IMF Working Paper

Do Trading Partners Still Matter for Nigeria's Growth? A Contribution to the Debate on Decoupling and Spillovers

Kingsley I. Obiora

INTERNATIONAL MONETARY FUND

IMF Working Paper

Strategy, Policy, and Review Department

Do Trading Partners Still Matter for Nigeria's Growth? A Contribution to the Debate on Decoupling and Spillovers

Prepared by Kingsley I. Obiora[1]

Authorized for distribution by Ulric Erickson von Allmen

October 2009

Abstract

Have developing and emerging market countries decoupled from the US enough to grow despite significant recession in the US? Using VAR models, this paper addresses this question for Nigeria in the context of the global crisis. The results seem to debunk the "decoupling theory" and suggest there are still significant spillovers from Nigeria's main trading partners, including the US, with trade and commodity price linkages being the dominant transmission channels. Given the sharp fall in trade financing and commodity prices in the aftermath of the crisis, these results provide some explanation to the realization of adverse second-round effects in Nigeria.

Contents   Page

Tables

Figures

I. INTRODUCTION

A growing consensus was beginning to emerge that the rest of the world could continue to grow despite significant slowdown in the US. In published reports[2], books[3], and short essays[4], proponents[5] of this theory, commonly called "decoupling", frequently pointed to the fact that emerging markets now constitute 30 percent of the world economy and contribute 60 percent of global growth. They also argued that consumption in emerging markets has risen to the extent where it can replace consumption declines in the US.

More arguments in favour of decoupling were built around several other factors including shifting trade patterns and demographic changes. Proponents argued that trade linkages with the US was becoming increasingly less important for many countries and that critical pro-growth demographic factors are in favor of emerging market countries. In particular, Garner (2008)[6] asserts that while working age population in emerging market countries will rise by one billion people by 2050, the same demographic group will shrink by 120 million in developed countries. In general, the underlying position was that emerging market and developing countries may have decoupled enough from the US such that these countries could continue on the path of economic growth even with a major slowdown in the US.

These conclusions seemed to have emanated from the benign effects of US economic recession which began in December 2007.[7] A number of possibilities may have resulted in

---

[2] For example, see Merrill Lynch's 2007 Global Economics Report titled "Global Decoupling: A Marathon, Not a Sprint".

[3] For example, see Schiff, P. D. and J. Downes (2007)

[4] See Peter Schiff's write-up in The Money Map Report (http://crashproofportfolio.com/archives/dollar/)

[5] These include Jim Rogers (cofounder - with George Soros- of Quantum Fund), Jonathan Garner (head of Global Markets Equity Strategy, at Morgan Stanley), Jim O'Neill (head of Global Economic Research for Goldman Sachs), Joseph Quinlan (Chief Market Strategist, Bank of America Capital Management), and Ralph Wiechers (Chief Economist, German Engineering Federation).

[6] See Business Week Magazine, March 20, 2008. Weblink: http://www.businessweek.com/globalbiz/content/mar2008/gb20080320_277085.htm

[7] The National Bureau of Economic Research (NBER) announced this date as the end of a 73-month expansion and the beginning of a recession in the US economy.

this outcome. The slowdown has been related to specific sectoral developments in the US economy including corrections in the housing and manufacturing sectors, rather than to broad-based, common factors such as oil price or equity market developments that were often behind earlier downturns (IMF, April 2007). This outcome may also have been related to the strengthening momentum of domestic demand in emerging markets, and other advanced economies (excluding the US), which made global growth seem more resilient at the time.

However, global reverberations emanating from the subprime crisis in the US seem to suggest otherwise. With the collapse of nearly all major investment banks in the US[8], and sharp decline in both equity and commodity prices, anecdotal evidences suggest that the scope for economic spillovers may have increased significantly. While low-income countries had no direct exposure to subprime mortgages, there are still significant indirect effects through sharp declines in remittances, trade financing, foreign direct investment, and commodity prices. Indeed, the crisis is projected to increase the financing requirements of low-income countries by as much as US$25 billion (IMF, 2009).

In the case of Nigeria, the global crisis has resulted in sharp declines in the value of oil exports, rapid depreciation of the exchange rate, and worsening investor sentiments in the banking sector. Given that over 90 percent of Nigeria's foreign exchange earnings and public sector revenue come from exports of crude oil, the fall in the price of crude oil (probably reflecting projected fall in global growth outlook) resulted in a rapid depreciation of the exchange rate and reversal of the trade balance from a usually comfortable surplus to a deficit. More also, there was a plummeting of share prices and market capitalization of quoted companies as both foreign and local investors divested from the Nigerian stock exchange. Remittances were also projected to fall by as much as 20 percent given the global slowdown.

In the context of this debate, this paper would examine the potential magnitude and transmission channels of spillovers in Nigeria. Given little empirical work (e.g. Dutse, 2008) on potential spillovers in Nigeria, I examine the relative effects of both external shocks in key

---

[8] These banks made huge losses from the crisis and had to either declare bankruptcy (Lehman Brothers), be sold (Bear Sterns, Merrill Lynch, Wachovia), or bailed out again and again by the US government (AIG). Others (Goldman Sachs, JP Morgan Chase, etc) survived but not without scars.

trading partners as well as shocks captured by the purchasing power parity (PPP) implied exchange rate[9] on economic activity in Nigeria. In addition to identifying the magnitude of spillovers from each of these countries, I would also measure the relative importance, and contribution of three potential sources of spillovers to Nigeria, namely, trade linkages, financial channels, and commodity prices.

I will be building on two main papers, namely, Bayoumi and Swiston (2007), and Obiora (2009). While the former dealt with spillovers across selected industrial countries, the latter analyzed spillovers in the Baltics. Although the magnitude of the effect is still contentious, the literature on spillovers and international business cycles typically finds that countries with greater trade and financial linkages have more synchronized business cycles (see Imbs, 2004; Inklaar, Jong-a-pin and De Hann, 2005; Herrero and Ruiz, 2007; and Koopman and Azevedo, 2007).

The rest of the paper is structured as follows. In section II, I discuss some stylized facts on trade and financial linkages of Nigeria with the rest of the world. A description of the data is presented in section III. Section IV uses vector autoregressive (VAR) models to assess the dynamics, and severity of shocks in trading partners as well as to competitiveness in Nigeria. Following Bayoumi and Swiston (2007), I estimate the contribution of spillovers from trade, commodity prices and finance in section V while section VI concludes the paper with some policy implications.

---

[9] I have used PPP-implied exchange rates because market exchange rates are mostly based on short-term factors and are susceptible to significant distortions from speculative activities and government interventions. More also, PPP-implied exchange rates better reflect a country's ability to export its products as it captures domestic cost considerations associated with tradable goods.

II. TRADE AND FINANCIAL LINKAGES

Over the past two decades, there has been remarkable increase in external trade and openness in Nigeria. The importance of trade in the Nigerian economy has grown rapidly in recent times, especially since 2002. Trade openness, measured as the ratio of exports and imports to GDP, has risen from just above 3 percent in 1991 to over 11 percent by 2008. The moderation in the growth rate of trade in 2008 partly reflects the unrest in Nigeria's oil-producing Niger Delta region, which resulted in significant disruptions in oil production and shortfalls in oil exports from Nigeria.

