



BANGKO SENTRAL NG PILIPINAS
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The Macroeconomic Effects of Basel III Implementation in the Philippines: A Preliminary Assessment

*Hazel C. Parcon-Santos and
Eufrocinio M. Bernabe, Jr.*

Series No. 2012-02

October 2012

Center for Monetary and Financial Policy
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Abstract

This study gives a general and preliminary assessment of the macroeconomic impact of implementing Basel III in the Philippines. The new framework seeks to significantly increase the quality and required level of banks' capital. Hence, it is expected to strengthen banks' capacity to absorb risks and reduce the probability of future banking crises. Nevertheless, different strategies adopted by banks to meet the new rules—such as increasing lending rates—can impact negatively on the economy.

The cost of implementing Basel III is estimated from the impact of higher capital requirement on GDP using an unrestricted VAR model, while the benefit is estimated using the expected default probability of banks. Results suggest that the higher capital requirements imposed by Basel III may have an initial negative impact on the Philippine economy. Nevertheless, the new requirements reduce the probability of a crisis. The estimated net effect of Basel III implementation in the Philippines is positive, albeit modest.

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by Hazel C. Parcon-Santos and Eufrocinio M. Bernabe, Jr.*

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1. Introduction

Since its establishment in 1974, the Basel Committee on Banking Supervision (BCBS) has formulated and recommended best practices for banking standards. The Basel Accords, in particular, are recommended banking regulations that put emphasis on capital measurement system.¹ The basic principle in the Basel rules is that banks should have capital sufficient to cover for the risks they take.²

The first accord, Basel I, issued in 1988, has initially focused on credit risk, but was subsequently refined to incorporate market risk. A further improvement was done with the release of the second accord – Basel II, which was released in 2004. The new framework was designed to better address financial innovation and to improve the way regulatory capital requirements reflect underlying risks.³ In addition, it covered operational risk⁴ and risk-based supervisory framework.⁵

On December 16, 2010, the Basel Committee presented a new set of regulatory framework for banks, the so-called Basel III. The framework presents new and tougher rules for capital and liquidity in the banking sector and was intended to address problems that were made apparent by the 2008-2009 financial crisis. Essentially, it aims to address both bank-specific and systemic risks. The implementation of Basel III is expected to considerably increase the quality and required level of banks' capital, thus strengthening banks' capacity to absorb risks and reducing the risk of future banking crises.

The Philippine banking system is set to adopt the new capital requirements of Basel III by January 1, 2014.⁶ Various studies of the Bank for International Settlements (BIS) claim that the new rules will strengthen banks, making them better prepared against financial crises.⁷ However, the BIS studies as well as other cross-country and country-specific studies

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¹ BCBS (2009)

² Cao (2011)

³ BCBS (2009)

⁴ Defined as the "risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events (Cao, 2011)

⁵ Cao (2011)

⁶ Under Resolution No.33 dated 5 January 2012, the Monetary Board of the BSP approved the Basel III implementation plans. Please refer to Appendix 1 for BSP Memorandum No. M-2012-002 (Implementation Plans for Basel III Standards on Minimum Capital Requirements). Basel III covers new rules for capital and liquidity in the banking sector. However, the BSP implementation plan does not cover the liquidity standards of Basel III.

⁷ BCBS (2010), MAG (2010a, 2010b, 2011)

also reveal that as a consequence of higher capital requirements, banks may adopt different strategies that can have negative impacts on the economy.⁸ For instance, banks may respond by raising their lending spreads, which increases the borrowing costs of the private sector. This in turn may limit debt-financed consumption and investment.

This study aims to give a general and preliminary assessment of the macroeconomic impact of implementing Basel III in the Philippines. We consider this important since the banking system comprises about 80 percent of the total financial system in the Philippines.⁹ While Basel III may better prepare the Philippine banking system against financial crisis as what the BIS suggests, it may have significant macroeconomic effects.

We examine the macroeconomic impact of Basel III implementation by estimating its impact on the country's GDP. While Basel III covers new rules for capital and liquidity in the banking sector, the BSP implementation plan so far only covers capital standards. Hence, what is being referred to in this study as Basel III standards implemented in the Philippines are only capital standards.

