high commodity prices before declining to 90% in 2009. Despite the decline in the degree of openness was due to the global financial crisis, the ratio of total trade to GDP indicates that PNG is a very open economy.

#### 4. Literature Review

The 2008 global financial crisis had significantly affected global economic activity and while reliable statistics may be scarce, a number of observations note that the contraction has hit the trade sector hard resulting in a dramatic fall in international trade (Auboin M, 2009). The two channels through which the financial crisis affected the international trade were: a sharp decline in global demand and a significant tightening of external financing. While its impact on global demand is well documented, there is limited empirical analysis on trade financing as an additional or equally important factor contributing to the significant decline in world trade. According to the WTO statistics, about 80-90% of the world trade relies on trade finance especially in short term nature (Auboin M, 2009). It was claimed that part of the significant fall in world trade was associated with the decline in the trade credit financing. The World Bank (2009) estimates that the reduction of trade credit accounted for 15% of the decline in world trade between mid-2008 and mid-2009, while the balance was due to the reduction in global demand.

What is trade credit? According to Hodgson G. (2005), trade credit can be classified into three broad categories; firstly trade credit can be provided to domestic buyers to purchase imports, especially inputs for export productions. Secondly, trade credit is required as working capital to be able to finance its operational costs prior to shipment of the exports. Thirdly, trade credit can be extended to foreign buyers for them to complete an export sale. Korinek et al, (2010) noted that trade credit is any financial arrangement executed between two parties or through a third party (financial intermediaries) for sale of exports of goods with settlement done at a later date based on certain terms and conditions agreed to by the transacting parties. It can take many different forms with or without financial intermediaries or may involve intra-firm and inter-firm financing. The trade financing may take the form of letters of credit, advance payment guarantees, performance bonds, and export credits insurance and guarantees. These forms of trade financing are sound because they are based on long-standing practices and procedures used by banks and traders supported with strong collateral and reliable credit operations.

Over the last ten years the financing of international trade has shifted away from letters of credit to more risky open account/short term financing from financial intermediaries and buyer/suppliers financing arrangements based on mutual relationships (Korinek et al., 2010). However, following the crisis banks have started to move back to letters of credit because it is a low risk form of financing. While financial intermediaries are the traditional providers for such a

trade facility, the non-financial intermediaries or inter-firm also provide this service usually at much more favourable terms and conditions. Trade credit done by non-financial intermediaries is pursued especially where there is a low intermediation between the foreign and local commercial banks to assist exporters and importers, a common feature in developing economies. This arrangement is usually based on long term mutual relationship with subsidized low interest rates extended by the supplier/exporter with the long term view of gaining higher returns from maintaining the relationship.

The IMF survey (IMF, 2009) found that trade financing declined following the financial crisis and fees of letter of credit increased during 2008. It also showed that export performance was due to firm-specific financial condition such that those that had greater financial liquidity experienced smaller fall in trade, while those that relied more on short-term debt were most affected resulting in significant fall in trade. Analysis on available data for the emerging markets further suggest that emerging economies are very dependent on bank financed trade credits to finance exports. Following the Asian financial crisis, the bank financed trade credit declined by as much as 30-50% in Brazil and Argentina, 50% in Korea and from US\$6 billion to US\$1 billion in Indonesia as well as sharp declines being observed in Russia, the Philippines and Thailand (Wang J and Tadesse H, 2009). However, those firms with greater reliance on trade credit from suppliers did well. It was also found that exporters that were financially vulnerable had limited access to trade credit as an alternative source of finance had disproportionately larger effect on international trade.

It is important to note that while trade financing may have affected trade among countries there has been few empirical analysis on trade credit and its impact on trade. In addition, trade may have been affected by other variables such as global demand, domestic demand, banking crisis, changes in export and import prices and real exchange rate depreciation (Jeanneau and Micu, 2002). The empirical work done by Ronci (IMF, 2009) involved a panel investigation on 10 economies of Southeast and East Asia which found that there is no clear cut relationship between international trade and trade financing. The downside of panel testing is that it does not capture the economy specific experiences. Trade data indicate that although export and import values fell, only import volumes contracted sharply while export volumes increased on average. For instance, in 2002 when Brazil went into crisis export credit lines fell significantly mainly due to shortage of supply of credit, while exports showed an increasing trend as supported by the real depreciation of the real exchange rate (Mori H., 2005). The decline in trade financing seems to have a little impact on export volumes,

while the significant decline on the volume of imports was associated with sharp real devaluation and fall in domestic demand due to the crisis.