Figure 1: Nigeria's Trade Openness
(In percent of GDP, 1991-2008)
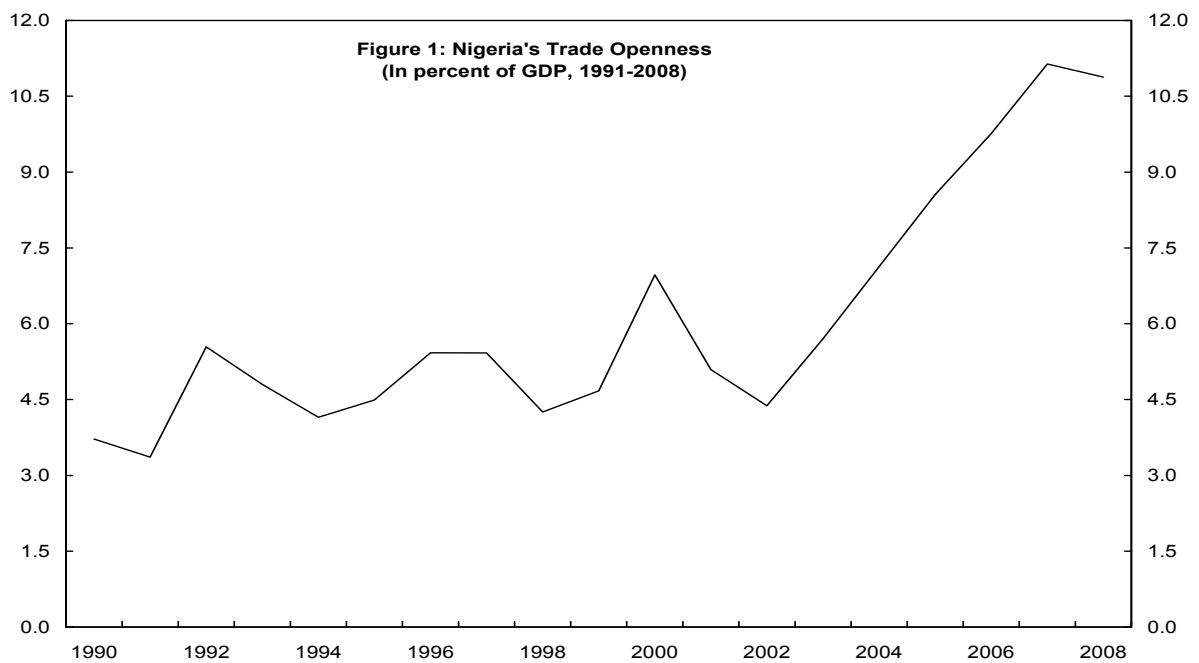
Direction of trade data indicates that the US, the EU, and Brazil are Nigeria's largest trade partners. Figure 1 shows that the US is Nigeria's single largest trade partner as it accounts for nearly 45 percent of Nigeria's exports. Of total exports, oil exports account for the vast bulk. The EU is also a major destination for Nigerian exports accounting for over 25 percent of total exports from Nigeria while Brazil accounts for about 6 percent of total exports. Trade relations between Nigeria and Brazil were further formalized in 2006 by the Abuja Resolution, which established the Africa-South America Cooperative Forum. Trade statistics show that Nigeria is the fifth largest exporter of merchandise to Brazil after the US, Germany, Argentina, and China.

Figure 2. Nigeria: Direction of Trade in Goods and Services (In percent of total, 1990-2007)
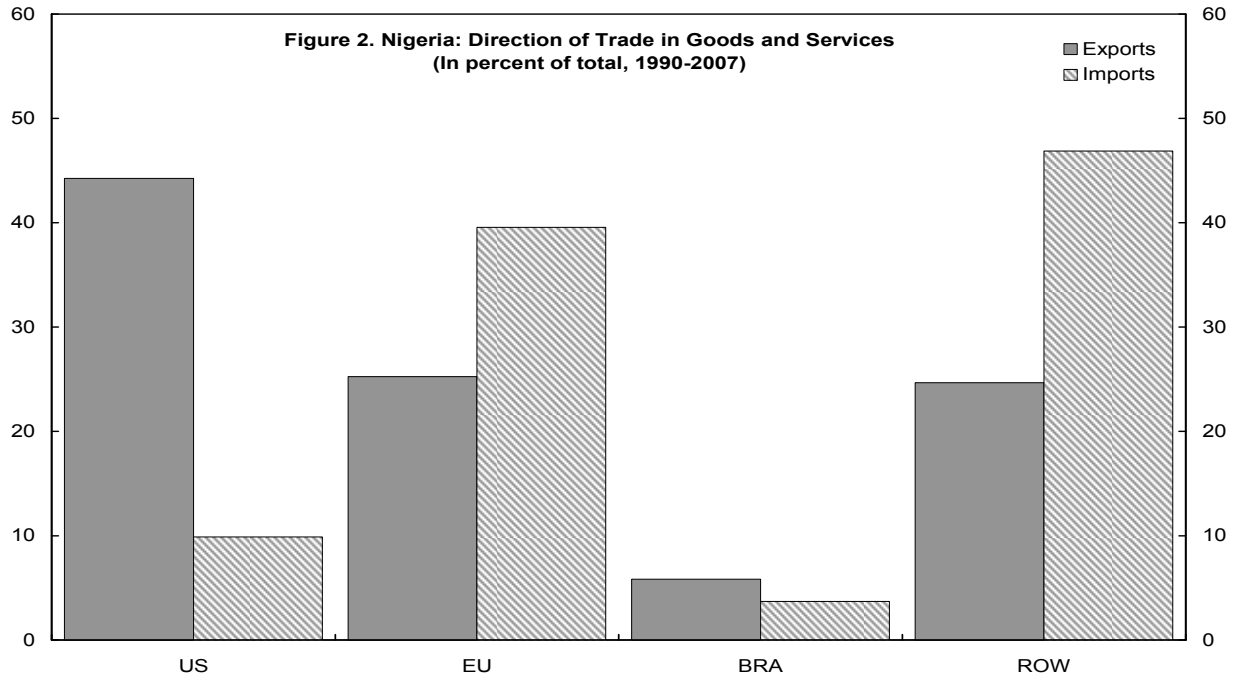
However, most of Nigeria's trade with the EU is concentrated in a small number of countries. Within the EU, Spain is the largest market for Nigeria's exports as it accounts for over 30 percent of exports to the EU (Figure 2). France, Germany and The Netherlands are also prominent export destinations for Nigerian goods.

Figure 3. Nigeria: Main Exports Markets in the EU (1990-2007)
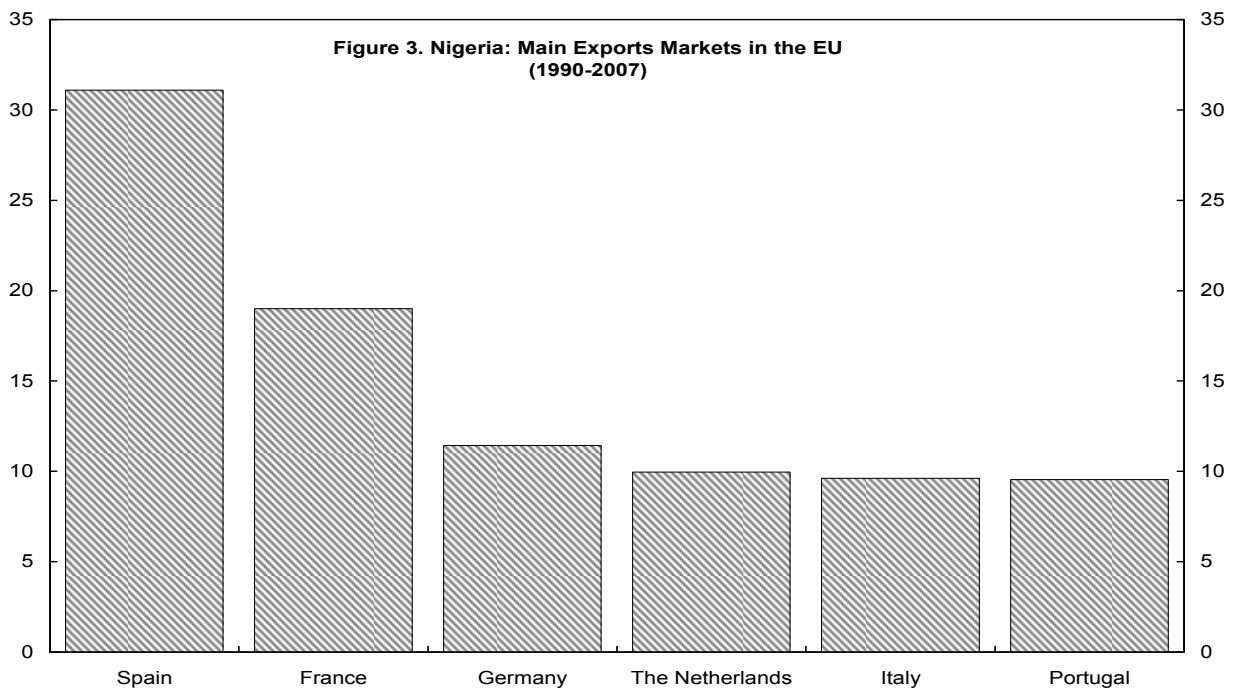
These trade linkages are reinforced by fairly close cooperation between Nigerian banks and their foreign counterparts. Characterized by aggressive competition and accelerated expansion, the Nigerian banking system underwent a major restructuring and recapitalization in 2004 which resulted in 24 commercial banks in the country. The sector was largely shielded from direct effects of the subprime crisis as they were mostly involved in traditional banking (receive deposits and give loans). However, the top 14 banks have strong ties to foreign asset managers who may have had direct exposures to the subprime crisis. One such tie is encapsulated in the central bank of Nigeria's decision (in February 2006) to award the management of Nigeria's external reserves to only foreign asset managers who had local partnership agreement with a Nigerian bank. Table 1 presents a list of the pairings.