2. How does Basel III affect the macroeconomy?

2.1 Benefits and costs of the new framework

The building blocks of Basel III are: (i) higher quality and level of capital, (ii) widened risk coverage, (iii) prevention of excessive leverage, (iv) stronger liquidity, (v) addressing of systemic risk, and (vi) higher standards for risk management and supervision.¹⁰ These are expected to enhance capital and liquidity regulations of the banking system and therefore reduce the intensity and frequency of financial crisis. Given that output losses from financial crisis can be substantial, as what past crisis episodes have shown,¹¹ then, the primary benefit that can be derived from the new framework is the mitigation of adverse macroeconomic effects in terms of foregone output.

Based on several studies reviewed by the Macroeconomic Assessment Group¹² of the Bank for International Settlements (MAG 2011), the cost of a crisis is 19% of pre-crisis GDP if effect of a crisis is temporary while the average probability of a systemic crisis is 4.5% per year for any given country.¹³ Using this information on global systemically important banks (G-SIB)¹⁴ in 14 countries,¹⁵ MAG estimated that that the Basel III framework would

⁸ See for instance IIF (2011), Cosimino and Hakura (2011) and Locarno (2011)

⁹ Based on total resources of the financial system as of December 2011 (Selected Philippine Economic Indicators)

¹⁰ BCBS (2010b)

¹¹ See BCBS (2010a), Table A1.1 and A1.2 for a summary of past episodes of crisis and the estimated output losses.

¹² MAG was primarily established to assess the transitional costs in meeting the additional capital and liquidity requirements of Basel III.

¹³ This is based on the survey of BCBS (2010a) of two articles, namely, Reinhart and Rogoff (2008) and Laeven and Valencia (2008). Both studies were published prior to the failure of Lehman. Countries covered in the study include Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Korea, Luxemburg, Mexico, Netherlands, Russia, Saudia Arabia, South Africa, Sweden, Switzerland, Turkey, United Kingdom and the United States.

¹⁴ The term "G-SIBs" refers to those global systemically important financial institutions (G-SIFIs) that are subject to banking regulation and supervision. The Basel Committee's proposed standards are intended for G-SIBs alone; other regulatory groupings are developing comparable standards for other categories of G-SIFIs (MAG 2011).

reduce crisis probability by 0.45% to 1.05% per year. Thus, the new guidelines would produce an annual benefit ranging from 0.09% ($=0.45\% \times 19\%$) to 0.20% ($=1.05\% \times 19\%$) of GDP.

Meanwhile, based on various studies examined by the Basel Committee on Banking Supervision (BCBS 2010a) of the BIS, the median estimate of the cumulative discounted costs of crises is around 60% of pre-crisis output when banking crises are allowed to have a permanent effect on real activity. Thus, each 1 percentage point reduction in the annual probability of a crisis yields an expected benefit per year equal to 0.6% of output. BCBS estimates of different models and methodologies consistently show significant reduction in the likelihood of a banking crisis at higher levels of capitalization and liquidity.¹⁶

Apart from the benefit of reducing the probability of a crisis, Angeline et al. (2011a) argue that tighter regulatory standards may also lead to smaller output fluctuations and, hence, higher welfare even in the absence of banking crises. Based on the various models estimated by Angeline et al. (2011a), a one percentage point increase in the capital-to-asset ratio reduces the standard deviation of output by 1.0 percent on average. Meanwhile, Angeline et al. (2011b) estimate that a 1% increase in capital reduces output variability in the range of 0.3-2.7% relative to baseline.

Despite the benefits, higher capital requirements also come with costs. In banks' attempt to meet the requirements, they may use a combination of strategies that may have adverse impact on aggregate macroeconomic activity.

In order to meet the new capital requirements, banks can:¹⁷

- (i) issue new equity;
- (ii) increase retained earnings, by:
 - reducing dividend payments;
 - increasing operating efficiency, including by reducing compensation and other costs;
 - raising average margins between borrowing and lending rates;
 - increasing non-interest (fee) income;
- (iii) reduce risk-weighted assets, by:
 - lowering the size of loan portfolios;
 - tightening loan agreements;
 - reducing loan maturities;
 - reducing or selling non-loan assets;
 - shifting balance sheet composition towards less risky assets.