In many developing economies the impact of the financial crisis on their financial systems depended on their exposure to the sub-prime market and the international capital markets. For instance, sub-Saharan Africa seems to be less affected, while it may have been more severe in the Central America and Caribbean countries. Based on research carried out by the Institute of Development Studies (Humphreys, 2009) on 30 medium to large-scale firms in the Sub-Saharan Africa, indicate that very few were affected by the availability of trade finance. One factor was the resilience of the domestic banking system which had very limited exposure to international capital markets. The exporters/importers had no problems in accessing funding from domestic banks so long as the companies maintained good financial position and considered to be creditworthy. The second factor is explained by the nature of the trading relationship between the export/supplier and the importer, in which a well established relationship can result in inter-company credit to sustain the trade. In addition, exporters provided trade credit to their reliable customers to bridge the gap between the shipment and payment, while other companies used the letter of credit extended by the commercial banks to facilitate trade. For many developing economies, the impact was more severe through the balance of payments as international commodity prices fell significantly during the crisis. In the case of Africa, the exports were affected as a result of the decline in the demand for garments and exchange rate volatility associated with the global financial crisis, and therefore, affecting export prices.

Among other factors that affected the international trade was the dramatic increase in the pricing in some markets. According to the International Chamber of Commerce (ICC) (1999), the tightening in liquidity conditions and increased counterpart risk aversion have prompted the financial intermediaries to drive interest rates up for their loans and fees charged on trade financing instruments in many countries, especially in emerging economies. Anecdotal evidence indicate that trade finance deals increased significantly by 300-400 basis points over the interbank refinancing rates which were two to three times more than the going rate in pre-crisis period. This was compounded by the bank's weak balance sheet, global currency volatility and more rigorous risk assessment which resulted in the sharp increase in the cost of trade credits. These factors have made it even more difficult to access trade credits. It was pointed out by Korinek J. et al, (2010) that the increase in the cost of financing through the banks during the crisis was unprecedented. The general increase in short term financing (not just the cost of trade finance) rose sharply by 233 basis points by end of 2008.

## 5. Research Methodology

### 5.1 Theoretical Model Specification

According to theory, export performance of a country is determined primarily by two main factors namely; the foreign income of its trading partners which is measured by economic activity or GDP and the relative price or terms of trade factor (Hopper and Marquer, 1993). The relative price or the terms of trade (TOT) implicitly captures the exchange rate and its impact on exports demand. As pointed out in the literature review, the other important determinant of export performance is the availability of trade credit for international trade. Over the years as international trade and globalisation increased, the need for trade credits also increased as producers or exporters found themselves in the need for finance to enable them to transact. In more recent years, evidence suggest that the 1997 Asian financial crisis and 2008 Global financial crisis had a significant impact on export performance and it is important for policy making purposes to explore the various channels through which these effects are propagated. The estimation of the model which takes into account these determinants is based on the export demand function:

$$\Delta X_t = \alpha + \sum \beta_i \Delta X_{t-i} + \sum \delta_i \Delta TOT_{t-i} + \sum \eta_i \Delta GDPTP_{t-i} + \sum \theta_i \Delta TCR_{t-i} + \sum \chi_i \Delta (DGDP * TCR)_{t-i} + e_t, \quad i = 0, 1 \dots n \quad \text{Model (1)}$$

where; ( $\Delta$ ) denotes growth rate from time (t-1) to (t); (X) is the export value; (TOT) denotes the terms of trade measured as the ratio of unit value of export over the unit value of import; (GDPTP) represents the trade weighted GDP of the country's main trading partners (in US dollar); (TCR) is the total export credit; and  $\Delta(DGDP * TCR)$  represents the interactive variable of domestic GDP and export credit. The error term (e) is assumed to have zero mean, constant variance and not auto-correlated.