Table 1: Partnership Between Nigerian Banks and Foreign Asset Managers

Access Bank PLC	ABN Amro (The Netherlands)
Bank PHB	Fortis (Benelux)
Diamond Bank PLC	Crown Agents (UK)
ECOBANK PLC	ING (Belgium)
Fidelity Bank PLC	Investec (SA)
First Bank PLC	HSBC (UK)
Guaranty Trust Bank PLC	Morgan Stanley (USA)
Stanbic IBTC Bank PLC	Credit Suisse (Switzerland)
Intercontinental Bank PLC	BNP Paribas (France)
Oceanic Bank PLC	Commerzbank (Germany)
Union Bank PLC	Black Rock (UK)
United Bank for Africa PLC	UBS (Switzerland)
Zenith Bank PLC	J.P. Morgan (USA)

Source: Central Bank of Nigeria Press Release, October 2006.

Net foreign direct investment (FDI) has soared over the past eight years, but there was a sharp decline in 2008. Reflecting increased investor confidence following Nigeria's return to democratic rule and political stability, net FDI increased steadily from 2000 with a peak of about $8.7 billion in 2006 (Figure 4). While the decline in net FDI began in 2007, it may have been intensified by the current global crisis.

Figure 4: Net Foreign Direct Investment in Nigeria
(1980-2008, in millions of US Dollars)

Nigeria's linkages with the rest of the world are also evident in the country's remittance receipts (Figure 5). Nigeria is the single largest recipient of remittances in Sub-Saharan Africa and accounts for about 65 percent of total remittances in West Africa (Orozco, 2003a, 2003b). This represents about 7 percent of the country's GDP (World Bank, 2007). Given that the current global slowdown has resulted in massive job losses in developed countries, it expected that remittances to developing countries, including Nigeria, will decline sharply.

Figure 5. Remittances to Nigeria
(in millions of US Dollars, 1995-2007)
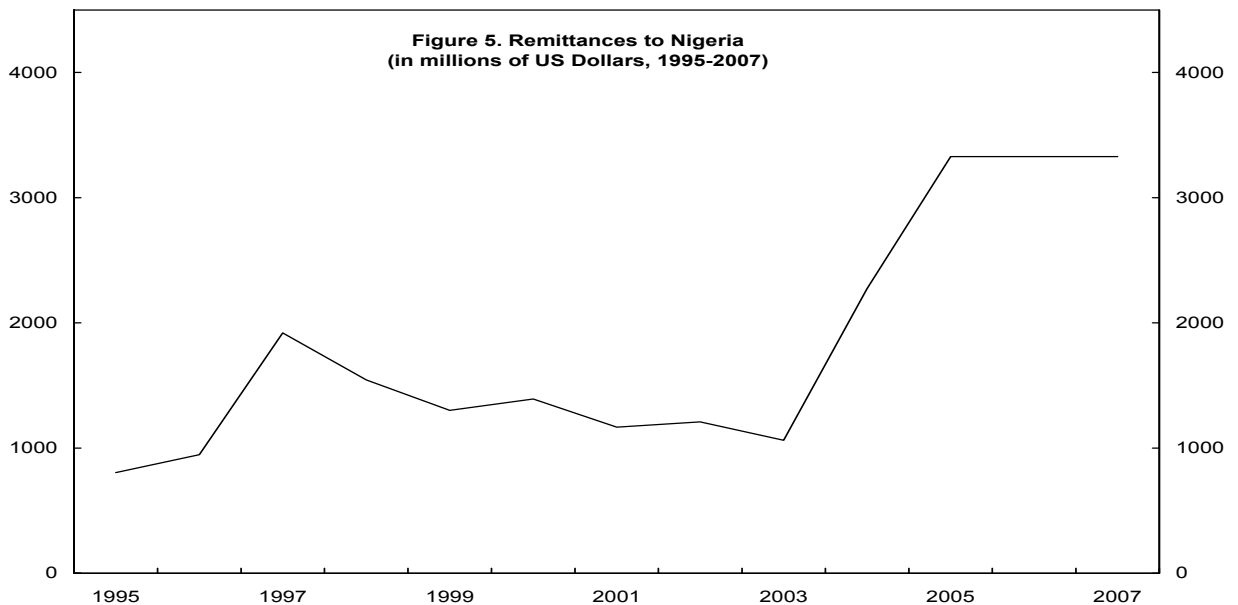
Given these linkages, business cycle correlations shows fairly similar turning points between Nigeria and her key trading partners (Figure 6).

Figure 5. Business Cycle Correlations between Nigeria and its Key Partners
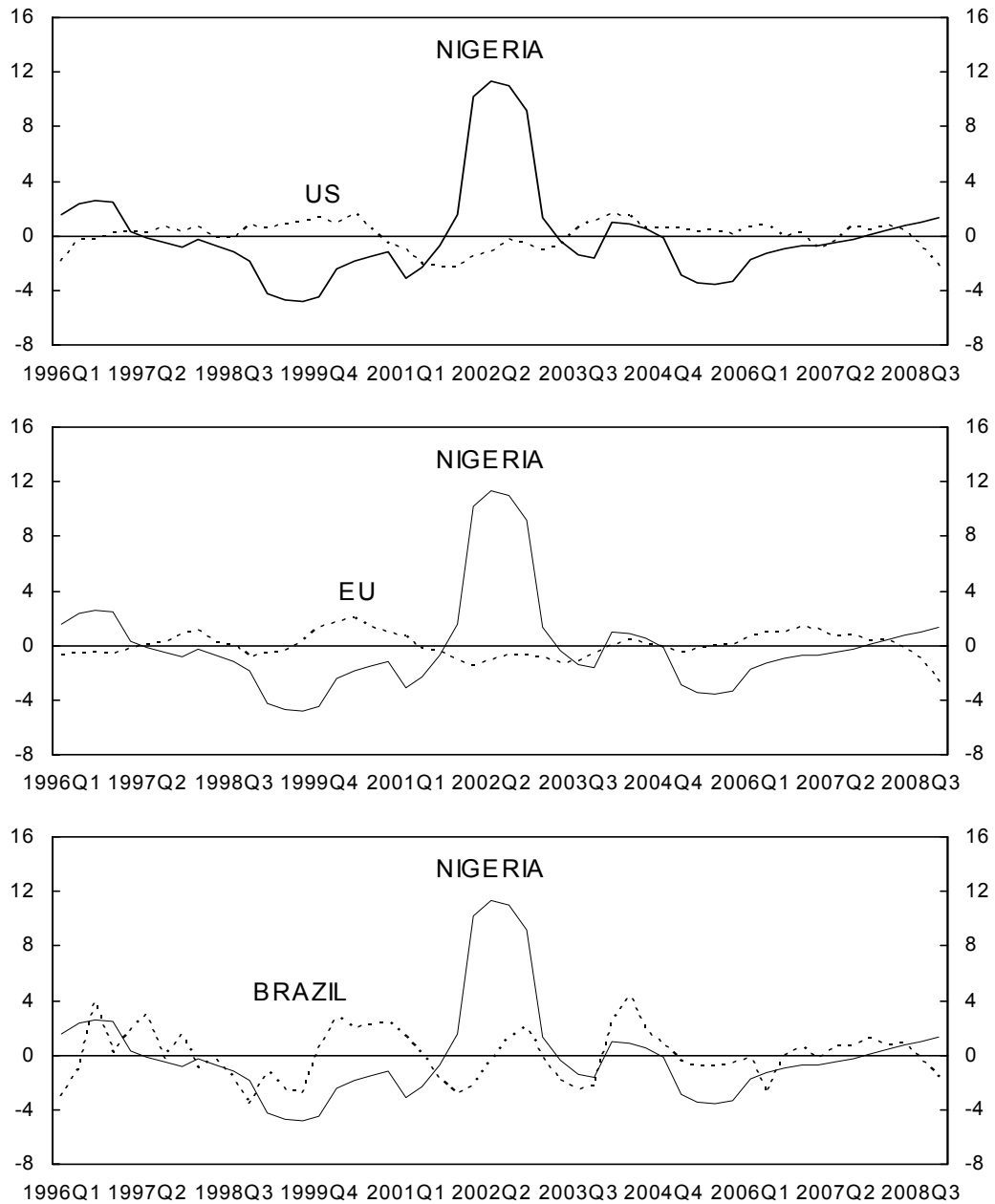
Source: Author's calculation.