¹⁵ Australia, Brazil, Canada, France, Germany, Italy, Japan, Korea, Mexico, the Netherlands, Spain, Switzerland, the United Kingdom and the United States

¹⁶ Haldane and Madouros (2012) take an extreme view by arguing that Basel III rules are too complex to become useful in averting bank failure. The complexity only encourages banks to reverse-engineer products or transfer assets from one category to another, which leads to reduced resilience. Kay (2012) supports this by saying that the only value of these regulations is to give politicians and the public a sense that "something is being done". Likewise, the IMF cautioned that the rules could raise incentives to develop new products to circumvent the framework and could push riskier activities into less regulated parts of the financial system (Jones and Masters, 2012).

¹⁷ MAG (2010a)

According to MAG (2010a), banks are likely to use a combination of these methods. The choice may in part depend on the length of time over which capital needs to be increased. A longer implementation period will give banks more flexibility as regards the mechanisms they can use to achieve targets. Thus, if Basel III is implemented over longer periods, output effects are expected to be smaller than if implemented over shorter periods. The choice of strategy may likewise depend on the existing capital ratios banks have and the distance from the target. In addition, Cosimano and Hakura (2011) confirm that banks' responses to higher capital requirements will vary considerably from one economy to another, reflecting cross-country variations in the tightness of capital constraints, banks' net cost of raising equity, and elasticities of loan demand with respect to changes in loan rates.

In its interim report, MAG (2010a) assumed that Basel III requirements will be achieved primarily through a combination of increases in lending spreads and a tightening of lending standards, particularly in riskier parts of loan portfolios. These will have an impact on the economy by reducing debt-financed investment and consumption. In addition, MAG (2010a) expects that once the targets are achieved, lending spreads will gradually retrace some of the widening and lending standards will be relaxed. Averaging results of various empirical estimations from several countries,¹⁸ the interim report shows that a 1 percentage point increase in the target capital ratio implemented over four years will lead to a maximum reduction in GDP to a level 0.19% below its baseline level - equivalent to a reduction in the annual growth rate of 0.04 percentage points over the period, followed by a gradual recovery of growth towards the baseline.

In its final report, MAG (2010b) results were presented in terms of the impact of the overall increase in bank capital that will be needed to meet the new Basel III requirements, instead of a generic one percentage point increase in target capital ratios. In addition, the implementation period is assumed to be eight years,¹⁹ instead of four years. The report estimated that banks will have to increase their capital by 1.3 percentage points to reach the overall capital ratio prescribed in Basel III.²⁰ Meanwhile, a 1 percentage point increase in capital ratios would cause a shortfall in GDP of 0.17% during the eight-year implementation scenario lower than the 0.19% estimate for the four-year implementation period. Thus, the estimated accumulated cost of Basel III impact to GDP is 0.34% ($=1.3 \times 0.17\%$) for an eight-year implementation scenario and 0.37% ($=1.3 \times 0.19\%$) for a four-year implementation scenario. These impacts correspond to annual growth reductions of 4 and 9 basis points, respectively. Given these, MAG (2010b) concluded that Basel III accord would have a "relatively modest impact on growth."

¹⁸ There are 13 countries and three multilateral institutions that submitted model estimation output to the Macroeconomic Assessment Group (MAG). The countries generally estimated results for their national economies except for Bank of Italy which produced an estimate for the euro area. The European Commission (EC) submitted a model output for the euro area. The European Central Bank (ECB) model output covered France, Germany, Italy, Netherlands, Spain and the euro area. The International Monetary Fund (IMF) estimated a global model, applying modeling techniques from 15 countries, and a Dynamic Stochastic General Equilibrium (DSGE) model with results for the United States and the euro area.

¹⁹ This is in line with the proposed implementation period of the group of Governors and Heads of Supervision (GHOS) of the Basel Committee (MAG 2010b).