### 5.2 Data & Methodology

The model specification for PNG is a reduced version of the above general model which is dependent on the availability of data:

$$\Delta LGEXPORT_t = \alpha + \sum \beta_i \Delta LGEXPORT_{t-i} + \sum \delta_i \Delta LGTOT_{t-i} + \sum \eta_i \Delta LGTWGDPEXUS_{t-i} + \sum \theta_i \Delta LGKLENDING_{t-i} + \sum \chi_i \Delta (LGDGDP * KLENDING)_{t-i} + e_{t-i}, \quad i = 0, 1 \dots n \quad \text{Model 2}$$

where, LG represents log of each of the variables, (EXPORT) is the total export for the period 1990 to 1994, which was sourced from the Bank of PNG Quarterly Economic Bulletin; (TOT) represents the price effect in terms of trade ratio of

unit value of export in kina to unit value of import in kina and was calculated using information from Bank of PNG. EXPORTPRICES was also used based on the line of thinking that export prices may have more significant effect on export performance than TOT. (TWGDPEXUS) represents the trade weighted GDP of PNG's main trading partners sourcing information from the IFS and Direction of Trade Statistics. The trade weighted GDP excludes US because imports from US increased significantly over the years while exports to US declined very significantly and therefore, distorting the effects of growth in US GDP on PNG exports. (KLENDING) represents two key variables, firstly as a proxy of the (TCR) which is the foreign component of the trade financing to domestic exporters and secondly, as domestic kina lending by commercial banks to the export sector. Data on TCR is not available so the kina lending to the private sector is used as a proxy. The interactive variable, (DGDP\*KLENDING) tries to capture the impact of the financial crisis on trade credit, its interaction with domestic activity or GDP and how it eventually affects export performance.

The model (2) is further decomposed from total exports to the agriculture/forestry/fisheries exports. The reason being that 75% of total exports are mineral exports that are not financed by trade credits but rather by long term foreign direct investments and therefore, the relationship does not exist. It is assumed that the agriculture/forestry/fisheries sector should use trade credit to finance exports and should exhibit a stronger relationship. Below is the further decomposed model:

$$ALGAFFEXPORT_t = \alpha + \sum \beta_i ALGAFFEXPORT_{t-i} + \sum \delta_i ALGTOT_{t-i} + \sum \eta_i ALGAUSGDP_{t-i} + \sum \theta_i ALGAFFLENDING_{t-i} + \sum \gamma_i A(LGDGDP * AFFLENDING)_{t-i} + e_t, \quad i = 0, 1, \dots, n \quad \text{model (3)}$$

### 5.3 Empirical Testing

#### *Unit Root Test*

The first empirical testing was done for the unit root test on all the variables to ensure stationarity. Log was taken for all variables before the unit root test was carried out. The results are presented below:

<b>Table 2: Unit Root Tests (Augmented Dickey-Fuller Test)</b>		
<b>Variables</b>	<b>Level</b>	<b>1st Difference</b>
	Probability	Probability
Total Export - (LOGEXPORT)	0.3510	0.0001
Agriculture Export - (LOGAFFEXPORT)	0.5500	0.0000
Terms of Trade - (LOGTOT)	0.7062	0.0000
GDP of Trading Partners - (LOGTWGDPEXUS)	0.3998	0.0000
Total Kina Lending - (LOGKLENDING)	0.9993	0.0000
Lending to Agriculture/Forestry/Fisheries Sector - (LOGAFFLENDING)	0.3772	0.0000
Interactive Variable - (LOGGDPDPCLKLENDING)	0.9557	0.0000
Interactive Variable - (LOGDGDPAFFLENDING)	0.0371	0.0000
Australia GDP - (LOGAUSGDP)	0.8296	0.0000
Export prices - (LOGEXPORTPRICES)	0.2050	0.0014

The unit root tests carried out on all the variables at the levels suggest that at 1% critical value there is a unit root in all variables. As part of the process to make the variables stationary, the next step involved taking the first difference of all variables. The above results indicate that there was not unit root at the first difference.