III.   DESCRIPTION OF DATA

The following quarterly data sets were obtained for the study: Real GDP growth rate for the US, the EU[10], Brazil, and Nigeria, as well as the purchasing power parity (PPP) implied exchange rate, net exports, and inflation for Nigeria. I also obtained the non-energy component of the Goldman Sachs Commodity Index and the average petroleum spot price (APSP) of crude oil. The data sets spanned 1996Q1 to 2008Q4. I am compelled to use this relatively short sample given that GDP data for the EU is only available from 1995. Besides, Nigerian data from much earlier periods may not provide useful insights into current spillovers given that the economy has undergone rapid structural change over the past two decades.

Given the multi-country nature of this study, I obtained the required data set from a number of sources, namely,

- EU Real GDP: Obtained from Eurostat; seasonally adjusted harmonized ESA95 quarterly GDP in millions of chained 2000 euros.

- US GDP: Obtained from the Bureau of Economic Analysis; seasonally adjusted in billions of chained US 2000 dollars.

- Brazil GDP: Annual GDP in billions of Reais (Brazil's national currency) at 1995 prices was obtained from the IMF's World Economic Outlook (WEO) database and converted into quarterly frequencies using Eviews (I selected option "Quadratic Match Sum").

- All Nigerian Data: Annual data was obtained from the IMF's World Economic Outlook (WEO) database and converted into quarterly frequencies using Eviews (I selected option "Quadratic Match Sum").

---

[10] Data for the EU covers the EU-15 countries including Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the UK.

Nigeria's GDP seems to have a somewhat weak correlation and covariance with the GDP of her major trading partners. Of the countries compared, the EU has the strongest correlation with the US with a value of about 0.6. However, the covariance of Nigeria's GDP with those of its key trading partners seems stronger than their correlations. The figure below contains line graphs for optimal choice in the unit root tests. These figures enable me to know whether or not to include an intercept, trend, or both in the unit root tests.

Covariance and Correlation Statistics for Real GDP

Covariance	EU	US	Brazil	Nigeria
EU	1.22			
US	0.84	1.87		
BRA	0.17	-0.44	3.57	
NGR	-2.52	-3.31	1.46	25.34
Correlation	EU	US	Brazil	Nigeria
EU	1.00			
US	0.55	1.00		
BRA	0.08	-0.17	1.00	
NGR	-0.45	-0.48	0.15	1.00

Source: Author's Calculations.

Figure 7: Quarterly Real GDP Growth Rates (1996-2008)
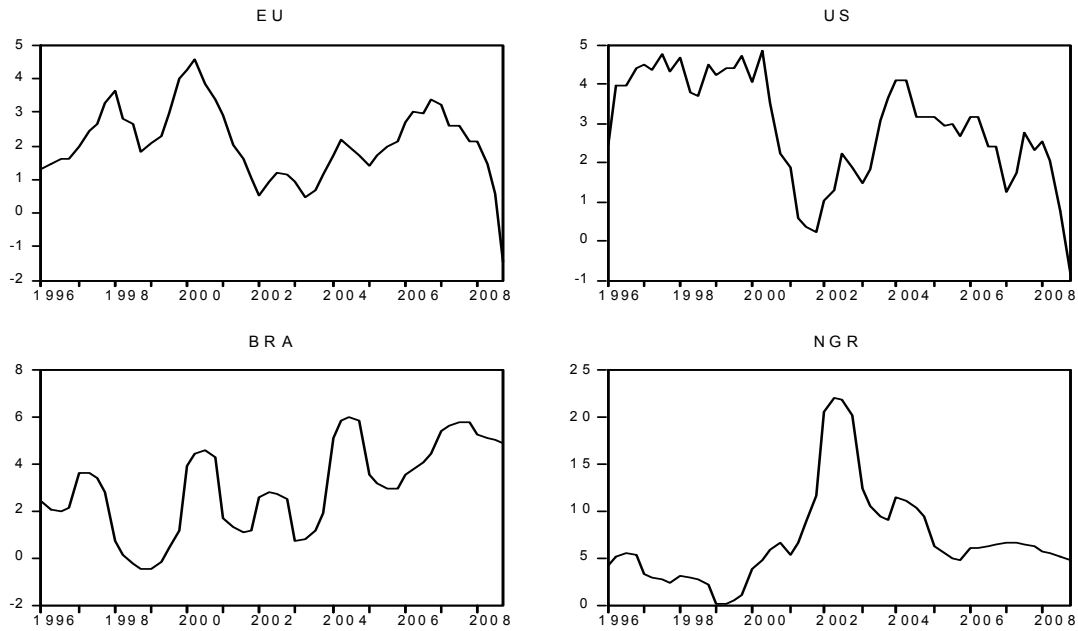
All variables were found to be stationary using the Ng-Perron unit root test. I adopted this testing procedure[11] because of its superiority in size and power over the more commonly used

---

[11] See Ng and Perron (2001) for details.

Dickey-Fuller and Phillips-Perron tests. Especially in small samples, the Dickey-Fuller and Phillips-Perron tests tend to over-reject the null hypothesis when it is true and under-reject when it is false (see Dejong, et al, 1992 and Harris and Sollis, 2003 for details). While the results (presented in Table 2), suggest stationarity, it is generally difficult to reject the unit root hypothesis for most macroeconomic variables given the persistence inherent in them.