²⁰ This is based on the submissions of 13 countries and three multilateral institutions. Refer to footnote 18.

A more recent report by the MAG (2011) combined the foregoing results with the increased capital requirements being proposed for G-SIB. The analysis concluded that all components of the Basel III agreement would only reduce growth by a minor 0.34% in an eight-year implementation scenario, lowering the annual growth by 0.04 percentage points during the period.

The negative impact of higher capital requirements on GDP found by the MAG is supported by findings of other cross-country and country-specific studies. For instance, Slovik and Cournède (2011) found that over a five-year implementation period, a 1 percentage point increase in capital ratios will reduce GDP relative to baseline by 0.19% in the United States, 0.30% in the Euro area and 0.11% in Japan. On average, GDP is estimated to decline by 0.20% relative to baseline, which translates to 0.04 reduction in annual growth for a period of 5 years. Similarly, Locarno (2011) found that for each percentage point increase in the capital ratio implemented over an eight-year horizon in Italy, the level of GDP would decline by a maximum of 0.33%, corresponding to a reduction of the annual growth rate of output in the transition period of 0.04 percentage points. Likewise, Sy (2011) found that output in France will decline by a maximum of 0.30% relative to baseline. Angelini et al. (2011b) found relatively smaller impact, such that for each percentage point increase in the capital ratio, output declines by 0.09% relative to baseline.

Using the case of the United States, Europe and Japan, Santos and Elliott (2012) argue that Basel III implementation will not significantly reduce lending or harm the economy due to banks' ability to adapt to the regulatory changes without taking actions that would harm the wider economy. This is based on expectations that banks will be willing to absorb part of the higher costs by cutting expenses and that investors will reduce their required rate of return on bank equity modestly as a result of the safety improvements. Santos and Elliot (2012) likewise argue that even without the prospect of regulatory changes, financial institutions often carry significantly higher safety margins than the minimums required by the rules, because of their own desire to operate safely and due to pressure from the markets and rating agencies.

In contrast to the foregoing, Basel III costs estimated by IIF (2011) are relatively large. Over a five-year implementation period, Basel III reforms are estimated to reduce GDP relative to baseline by 2.7% in the United States, 3.0% in the Euro area, 4.0% in Japan, 5.5% in UK and 3.7% in Switzerland. On average, GDP would in five years time be about 3.2% lower than otherwise. United States is seen to be the least adversely affected among the countries in the study since its banking system has the least distance to the new regulatory norms and accounts for a smaller share of debt intermediation. A key difference between other studies and the IIF study that may explain the relatively large divergence in results is that the latter assumed that Basel III requirements will have spillover effects in non-bank financial intermediaries. The higher lending costs in the banking system will lead to greater demand for credit in non-bank intermediaries, resulting to higher lending costs in the latter. In addition, the IIF study recognized the jobs that would be lost as a result of the higher borrowing costs faced by the private sector.

Studies on the impact of Basel III implementation on emerging economies (EMEs) are scant, but give qualitatively similar results as the studies covering advanced countries. In a study of 47 emerging countries, Abdel-Baki (2012a) found that implementing Basel III in EMEs would hamper growth by more than 3 percentage points and that the recovery period from the shock would require 3 years and 2 quarters. Among EMEs, advanced EMEs²¹ are the most adversely affected relative to secondary²² and frontier²³ emerging EMEs. Focusing on Egypt and Tunisia, Abdel-Baki (2012b) found that Egypt is much less negatively impacted by Basel III implementation compared to Tunisia since its banking sector is adequately prepared to meet the new capital adequacy requirements. However, Egypt is slower to recover than Tunisia largely due to the higher borrowing costs in the former.

Though the estimated effects of Basel III on GDP differ across studies, the consistent message is that higher capital and liquidity standards have both benefits and costs. Benefits come in the form of reduced crisis probability and output loss or variability, while costs come in the form of reduced GDP relative to baseline.²⁴ The common caveat is that the actual benefits and costs could be different from the estimates as the results are sensitive to technical assumptions, including the model choice.²⁵ In addition, the net impact will depend not only on the initial conditions of capital and liquidity, but on other conditioning variables used to estimate the models. Moreover, the difference in prevailing economic conditions across countries will add uncertainties in cost and benefit calculation. Nevertheless, regardless of the assumptions, models and results, majority of the studies argue that costs are still outweighed by benefits as the former will tend to be temporary while the latter are most likely to be permanent.