### Regression Results on Total Exports

The first regression was run on the total exports based on model (2) and the results were as follows:

Model 2a					Model 2b				
Dependent Variable: DLOGEXPORT					Dependent Variable: DLOGEXPORT				
Method: Least Squares					Method: Least Squares				
Date: 11/30/10 Time: 11:14					Date: 12/05/10 Time: 15:34				
Sample (adjusted): 1990Q4 2009Q4					Sample (adjusted): 1990Q3 2009Q4				
Included observations: 77 after adjustments					Included observations: 78 after adjustments				
	Coefficient	Std. Error	t-Statistic	Prob.		Coefficient	Std. Error	t-Statistic	Prob.
C	0.017	0.016	1.049	0.298	C	0.007	0.016	0.450	0.654
DLOGEXPORT(-1)	-0.319	0.095	-3.339	0.001	DLOGEXPORT(-1)	-0.375	0.097	-3.864	0.000
DLOGKLENDING	0.640	0.313	2.044	0.045	DLOGKLENDING	0.564	0.300	1.877	0.065
DLOGKLENDING(-2)	-0.608	0.313	-1.942	0.056	DLOGTOT	0.534	0.134	3.976	0.000
DLOGTOT	0.463	0.130	3.561	0.001	DLOGTOT(-1)	0.301	0.146	2.065	0.043
DLOGTOT(-1)	0.251	0.140	1.800	0.076	DLOGTWDPEXUS	0.741	0.185	4.009	0.000
DLOGTWDPEXUS	0.671	0.184	3.653	0.001					
DLOGDGDPCLENDING	0.091	0.040	2.252	0.028					
R-squared	0.497	Mean dependent var	0.032		R-squared	0.420	Mean dependent var	0.032	
Adjusted R-squared	0.446	S.D. dependent var	0.156		Adjusted R-squared	0.380	S.D. dependent var	0.155	
S.E. of regression	0.116	Akaike info criterion	-1.373		S.E. of regression	0.122	Akaike info criterion	-1.298	
Sum squared resid	0.928	Schwarz criterion	-1.130		Sum squared resid	1.069	Schwarz criterion	-1.117	
Log likelihood	60.875	Hannan-Quinn criter.	-1.276		Log likelihood	56.633	Hannan-Quinn criter.	-1.226	
F-statistic	9.736	Durbin-Watson stat	2.106		F-statistic	10.440	Durbin-Watson stat	1.983	
Prob(F-statistic)	0				Prob(F-statistic)	0			

The estimation regression results of Model 2a (see Table 3) show that PNG's total exports are significantly influenced by external factors such as the trading partners' GDP (TWDPEXUS) or income and international prices or terms of trade (TOT). The growth in GDP of PNG's main trading partners has a significant impact on PNG's exports. As expected, there is a positive relationship and is significant with a coefficient of 0.67. This implies that 1% increase in the trade partners GDP will result in 0.67% increase in PNG's total exports. This is consistent with the analysis in the previous Section where a significant fall in exports as a result of the financial crisis was associated with the significant fall in the GDP of PNG's main trading partners. Although the impact is significant at the current period, it is not persistent over the preceding quarters. The results also indicate that PNG's exports are also significantly influenced by international prices (TOT). The cumulative effect of price (TOT) implies that with a 1% increase in price, exports are expected to increase by 0.71%. The impact of prices is only up to the first quarter lag and implies some persistence in the effect. The estimation results also indicate that while lending to the private sector as denoted by KLENDING (or as a proxy to foreign trade financing) is significant at 5% critical value, the cumulative effect is only 0.032. This means that 1% increase in lending will result in 0.032% increase in exports. The interactive variable (DGDPCLENDING) is also significant and indicates that 1% increase in the interactive variable will result in 0.09% increase in exports.