Table 2: Results of Unit Root Tests Using the Ng-Perron Procedure

	Test statistics 1/	Critical values		
		1 Percent level	5 Percent level	10 percent level
US Real GDP Growth				
MZa	-8.24***	-13.80	-8.10	-5.70
MZt	-1.74***	-2.58	-1.98	-1.62
MSB	0.21***	0.17	0.23	0.28
MPT	4.01***	1.78	3.17	4.45
EU Real GDP Growth				
MZa	-17.35**	-13.80	-8.10	-5.70
MZt	-2.41**	-2.58	-1.98	-1.62
MSB	0.13**	0.17	0.23	0.28
MPT	3.20**	1.78	3.17	4.45
Brazil Real GDP Growth				
MZa	-6.65***	-13.80	-8.10	-5.70
MZt	-1.83***	-2.58	-1.98	-1.62
MSB	0.27***	0.17	0.23	0.28
MPT	3.66***	1.78	3.17	4.45
Nigeria Real GDP Growth				
MZa	-7.67***	-13.80	-8.10	-5.70
MZt	-1.95***	-2.58	-1.98	-1.62
MSB	0.25***	0.17	0.23	0.28
MPT	3.21***	1.78	3.17	4.45
Nigeria Exchange Rate				
MZa	-15.99**	-13.80	-8.10	-5.70
MZt	-2.73**	-2.58	-1.98	-1.62
MSB	0.17**	0.17	0.23	0.28
MPT	1.89**	1.78	3.17	4.45
Nigeria Inflation				
MZa	-180.53*	-13.80	-8.10	-5.70
MZt	-9.5*	-2.58	-1.98	-1.62
MSB	0.05*	0.17	0.23	0.28
MPT	0.13*	1.78	3.17	4.45

Source. Author's calculations.

1/ *, **, and *** represent rejection of the unit root hypothesis at the 1 percent, 5 percent, and 10 percent levels, respectively.

IV. METHODOLOGY

A combination of a base and an extended vector autoregression (VAR) model will be estimated to assess spillovers to Nigeria. VAR models are generally best suited for assessing spillovers given that we can obtain impulse responses and variance decomposition. Following Cholesky decomposition, the variables in the VAR were ordered as follows: the growth rates of US real GDP, EU real GDP, Brazil real GDP, and Nigeria real GDP, as well as the PPP-implied (real) exchange rate. My selection of the ordering of the variables is based on the relative exogeneity of the variables.[12] The analyses will also decompose the contributions of three potential channels of spillovers. In the subsequent subsections, I describe in more detail each of the models I will be estimating.[13]

To better assess Nigeria's responses, I extended the base VAR model by introducing oil price growth. Following Obiora (2009), I will improve on the presentations in Kanda (2007) and Swiston and Bayoumi (2008) by extending the base VAR model to include changes in oil prices given Nigeria's role as a major oil-exporting country. Changes in the price of oil may have opposing effects on the group of countries in this paper because increases in oil prices may have positive effects on Nigeria through increased revenue but may represent adverse supply shocks to Nigeria's oil-importing trading partners. The inclusion of oil price growth in the VAR, therefore, attempts to isolate these effects.

In the extended VAR model, I followed the same relative exogeneity assumptions used in the base VAR model. Given this, the ordering of the extended VAR is as follows: Oil price Growth, US GDP, EU GDP, Brazil GDP, Nigeria GDP and PPP-implied exchange rate.

---

[12] See appendix for results of the exogeneity tests, which show that US GDP growth is the most exogenous of all four variables in the VAR.

[13] All models were estimated using Eviews 6.0 version.

V. RESULTS

A. Base VAR Model Results

A significant share of variation to Nigeria's GDP growth emanates from variation in GDP growth of her trading partners (Table 4). The VAR models were estimated with two lags[14] for each variable in line with results presented in Table 3. Over a 12-quarter horizon, variations in US GDP explains about a third of variations in Nigeria's GDP. While this result provides ample evidence against signs of developing and emerging markets decoupling from the US, it is important to stress that this finding may be country-specific and should be interpreted as such.

Table 3: Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-499.73	n.a.	935.4239	21.03036	21.22527	21.10401
1	-213.09	501.6229	0.017349	10.12862	11.29812*	10.57058
2	-178.33	53.57662*	0.011966*	9.722270*	11.86635	10.53252*
3	-159.05	25.71866	0.016627	9.960228	13.0789	11.13878
4	-136.82	25.00256	0.022434	10.07587	14.16913	11.62272

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Indeed, the results show that the share of variations in Nigeria's GDP attributable to changes in US GDP rises over the three year (12 quarters) horizon with a peak of over 50 percent by the end of the second year. The implication of this is that Nigeria is likely to continue to suffer from shocks from the US recession until about 2010.

---

[14] Although our results point to two lags, I will try to use four lags too for sensitivity. In addition to being the logical choice for quarterly data, using four lags is also consistent with the specifications in Stock and Watson (2005), and Perez, et al (2007)

Table 4: Variance Decomposition for Nigeria's Real GDP Growth
(Base VAR Model)

Horizon (Quarters)	US GDP	EU GDP	Brazil GDP	Nigeria GDP	Exchange Rate (PPP-implied)
1	0.0	0.0	43.6	56.4	0.0
2	1.4	4.9	44.2	49.1	0.4
3	10.4	8.0	39.6	41.3	0.6
4	24.2	8.5	31.8	34.9	0.6
5	36.8	7.9	25.1	29.7	0.5
6	45.2	7.5	20.8	26.0	0.4
7	49.6	7.8	18.3	23.8	0.4
8	50.7	9.2	17.3	22.4	0.4
9	49.4	11.7	17.5	21.1	0.4
10	46.8	14.7	18.2	20.0	0.3
11	44.5	17.7	18.5	19.0	0.3
12	43.1	20.0	18.2	18.3	0.4

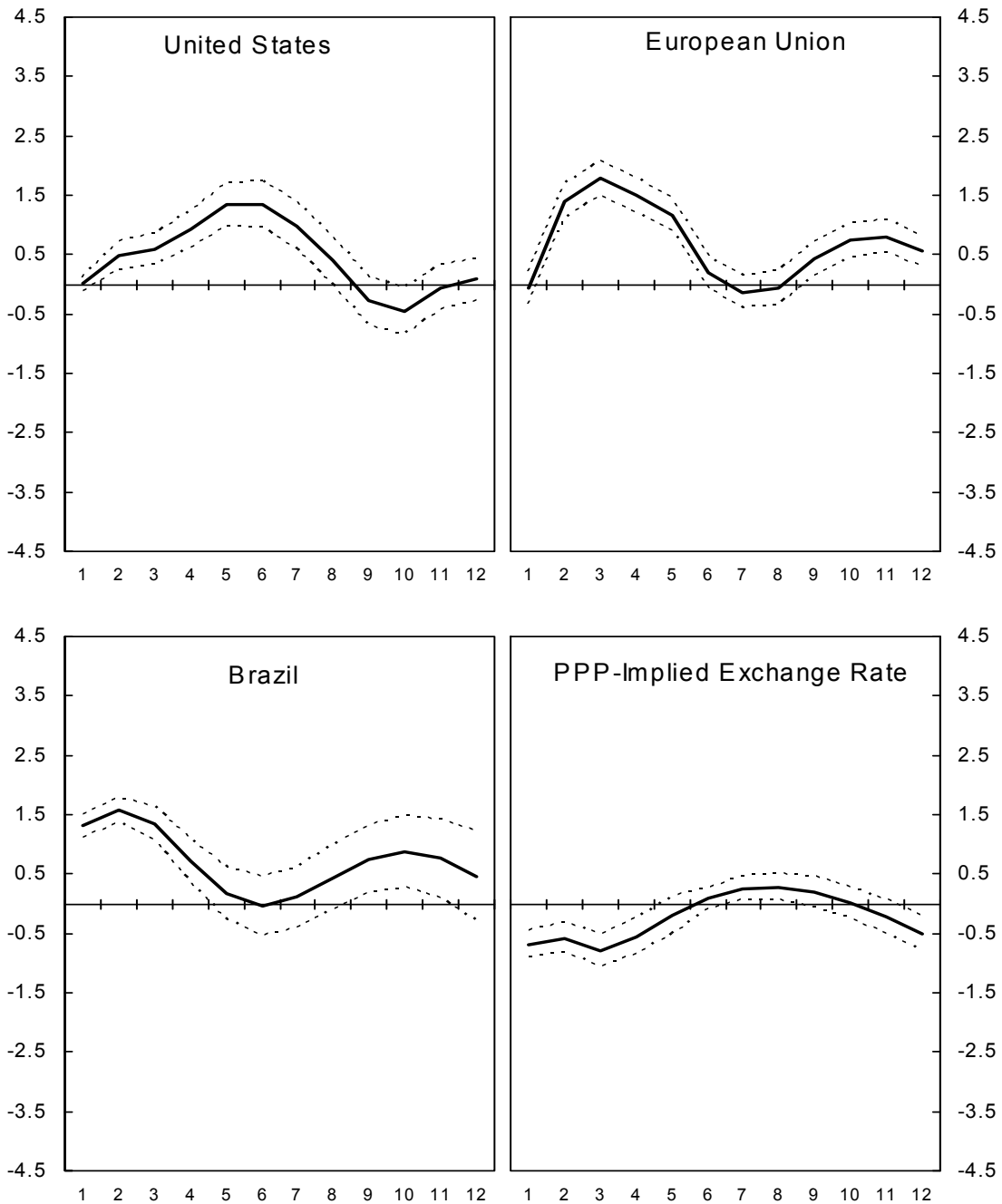Source: Author's calculations.