2.2 BSP implementation plans

Table 1 displays the Basel III standards that shall be incorporated in the risk-based capital adequacy framework for universal and commercial banks (U/KBs) and their subsidiary banks and quasi-banks (QBs) for the Philippines. As approved under Monetary Board Resolution No. 33 dated 5 January 2012, the BSP has instructed concerned banks to fully adopt the new minimum ratios beginning 1 January 2014, which is in contrast to the Basel Committee's recommended staggered implementation. In addition, while Basel III

²¹ Brazil, Czech Republic, Hungary, Malaysia, Mexico, Poland, South Africa, Taiwan, Turkey

²² Chile, China, Columbia, Egypt, India, Indonesia, Morocco, Pakistan, Peru, Philippines, Russia, Thailand, UAE

²³ Argentina, Bahran, Bangladesh, Botswana, Bulgaria, Cote d'Ivoire, Croatia, Cyprus, Estonia, Jordan, Kenya, Lithuania, Macedonia, Malta, Mauritius, Nigeria, Oman, Qatar, Romania, Serbia, Slovakia, Sri Lanka, Tunisia, Vietnam

²⁴ But not necessarily to initial conditions

²⁵ MAG (2010a) provides several possible methods to quantify the impact of Basel III on the economy. First is through the use of a satellite model. In this approach, the impact of changes to regulatory requirements are modeled by considering the adjustments that banks make to their balance sheets to achieve a desired capital ratio. A key element of this methodology is the need for detailed bank level data. Second is the use of bank-augmented DSGE models. An advantage of this method is that dynamic relationships among different macroeconomic variables can be captured while being grounded in microeconomic theory. However, DSGE models may be too stylized to fully capture the dynamics of the data and solving them may become challenging. Third is the use of past statistical relationships among capital, growth and other variables to estimate the likely growth effects of tighter capital and liquidity regulation, through the use of reduced-form VAR models. An advantage of this approach is it does not rely on detailed ex-ante modeling of the relationships among the variables of interest. However, a disadvantage is that the results are heavily influenced by the market and macroeconomic conditions in place at the time of large past shifts in the modeled variables, so they may not be informative if similar shifts take place under different circumstances.

covers new rules for both capital and liquidity in the banking sector, the BSP implementation plan so far does not cover the liquidity standards of Basel III.

The changes in the BSP guidelines were introduced to U/KBs in the first quarter of 2012. Simultaneous with the release of the draft guidelines, covered banks were requested to participate in the quantitative impact study during the exposure period. The final guidelines are intended to be issued by the third quarter of 2012.²⁶

Table 1: Comparison of Basel III guidelines and proposed BSP regulations

Capital requirements	Under Basel III		BSP guidelines			Staff Estimates	
	Minimum ratios (%)	With conservation buffer (%)	Existing minimum ratios (%)	Proposed minimum ratios (%)	Proposed minimum with conservation buffer (%)	Capital Difference - Basel (percentage point)	Capital Suplus - Actual ^{2/} (percentage point)
	(a)	(b)	(c)	(d)	(e)	(f)=(c)-(e)	(g)= actual - (c)
a. CET1 ratio	4.5	7.0	None	6.0	8.5	-8.5 ^{1/}	0
b. Tier 1 ratio	6.0	8.5	5.0	7.5	10.0	-5.0	9.2
c. CAR	8.0	10.5	10.0	10.0	12.5	-2.5	7.4

Notes:

1/ The CET 1 (Common Equity Tier 1 or Core capital Tier 1) ratio is used in the computation of Tier 1 ratio. The Tier 1 Capital consists of core Tier 1 capital (Common Equity Tier 1) and allowable amount of hybrid Tier 1 capital as prescribed under BSP circular 688 series of 2010.