In model 2b, the relationship is more stronger once the lag variable of kina lending, LGKLENDING(-2) is removed from the equation because it is theoretically not consistent with a negative sign and subsequently the interactive variable, LGDGDPCLENDING also drops off as it is no longer significant. Total kina lending denoted by LGKLENDING now shows a stronger relationship with a coefficient of 0.56 and implies that 1% increase in kina lending will result in 0.56% increase in exports. On the other hand, the price effect on exports now indicates that a 1% increase in international prices as denoted by LGTOT will result in about 0.83% increase in exports, while growth in trading partners GDP (LGTWGDPEXUS) by 1% increase will result in 0.74% increase in exports. The regression analysis indicates that kina lending, international prices and GDP of PNG's trading partners are important variables that can have significant impact on PNG's exports. The adjusted R<sup>2</sup> is 44 in model 2a and 38 in model 2b, which imply that the models are not robust, e.i., only 44% and 38% of the movements can be explained by the models, respectively. However, the objective of this exercise is to identify the important variables that influence PNG's export performance and not necessarily to construct a robust model. It would be a bonus if we did in the process but data quality and limitations have made the task not possible.

### *Regression Results on Agriculture Exports*

Model 3a					Model 3b				
Dependent Variable: DLOGAFFEXPORT					Dependent Variable: DLOGAFFEXPORT				
Method: Least Squares					Method: Least Squares				
Date: 11/30/10 Time: 15:07					Date: 12/08/10 Time: 15:40				
Sample (adjusted): 1991Q2 2009Q4					Sample (adjusted): 1998Q2 2009Q4				
Included observations: 75 after adjustments					Included observations: 47 after adjustments				
	Coefficient	Std. Error	t-Statistic	Prob.		Coefficient	Std. Error	t-Statistic	Prob.
C	0.051	0.025	2.057	0.044	C	0.018	0.029	0.623	0.537
DLOGAFFEXPORT(-1)	-0.423	0.113	-3.748	0.000	DLOGAFFEXPORT(-1)	-0.490	0.139	-3.528	0.001
DLOGAFFEXPORT(-2)	-0.503	0.111	-4.543	0.000	DLOGAFFEXPORT(-2)	-0.354	0.131	-2.706	0.010
DLOGAFFEXPORT(-3)	-0.286	0.110	-2.603	0.011	DLOGAFFEXPORT(-3)	-0.292	0.124	-2.359	0.023
DLOGAFFEXPORT(-4)	0.230	0.106	2.162	0.034	DLOGAUSGDP(-1)	1.050	0.393	2.670	0.011
DLOGAUSGDP(-1)	0.806	0.330	2.441	0.017	DLOGAUSGDP(-2)	0.716	0.441	1.622	0.113
DLOGAFFLENDING(-3)	0.167	0.092	1.814	0.074	DLOGAFFLENDING(-3)	0.153	0.088	1.733	0.091
DLOGTOT(-2)	0.338	0.222	1.526	0.132	DLOGEXPORTPRICES	0.706	0.342	2.060	0.046
R-squared	0.587	Mean dependent var	0.039		R-squared	0.459	Mean dependent var	0.028	
Adjusted R-squared	0.544	S.D. dependent var	0.275		Adjusted R-squared	0.361	S.D. dependent var	0.226	
S.E. of regression	0.186	Akaike info criterion	-0.428		S.E. of regression	0.180	Akaike info criterion	-0.434	
Sum squared resid	2.313	Schwarz criterion	-0.181		Sum squared resid	1.269	Schwarz criterion	-0.119	
Log likelihood	24.042	Hannan-Quinn criter.	-0.329		Log likelihood	18.190	Hannan-Quinn criter.	-0.315	
F-statistic	13.618	Durbin-Watson stat	2.113		F-statistic	4.718	Durbin-Watson stat	1.816	
Prob(F-statistic)	0.000				Prob(F-statistic)	0.001			