Variations to Brazil's GDP growth also contribute a significant share of variations to Nigeria's GDP but the same is untrue for EU GDP. About 26 percent of variations to Nigeria's GDP growth are attributable to changes in Brazil's GDP growth but the effect, in contrast to US GDP growth, falls over the 12-quarter horizon. The effect of Brazil's GDP changes peaks very fast in the second quarter at about 44 percent. Of the three leading trading partners, the EU contributes the least in explaining variations to Nigeria's GDP.

The results also show that exchange rate changes explain an insignificant share of variations to Nigeria's GDP. Given that PPP-implied exchange rate captures some form of the competitiveness of a country vis-à-vis its trading partners, this result would seem implausible. However, one rationale for this might be that Nigeria's key export commodity, crude oil, does not depend on the vagaries of exchange rates. Besides, the manufacturing sector has suffered greatly from the Dutch Disease syndrome since the commercial exploration of oil began in the country.

The impulse response results confirm the findings that there are significant cross-country spillovers to Nigeria from major trading partners(Figure 8). For clarity of interpretation, I normalized the impulse responses to present the percentage change in Nigeria's GDP in response to one percent shocks emanating from trading partners' GDP and the exchange rate. The results confirm there are significant cross-country spillovers to Nigeria from all three main

trading partners and the exchange rate. In all cases with trading partners, Nigeria's GDP growth responds with a contemporaneous increase in the first quarter following the shock, and settles on a higher and stable growth path around the end of 12-quarter horizon.

Figure 8. NIGERIA: GDP Growth Responses to One Percent Shocks from Key Trading Partners and PPP-Implied Exchange Rate (1996-2008)

Source: Author's Calculation

In particular, a one percentage point shock in US GDP growth exerts significant increase in Nigeria's GDP with a peak of about 1¼ percent in the 5th quarter following the shock. Similarly, Shocks from the EU and Brazil contemporaneously increases GDP growth in Nigeria with peak of about 1¾ and 1½ percents in the third and second quarters of the horizon, respectively.

In contrast to shocks from major trading partners, an appreciation of exchange rate contemporaneously depresses GDP growth in Nigeria. In the context of increases in the REER signifyin**g** appreciation of the exchange rate, and therefore, a loss of international competitiveness, shocks to the REER have adverse effects on Nigeria. However, the responses to shocks from the exchange rate hover around zero from the sixth quarter of the 12 quarter horizon.

B. Extended VAR Model Results

The introduction of oil price growth to the base VAR model does not change the results in a significant way (Table 6). In particular, the key variance decomposition results emanating from the extended VAR model include the following:

- Variations in trading partner GDP continue to explain a substantial part of variations in Nigeria's GDP

- US GDP growth accounts for about a third of variations in Nigeria's GDP growth over the 12 quarter horizon

- On average, about 7 ¼ percent of variations in Nigeria's GDP are attributable to variations in Brazil's GDP growth.

- Over the 12 quarter horizon, EU GDP growth accounts for about 14 percent of variations in Nigeria's GDP growth.

- Oil price growth accounts for a quarter of variations in Nigeria's GDP in the extended model.

- The effect of changes in US GDP on Nigeria's GDP rises over time and peaks at about 50 percent by the end of the second year.

Table 5: Variance Decomposition for Nigeria's Real GDP Growth
(Extended VAR Model)

Horizon (Quarters)	Oil Price Growth	US GDP	EU GDP	Brazil GDP	Nigeria GDP	Exchange Rate (PPP-implied)
1	25.0	0.0	10.1	20.4	44.5	0.0
2	25.3	1.1	16.1	17.8	38.8	0.9
3	25.4	10.0	17.8	11.7	34.3	0.8
4	26.7	23.8	17.6	9.6	21.7	0.6
5	23.7	36.1	11.8	8.0	19.9	0.5
6	21.3	44.0	11.1	6.7	16.3	0.5
7	22.5	48.2	11.0	3.5	14.2	0.5
8	23.4	49.6	11.5	2.1	12.9	0.6
9	24.3	49.0	12.4	1.7	11.9	0.8
10	25.3	47.4	13.5	1.9	11.1	0.9
11	26.4	45.7	14.4	1.8	10.5	1.1
12	27.7	44.5	15.1	1.5	10.1	1.2

Source: Author's calculations.

Results from the impulse responses in the extended VAR model align with those from the base model. The results confirm there are indeed significant spillovers to Nigeria from trading partners, oil price growth and exchange rate shocks (Figure 9). In summary, the following can be delineated from the results.

- A one percent shocks from oil price growth significantly and contemporaneously increases Nigeria's GDP growth over the 12 quarter horizon with a peak of about 1 ¾ percent in the 5th quarter.

- Shocks from the US, EU, and Brazil generally increase Nigeria's GDP growth over the horizon with peaks of about 3.1 percent, 1.6 percent and 1.7 percent, respectively.

- In line with results from the base VAR model, an appreciation of the exchange rate contemporaneously depresses GDP growth in Nigeria but GDP growth returns into positive territory around the 5th quarter after the shock.

Figure 9. NIGERIA: GDP Growth Responses to One Percent Shocks from Key Trading
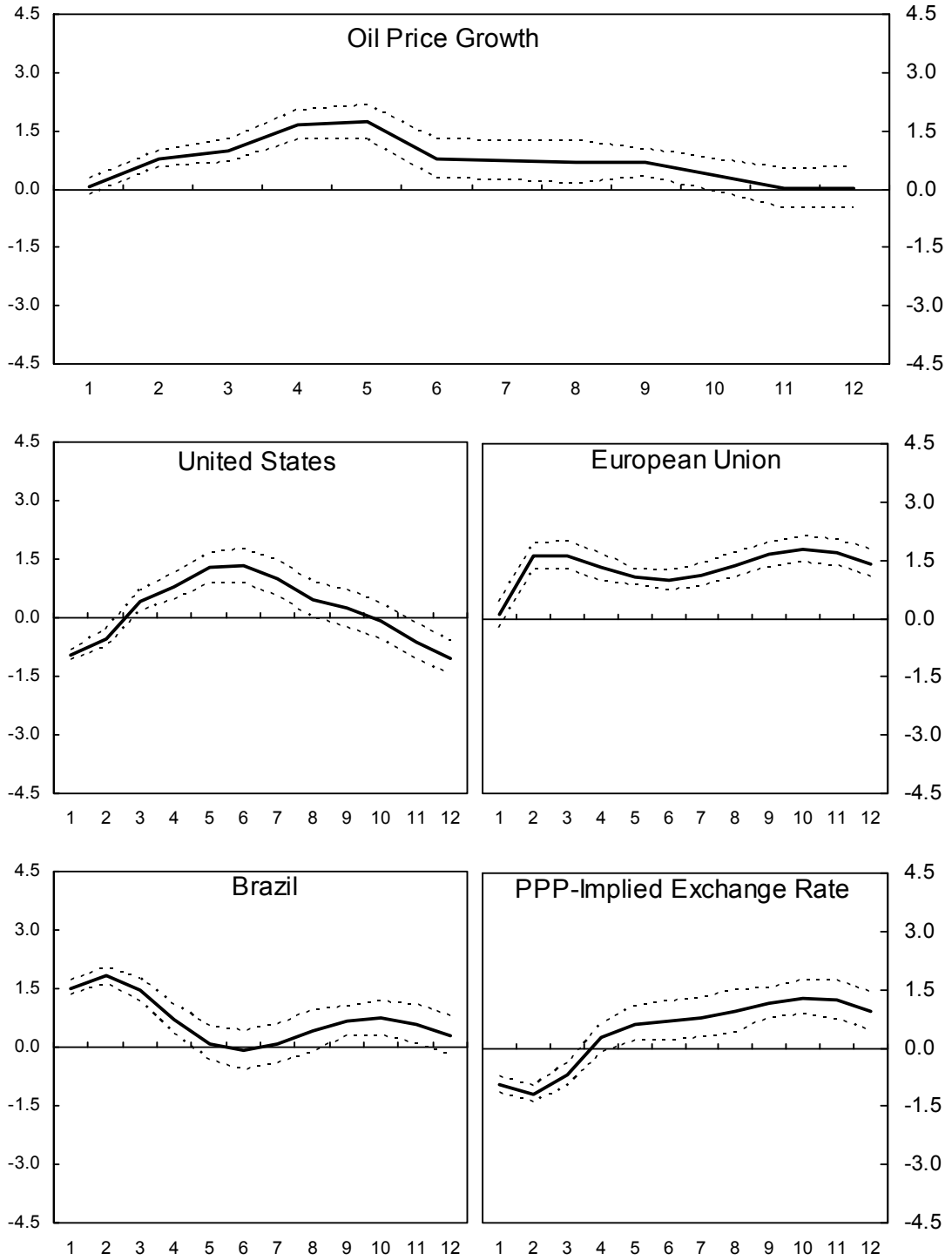
Source: Author's Calculations