2/ Actual capital ratios are as of September 2011.

Source: BSP Memorandum No. M-2012-002

The new Basel III requirement sets CET1 ratio with conservation buffer to be equal to 8.5 percent. Currently, the BSP has no existing requirement for the CET1 ratio. Meanwhile, for Tier 1 ratio, the BSP currently requires it to be 5.0 percent. With the adoption of Basel III, the BSP proposes a ratio of 10.0 percent, although Basel III guidelines only require it to be equal to 8.5 percent. Meanwhile, the new Basel III requirement sets the Capital Adequacy Ratio (CAR)²⁷ with conservation buffer to be equal to 10.5 percent. Existing BSP guidelines sets it at 10.0 percent, but proposed BSP requirement sets it at 12.5 percent. Based on the existing and proposed BSP minimum ratios, Philippine U/KBs are expected to raise CET1 ratio by an additional 8.5 percentage points, Tier1 capital ratio by an additional 5.0 percentage points and CAR by an additional 2.5 percentage points (column f in Table 1).

A key factor determining banks' responses to new capital and liquidity standards is the length of the period during which the new requirements are phased in. If the transition period is short, banks may choose to curtail credit supply in order to lift capital ratios and adjust asset composition and holdings quickly. A longer transition period could substantially mitigate the impact, allowing banks additional time to adapt by retaining earnings, issuing equity, shifting liability composition and the like. Whether the transition is long or short, decisive action to strengthen banks' capital and liquidity positions could boost confidence in the long-term stability of the financial system as soon as implementation starts. Giving banks time to use these adjustment mechanisms would almost certainly mitigate any adverse effects on lending conditions and, eventually, on aggregate activity.

Another factor that may influence the response of banks is their distance from target or their initial capital conditions. The farther banks are from the new regulatory norms, the

²⁶ Results of the quantitative impact study and final guidelines will be released by the Office of the Supervisory Policy Department.

²⁷ CAR is the ratio of capital to risk weighted assets computed in accordance with the risk-based capital adequacy framework.

greater adjustment that must be done, which can spell the magnitude of the impact on the aggregate economy. Though Basel III framework will not be implemented on a staggered basis in the Philippines, as what is being recommended by the Basel Committee, Philippine banks are considered to be well capitalized.²⁸ In fact, based on the latest data (as of September 2011), Philippine banks' capital ratios are above international norms.²⁹ This behavior of keeping higher safety margins than what is actually required is considered common in financial institutions, as explained by Santos and Elliot (2012). Tier 1 capital ratio of the entire Philippine banking system is at 14.2 percent on a consolidated basis and CAR is at 17.4 percent. All segments of the banking system remain well capitalized. CAR of U/KBs, thrift banks and rural banks (including cooperatives) is at 17.4 percent, 16.5 percent and 18.6 percent, respectively. However, these ratios are based on Basel II framework. Since Basel III introduces enhanced and stricter definition of capital and risk-weighted assets, these ratios may not necessarily hold under the new framework.

3. Data and Methodology

We assess the macroeconomic impact of Basel III implementation by estimating its cost and benefit on the real economy. To estimate the cost, we use an unrestricted VAR. As suggested by MAG (2010a), we use measures of bank capital, lending wedge³⁰, aggregate bank loans to consumers and firms and economic output (real GDP). The first three are bank-level data, while the last is country-level data. Total capital and loan portfolio for each bank were obtained from their published balance sheets. Thirty three U/KBs were included in the sample, with period coverage of 2006-2011.³¹

The use of VAR does not explicitly take into account the Basel III deficit of banks, but only considers how a unit change in capital may affect variables of concern. We consider this methodology useful since we do not have data on the exact capital deficit of individual banks.³² Nevertheless, as mentioned earlier, based on existing requirements, capital ratios of Philippine banks are well above international norms.