In this further decomposed model 3a and 3b we test to see how these variables affect PNG's exports from the agriculture/forestry/fisheries sector. The regression results indicate that international prices can have a significant influence to the agriculture/forestry/fisheries sector exports. As indicated in model 3a, the impact of terms of trade (TOT) of 0.34 is not immediate but occurs on the second lag, while in model 3b, export prices have an immediate effect of 0.71. As expected, both prices have a positive relationship however export prices have a relatively bigger effect than TOT. This implies that 1% increase in international commodity prices could affect exports to increase by 0.71%. In this decomposed model of the agriculture/forestry/fisheries sector, it was found that trade weight GDP for PNG's trading is not significant and instead, the Australian GDP was used as it accounts for almost 50% of PNG's total exports. The relationship is significant and positive as expected, and while we cannot be completely confident with the results we can still make the following assumptions. Model 3a indicate that for every 1% increase in the Australian GDP, exports are estimated to increase by 0.81%, while Model 3b indicates that its impact can be even more significant with the cumulative effect of about 1.7%. Kina lending to the agriculture/forestry/fisheries sector is also a significant variable at 10% critical value, however its impact on exports is relatively small at 0.15. The relationship is positive as expected and implies that 1% increase in lending will result in 0.15% increase in exports. The relatively low impact could imply that the agriculture/forestry/fisheries sector is not so much dependant on credit from the banking system. Companies and small holders may be tapping into other sources of finance either from parent companies, especially logging and fisheries companies or their own cash-flow in the case of small holder farmers. Smallholders in PNG find it difficult to obtain credit from banks due to lack of capital, management capabilities, landowner issues and etc.

## **6. Policy Implications and Recommendations**

The global financial crisis that resulted in a global recession in major industrialised economies and significant fall in international trade has brought widespread concern for policy makers. Apart from the downturn in the global demand that affected economic activity and international trade in particular, the significant decline in trade financing also played a role in this. While the industrial and many of the emerging market economies were significantly affected by the substantial decline in foreign trade financing, developing economies like PNG were not so much affected by the shortage of trade financing. One reason is the resilience of the domestic banking system as well its lack of exposure to the sub-prime crisis. In the case of PNG, the sound and prudent management of the

domestic financial system ensured stability during the crisis. The regression analysis indicate that the impact of total lending by the commercial banks (taken as a proxy to foreign trade credit financing) on total export performance can be as significant as 0.56, while the impact of lending to the agriculture/forestry/fisheries sector to exports is small around 0.15. It indicates that overall kina lending has a much bigger impact on total exports than the kina lending to the agriculture/forestry/fisheries sector exports. It is an interesting finding that kina lending does not have a significant impact on agriculture/forestry/fisheries export performance, which implies that exporters or producers may be tapping into other sources of finance. For PNG, the decline in lending was more of a lack of demand rather than supply of credit during the financial crisis because banks had excess liquidity. The effect of total kina lending on exports in model 2a shows that there is a two quarter lag effect while, in models 3a and 3b, kina lending to the agriculture/forestry/fisheries sector shows that there is a three quarter lag effect. While we cannot be completely confident about the lag effects, we can still make the assumption based on the outcome of both models that there is some persistence. This provides some direction for Government policy to provide financial support to sustain export production during times of crisis when trade financing and/or bank lending falls.

The other factor that adversely influenced the PNG export performance was the significant fall in terms of trade (TOT) or export commodity prices and deterioration in the balance of payment accounts, especially the trade account. The regression analysis in model 2 finds that prices (TOT) is a significant variable and indicated that 1% increase in TOT can result in a cumulative effect of around 0.70% to 0.80% increase in exports. Its impact shows some persistence to the next quarter and can last for six months, with around 0.50% of the impact occurring in the current quarter and the rest in the next quarter. In model 3a, the effect of TOT is lower at 0.34. In model 3b, export commodity prices show a higher effect of 0.70. The results indicate that the effect of prices, both the TOT and export commodity prices can have a substantial effect on exports, and thus implies that PNG is significantly vulnerable to international price fluctuations. These findings suggest that Government policy must assist the export sector during times of dramatic fall in export prices in order to maintain production and export volumes.

Finally, the GDP of PNG's trading partners is also a significant influence on PNG's exports. As indicated in the regression analysis, its impact is immediate in model 2a and 2b, while in model 3a and 3b, the effect is persistent and can last to the first quarter and second quarter lag. It shows that 1% increase in trading partners GDP can result in 0.60% to 0.70% increase in exports, however

model 3b shows an even greater impact. The degree of openness, which is defined as the ratio of total trade to GDP, of 90% in 2009 indicates that PNG is a very open economy and so can be exposed to external shocks. Significant falls in economic activity or recession in trading partners' economies will adversely affect PNG's exports reflecting its openness to trade and narrow export base.