VI. CHANNELS OF SPILLOVERS TO NIGERIA

Following Bayoumi and Swiston (2007), I examine the relative importance of potential channels of spillovers to Nigeria. This procedure consists of augmenting our original VAR model by introducing variables that proxy for these potential channels of spillovers as exogenous variables in a separate VAR (Obiora, 2009). The difference between the response of GDP in the base and augmented VAR is interpreted as the size of the spillover attributable to that particular channel. For example, the difference between the response of Nigeria to the US GDP growth in the base VAR and the augmented VAR with financial conditions equals the impact of financial spillovers between the two countries. This difference is interpreted as the share of spillovers from the US that is transmitted through financial linkages. Thus, the contribution of a given channel to spillovers can be given as:

$$K_{i,j} = IR_i - IR_{i,j} \qquad (3)$$

where $K_{i,j}$ is the contribution of a particular channel to spillovers, IR_i is the impulse responses from the base VAR while $IR_{i,j}$ is the responses from augmented VAR in which a given channel, j, is introduced as an exogenous variable, rather than as an additional equation in the VAR[15]. To capture trade linkages, I added Nigeria's net exports as an exogenous variable; for financial linkages, I used the London Interbank Offer Rate (LIBOR)[16] and for commodity prices, I added non-energy component of the Goldman Sachs Commodity Index and the average petroleum spot price (APSP) of crude oil.

In addition to being a widely-quoted short-term interest rate, the choice of the LIBOR is informed by its far-reaching influence on global lending decisions, and its effect on some of the world's most liquid and dynamic interest rate markets.

---

[15] Given that these channels are quantified using this difference methodology, their sum is not constrained equal the estimates of aggregate spillovers coming from the base VAR. As Bayoumi and Swiston (2007) alludes, this "independent" approach to identifying the sources of spillovers provides an alternative estimate on the size of overall spillovers, which can be compared to the main results.

[16] I have used this as a proxy for short term interest rates given that my inability to obtain an unbroken series of an anchor short term interest in Nigeria. On December 11, 2006, the central bank of Nigeria announced its adoption of the Monetary Policy Rate (MPR) to replace the Minimum Rediscount Rate (MRR).

Trade and commodity prices are clearly the most dominant transmission channels of spillovers to Nigeria (Figure 10). These channels account for over 80 percent of spillovers to Nigeria from each of the main trading partners. In particular, commodity price linkages alone account for over 70 percent of spillovers from the EU. The results also show that the share of spillovers to Nigeria transmitted by

Contribution to Overall Spillovers in Nigeria (in percent).			
	Finance	Trade	Comm-prices
US	15.6	38.7	45.7
EU	19.8	41.3	38.9
BRAZIL	12.0	39.0	49.0

Source: Author's calculations.

financial linkages is just about 16 percent only. The dominance of trade and commodity price linkages is not surprising given that most of Nigeria's trade with the rest of the world is dominated by exports of crude oil. More also, Nigerian banks, like their counterparts in other developing countries, do not seem to have direct linkages to the banking systems in the advanced countries.

These results unequivocally provide compelling arguments against decoupling theory in the case of Nigeria. Given the overwhelming share of spillovers attributable to trading partners, and in consideration of the depth and breadth of the current global crisis, it is daunting to make any compelling argument that Nigeria (and probably many other developing and emerging market countries) could have been unaffected by the crisis on the basis of having decoupled from the US.

Figure 10. Decomposition of Spillovers from Nigeria's Key Trading Partners

The United States

The European Union

Brazil
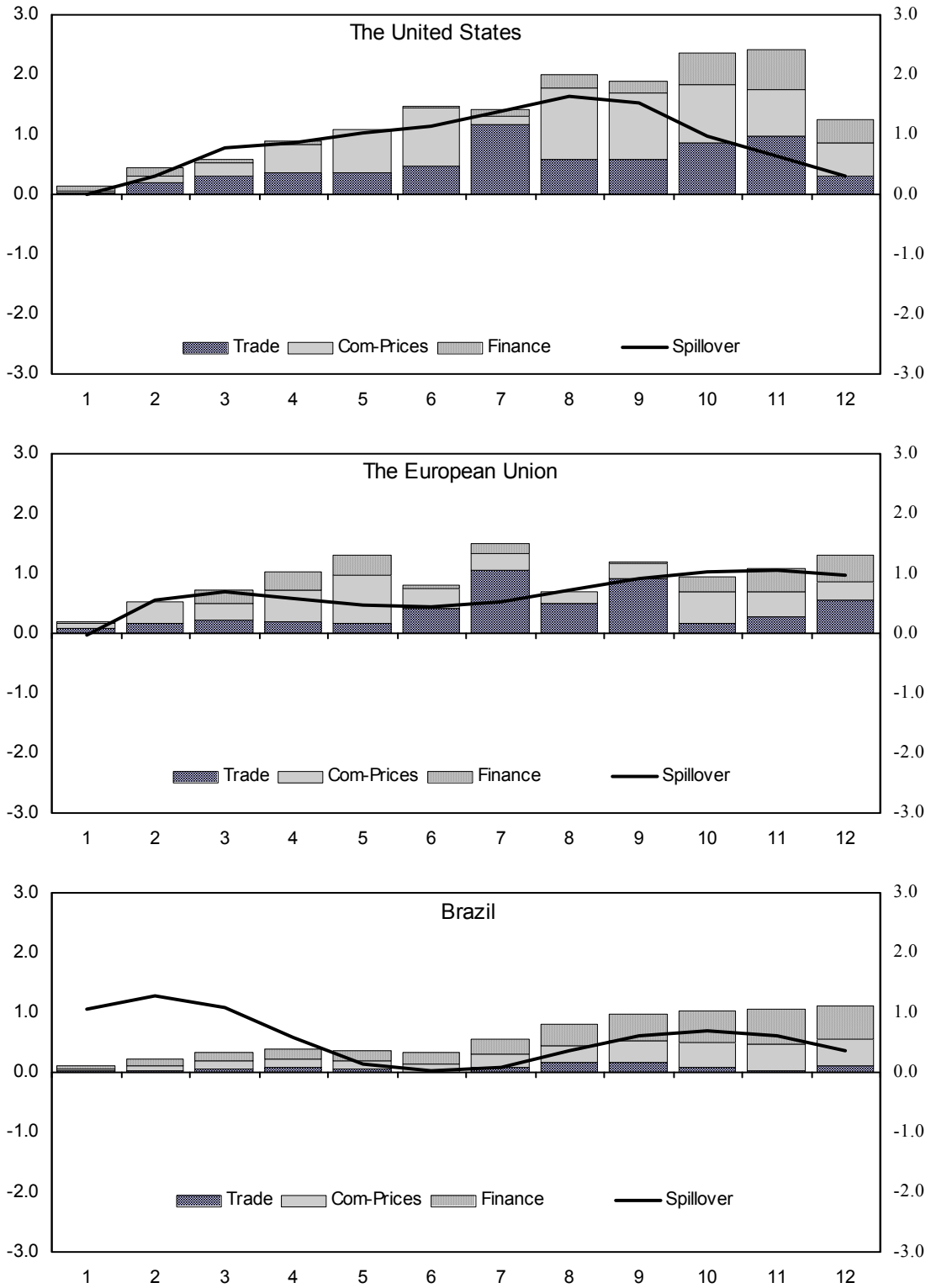
Source: Author's Calculations.