Similar to MAG (2010a), we assumed that higher capital funding costs are fully passed on to lending rates, which increases the lending wedge.³³ As a result, firms and consumers may decrease their demand for loans, lowering debt-financed investment and consumption, which eventually will lead to lower GDP growth. Thus, changes in bank capital will have an impact on real GDP growth by changing the lending wedge and/or total loan portfolio of banks. Nevertheless, loan portfolio of banks may increase as a result of bank's

²⁸ Cao (2011)

²⁹ Based on the most recent media release of the BSP on CARs (27 April 2012), Philippine banks remain healthy as CARs persist above 10 percent. (<http://www.bsp.gov.ph/publications/media.asp?id=2860>)

³⁰ The lending wedge is the difference between borrowing and lending rates. Data on the lending wedge can be approximated by the difference between central bank rates and lending rates in the market considered (MAG 2010a). This study uses the overnight RRP rate as the central bank rate and the average lending rates of UK/Bs as the lending rate.

³¹ Though there are 37 U/KBs, 4 banks were dropped from the sample due to too many missing data.

³² In order to estimate the capital deficit for individual banks, we need access to detailed balance sheet and income statement information including notes to financial statements.

³³ MAG (2010a) mentions that in practice, banks may follow a combination of strategies to comply with higher capital requirements.

efforts to comply with higher capital requirements since higher lending allows banks to earn higher interest income and accumulate retained earnings.

The following VAR model of order p is used:

$$\Delta Y_t = c + \sum A_p \Delta Y_{t-p} + v_t \quad (1)$$

where Y_t is an $n \times 1$ vector of endogenous variables, A_p is a matrix of coefficients to be estimated, c is the intercept vector of the VAR, and v_t is a generalization of a white noise process. The vector of endogenous variables includes changes in capital (DLCAPITAL), lending wedge (DLWEDGE), loan portfolio (DLLOANPORT) and real GDP (RGDPGR).³⁴

VAR ordering is DLCAPITAL DLWEDGE DLLOANPORT RGDPGR. Since our interest is to investigate the impact of an increase in capital to the macroeconomy, DLCAPITAL is placed on top of the VAR ordering, followed by DLWEDGE and DLLOANPORT. RGDPGR is placed last in the ordering to allow DLCAPITAL to have the maximum opportunity to affect it through several channels.³⁵ A dummy variable, CRISIS, is set equal to 1 for quarters Q12009-Q42009 (0, otherwise) to control for the impact of the global crisis in 2009.³⁶

According to MAG (2010a), an advantage of using this approach is that many factors that need to be modeled separately by other estimation process are implicitly incorporated. However, since statistical relationships are estimated from historical data, they may not be fully informative about how economic actors will respond to future policy changes (the Lucas critique).

Next, we estimate the benefit of strengthened capital through reduced crisis probability. The crisis probability is measured on the basis of individual bank's expected default frequency. The latter provides an estimate of the probability that a firm will default within a given time horizon, based on equity prices and volatility, and balance sheet data. In this estimation, the crisis risk is specified as a function of a vector of bank-specific characteristics. Two broad categories of factors are expected to influence crisis risk: a set of variables referring to the bank's capacity to generate income and accumulate capital and a set of variables referring to the bank's level of risk in the balance sheet. The benefit of higher capital requirement is estimated using:

$$EDF_t^i = \alpha_i + \beta \left(\sum_{k=1}^p \theta_k^{INC} \cdot INC_{t-k}^i + \sum_{k=1}^q \theta_k^{RISK} \cdot RISK_{t-k}^i + \sum_{k=1}^r \phi_k^X \cdot RISK_{t-k}^i \cdot X_{t-k}^i \right) \quad (2)$$

where EDF = expected default frequency of bank i at time t ; INC = indicators referring to bank's income capacity (return on equity (ROE), return on assets (ROA) and retained

³⁴ Note that (1) is in differenced form. We initially tested for stationarity of the variables in level and found that we cannot reject the null hypothesis of a unit root process in the variables of concern. We next tested for cointegration of the variables using the Pedroni Residual Cointegration Test, but cannot reject the hypothesis of no cointegration. Hence, we transformed the variables by differencing to obtain stationary variables. Difference was calculated year-on-year.