A number of policy options or recommendations can be suggested to help PNG strengthen its economic base to minimise its vulnerability to external shocks that could arise from financial crisis, global recession and collapse in commodity prices. Firstly, PNG must seek ways of how to improve production and add value to exports to which it has comparative advantage. A long term strategy for PNG should be to expand the current traditional export crops and further diversify the agriculture sector to other high yielding crops. In this regard, the Government should put more emphasis in developing the agriculture export sector by improving its extension services to rural farmers where large part of the production occurs. Increase in the level of production would enable downstream processing of its raw materials and agricultural commodities and add value to exports. The high valued export products will be able to fetch high prices in international markets as well as benefit from more stable prices like any other manufactured products. It is also critical that the Government must support the production of agriculture food crops for domestic consumption so that demand for import food products can be reduced. If domestic food crop varieties and other products for consumption can be expanded and production increased, it can substitute imported food and other manufactured products. These would help reduce PNG's dependency on imported food items.

Secondly, the Government should provide some form of financial assistance and other incentives for rural farms or smallholders with the aim of supporting them during times of low commodity prices. The idea of price support to the agriculture sector is not new to PNG, back in the 1980s and 1990s different forms of commodity price support was put in place which supported the small growers during those difficult times when prices were very low (Millet J., 1990). This was important to ensure that export crops are not neglected but maintained so that future production is not affected. However, the terms of trade for PNG has been declining over the years due to continuous fall in commodity prices and the subsidy scheme become unsustainable. The subsidy scheme was abolished in the 1990s when it became expensive to maintain by the Government due to prolonged low commodity prices and abuse of funds by implementing agencies. The concept is still good and the Government should consider reviving commodity price support scheme so that during boom periods revenue from higher commodity prices can be saved and made available during times of low

commodity prices to support the sector. For the future success of this scheme, it is important that the processes and guidelines need to be strengthened to stop abuse of funds if it were to serve the interest of the growers. Other incentives that the Government should provide or improve are road infrastructure, market accessibility and reduction of cost of imported inputs used in the agriculture sector in order to increase productivity and production for exports and domestic consumption.

Thirdly, it is important to note that since independence PNG adopted an inward looking industrialisation strategy which involved the development of certain industries under heavy protection. This protection took the form of high import tariffs and non-tariff barriers that directly increased input costs for agriculture production and indirectly through other industries which eventually affected productivity and profitability of the agriculture export sector (Bosworth M. et al, 2000). In the 1990s, PNG made a significant policy shift away from protectionism and pursued domestic industrialisation with less protection as well as promoting export oriented industries. This involved trade liberalisation or tariff reforms which were undertaken with the aim of adopting a more neutral cost effective tariff structure. This is still on-going and further tariff reduction is needed to reduce costs and promote private sector competitiveness, especially the export sector. In the promotion of export-led industrialisation, PNG tried to adopt the similar export strategy of the Asian growth model (Cole J., et al, 1997). The reasoning is based on the economic success of East Asian economies up to the 1990s before the Asian Financial Crisis in 1997 and how PNG could model this success. As shown from the Asian experience that export-led strategy opens up a lot more opportunities for higher economic growth. These opportunities include unlimited overseas markets, foreign competition, capital accumulation and technology transfer, skills transfer, foreign investments and etc (Thirlwall A. P., 1994). This is a good strategy for PNG to adopt because of the kind of competitive environment that makes the export industries efficient, innovative and competitive. In the Papua New Guinea Development Strategic Plan 2010 – 2030 (2010), the Government made it clear that in order to maximise economic benefits from its rich natural resources an outward-oriented trade policies will be pursued.