As suggested in IMF (2007), there are a number of arguments against the realization of the decoupling theory. While there is ample evidence of a decline in trade linkages between the US and many developing/emerging market countries, this decline must be weighed against the rapid increase in financial linkage between the US and the rest of the world. More also, although the five largest emerging market economies now account for about a quarter of global GDP on a purchasing power parity (PPP) basis, they only represent about 14 percent of global trade. Hence, it is difficult to argue that they could entirely replace the U.S. economy as an engine for global growth (IMF, 2007).

VII.   CONCLUSION AND LESSONS FOR POLICY

Did the world really decouple from the US? Using Nigeria as a case study, I have adopted a combination of a base and extended vector autoregression (VAR) models to provide a sufficiently unambiguous answer to this question. Results from both models debunk the "decoupling theory" in Nigeria's case and show that there are still significant cross-country spillovers from US (and other major trading partners) to Nigeria.

Indeed, both models show that the effect of a shock from the US rises over time in Nigeria with peaks around the end of the second year following the shock. I also found that of three potential channels of spillovers, namely trade, finance, and commodity prices, the most dominant channel of spillovers from the US to Nigeria are trade and commodity price linkages. Hence, it is not surprising that the indirect effects of the current global crisis, which began in the US financial sector, has been quite significant, reflected in sharp fall in export earnings, trade financing, and depreciation of the exchange rate. Given these results, policymakers in Nigeria may have to pay attention to occurrences in the economies of key trading partners. It will also be beneficial to take cognizance of the fact that shocks from the US and the EU may have even larger effects over time as is clearly the case with the results from the variance decomposition in both models.

Two options for further studies emanate from this one. It might be interesting to evaluate the extent of spillovers from the US to regional trading blocs in developing and emerging market countries, and then to major emerging market countries individually. Findings from these

studies are likely to provide us with a fuller understanding of cross-country linkages around the world, and add evidence to the debate on decoupling and spillovers.

REFERENCES

Bayoumi, T., and A. Swiston, 2007, "Foreign Entanglements: Estimating the Source and Size of Spillovers across Industrial Countries," IMF Working Paper WP/07/182. (Washington: International Monetary Fund).

DeJong, D. N., J. C. Nankervis, N. E. Savin and C. H. Whiteman, 1992, "Integration Versus Trend Stationary in Time Series," *Econometrica*, Vol. 60, No. 2, pp. 423-433

Dutse, A.Y. (2008) "Nigeria's Economic Growth: Emphasizing the Role of Foreign Direct Investment in Transfer of Technology" *Communications of IBIMA*, Vol3, 2008

Eviews 6.0, 2007, Quantitative Micro Software (by Lilien, D, et al)

Harris, R., and R. Sollis, 2003, "Applied Time Series Modeling and Forecasting," New York: John Wiley and Sons.

Herrero, A., and J. M. Ruiz, 2008, "Do Trade and Financial Linkages Foster Business Cycle Synchronization in a Small Economy?" Banco De Espana Working Paper No. 0810

Imbs, J., 2003, "Trade Finance, Specialization, and Synchronization," IMF Working Paper 03/81 (Washington: International Monetary Fund).

Inklaar, R., R. Jong-A-Pin, and J. De Haan, 2005, "Trade and Business Cycle Synchronization in OECD Countries: A Re-Examination," CESifo Working Paper Series No. 1546

International Monetary Fund, 2007, "Decoupling the Train? Spillovers and Cycles in the Global Economy" *World Economic Outlook,* (April), pp. 121-159

International Monetary Fund, 2009, "Implications of the Global Crisis for Low-Income Countries" Special Report, (March, 2009),

Kanda, D, 2007, "Spillovers to Ireland," IMF Working Paper WP/08/2 (Washington: International Monetary Fund).

Koopman, S. J. and J. V. Azevedo, 2008, "Measuring Synchronization and Convergence of Business Cycles for the Euro area, UK and US," *Oxford Bulletin of Economics and Statistics*, Vol. 70, No. 1 pp. 23-51

Kose, M.A., C. Otrok, and C. H. Whiteman, 2003, "International Business Cycles: World, Region, and Country-Specific Factors," *American Economic Review*, Vol. 93, No 4, pp. 1216–39.

———, E. Prasad, and M.E. Terrones, 2003a, "How Does Globalization Affect the Synchronization of Business Cycles," IMF Working Paper 03/27 (Washington: International Monetary Fund).

Ng, S., and P. Perron, 2001, "Lag Length Selection and the Construction of Unit Root Tests with Good Size and Power," *Econometrica*, Vol. 69, pp. 1519–54.

Obiora, K. I., 2009, "Decoupling from the East Toward the West? Analyses of Spillovers to the Baltic Countries," IMF Working Paper WP/09/125 (Washington: International Monetary Fund).

Orozco, Manuel. 2003a. "Remittances, Markets and Development.", Inter-American Dialogue, Washington, D.C.

———. 2003b. "Worker Remittances: An International Comparison." Working Paper Commissioned by the Multilateral Investment Fund, Inter-American Development Bank.

Schiff, P. D. and J. Downes, 2007, "Crash Proof: How to Profit from the Coming Economic Collapse", *New Jersey: John Wiley& Sons Inc.*

Swiston, A. and T. Bayoumi, 2008, "Spillovers Across NAFTA," IMF Working Paper WP/08/3 (Washington: International Monetary Fund).

World Bank, 2007, "Migration and Remittances Factbook", (Washington, DC).

APPENDIX

VAR Granger Causality/Block Exogeneity Wald Tests
Sample: 1996Q1 2008Q4
Included observations: 50

Dependent variable: BRAZIL GDP Growth

Excluded	Chi-sq	df	Prob.
Y_EU	1.979493	2	0.0127
Y_NGR	5.481937	2	0.5973
Y_US	6.233767	2	0.6370
All	14.04734	6	0.0312

Dependent variable: EU GDP Growth

Excluded	Chi-sq	df	Prob.
Y_BRA	5.152394	2	0.0761
Y_NGR	0.038903	2	0.9807
Y_US	3.962953	2	0.1379
All	10.30646	6	0.0764

Dependent variable: NIGERIA GDP Growth

Excluded	Chi-sq	df	Prob.
Y_BRA	2.242583	2	0.3259
Y_EU	3.611697	2	0.1643
Y_US	13.82199	2	0.0010
All	16.47396	6	0.0114

Dependent variable: US GDP Growth

Excluded	Chi-sq	df	Prob.
Y_BRA	8.739252	2	0.3717
Y_EU	1.03081	2	0.0645
Y_NGR	0.902099	2	0.0443
All	8.86287	6	0.1227