Finally, at a broad macro level, certain economic and financial framework or reforms must be put in place to promote sound financial and stable economic systems in crisis countries or for any country for that matter. In the Asian crisis, the key element in the comprehensive structural reform agenda has been to deal with the weaknesses in the financial system, which includes measures to facilitate corporate restructuring, strengthening governance, disclosure and improving

accounting standards (Boorman J., et al, 2000). Also various structural reforms such as trade and capital account liberalisation, healthy competitive environment, and privatisation are important reforms aimed at enhancing the resilience and growth potential of the crisis economies. These reforms are crucial for PNG because of its increasing integration into the global economy. Since the 1990s and, more so, following the passing of the Central Banking Act 2000 and Banks and Financial Institutions Act 2000 significant reforms were undertaken in the financial system in terms of corporate restructuring, strengthening governance, disclosure of information and improving accounting standards. As part of the reform, the Central Bank liberalised the trade account in 2005 and capital account in 2007. The Government has also recognised the importance of having a comprehensive competition policy that would promote a competitive environment for business operations as well as improving the standard of living for consumers in PNG. While it had successfully brought in competition in the telecommunication market and the air transport sector, competition is lacking in several sectors including cement and processed food products. The Government has also made an undertaking to improve the service delivery of state-owned enterprises by adopting commercial principles through the concept called public private partnership (PPP) (Papua New Guinea Development Strategic Plan 2010 – 2030, 2010). This will involve Government and private sector partnership in providing key services such as electricity, water, transportation etc., to promote efficiency and improve service delivery. These reforms are crucial in order to enhance the resilience and growth potential of the PNG economy.

## **7. Conclusion**

The findings in this paper suggest that PNG is not immune to external shocks such as the Asian Crisis and the recent Global Financial Crisis. The impact of these crises varied in different economies through various channels depending on how integrated they are to the global financial markets and globalised through international trade. It was found from the regression analysis that there are three main determinants through which the effects of these crises were propagated into the PNG's economy. They were; (1) international prices, i.e., terms of trade or export commodity prices, (2) GDP of PNG's main trading partners and (3) commercial bank credit to the private sector or export sector. The prices and GDP of PNG's main trading partners were found to have a much bigger impact on export performance compared to kina lending which was also used as a proxy of trade credits. Although, data limitations and the quality of data used may have affected the results and the robustness of the models, the results from the four models show that these three key variables are significant but with varying degrees of impact.

The openness of the economy as indicated by the ratio of total trade to GDP of 90% by end of 2009 implies that PNG is a very open economy which makes it very vulnerable to external shocks. This is further exacerbated by the fact that PNG has a very narrow and weak export base, characterised by mineral and agricultural commodity exports whose prices can be very volatile and unstable. It is therefore important for PNG to expand its export base in terms of crop variety and production level and quickly move into downstream processing and high value-added production of its raw exports if it were to take advantage of high prices of manufactured products in the world market. The export revenue from the mineral and agricultural exports should be used to expand its industrial base for production of raw materials and agriculture cash crops to high value-added exports. For a small country like PNG, export-oriented policy is a good strategy to promote economic growth because it opens up a lot of opportunities in terms of unlimited overseas markets, advanced capital and technology transfer, skills transfer, foreign investments and etc. It is important that while PNG embraces the export-led strategy as a growth model, it must also learn from the mistakes of such policy such as too much Government intervention and other non-market practices. Government policy should always be viewed from the perspective of making the markets work more efficiently and promoting higher economic growth. While promoting export industries to add value to exports, local industries must also be developed to meet domestic consumption demand and reduce import dependency. In that regard, PNG must increase its food variety and production to reduce import dependency on imported food items that can be produced locally. Therefore, having a balanced growth in both the export and domestic sectors will definitely help reduce the impact of future external shocks in the real sector.

It is also important that at a macro level, PNG must aim to achieve and maintain a sound and prudent financial system, good management of Government fiscal operations as well as to achieve competitiveness in the private sector. In that regard, the Government must continue to carry out further reforms in trade liberalisation, state-owned enterprises as well as adopt a comprehensive competition policy to promote healthy competition in various sectors of the economy where it is lacking. It is crucial that the Government must successfully undertake these reforms in order to enhance the resilience and growth potential of the PNG economy.

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