³⁵ Using Granger causality test, we confirmed that changes in capital Granger causes real GDP growth, but changes in real GDP growth do not Granger cause changes in capital. Hence, we are justified in placing DLCAPITAL first and RGDPGR last in the ordering. Based on various VAR lag order selection criteria (LR, FPR, AIC, SC and HQ), the optimal lag length is 8.

³⁶ In these quarters, real GDP growth of the Philippines ranged from 0.5-1.6 percent, way below the average of 4.4 percent for the entire sample period.

earnings over total assets (RE)), RISK = indicators of risk from bank's balance sheet (allowance for losses over net loans, loan write offs over net loans, risk assets over total assets), and X = structural indicators representing size (SIZE = total assets) and capital ratio (RATIO = Tier1 capital over total capital).

The interaction term between RISK and X makes it possible to analyze how the relationship between the perceived risk and bank characteristics changes with the size of the institution and its degree of capitalization. The market perception of risk in the balance sheet is magnified for large institutions if the coefficient Φ^{size} in equation (2) is positive and significant. It is reduced by the degree of capitalization if the coefficient Φ^{ratio} in equation (2) is negative and significant.

Banks' balance sheets, income statements and schedule of loans and receivables were gathered to obtain the required bank-level data to estimate equation (2). These were obtained from the Bangko Sentral ng Pilipinas Financial Reporting Package (BSP FRP) database. Implementation of the BSP FRP began in 2008 only, which limited the period covered to 2008-2011. This approach likewise requires the use of expected default frequencies of each bank to compute for the benefit analysis, which were obtained from Moody's KMV.³⁷ However, the expected default probabilities from Moody's KMV are only available for 12 U/KBs in the Philippines.³⁸ In contrast, the cost analysis included 33 U/KBs. Country-level data were obtained from the National Statistical Coordination Board (NSCB) and the BSP.

MAG (2011) suggests the use of panel least squares to estimate (1). We consider the panel nature of our data and account for the possibility that there may be bank-specific factors that are not captured by the model; hence, we use fixed effects estimation. Another consideration is that the EDF may affect bank behavior that alters the composition of bank's balance sheet, leading to the problem of endogeneity. Using Granger causality test, we fail to reject the null hypothesis that EDF does not Granger cause income and risk factors. This provides some evidence that endogeneity is not a problem in the model.³⁹

4. Estimated Macroeconomic Effects of Basel III for the Philippines

MAG (2011) reports that higher capital may result to short-term costs due to the adjustments that banks need to make in order to meet the requirements. Nevertheless, these costs should be weak or non-existent in the long-run. For the Philippine case, estimates confirm the possibility of short-term costs.

³⁷ Moody's KMV is a wholly owned subsidiary of Moody's Corporation. We acknowledge Mr. Dennis Botman for letting us use his data.

³⁸ Hence, benefit calculation maybe underestimated. Nevertheless, the 12 banks comprise 62 percent of total assets of the U/K banking system.

³⁹ We initially considered using quantile regression, which models conditional quantiles as functions of predictors (Koenker and Bassett, 1978). However, since our study only attempts to give a general assessment of the impact of Basel III implementation, we consider the use of conditional mean to suffice.

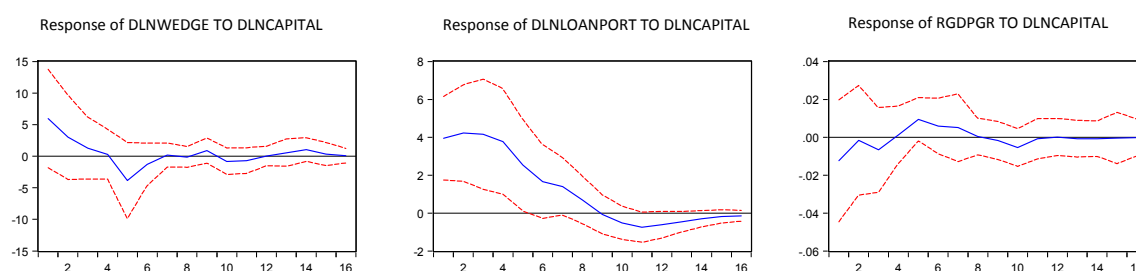
Table 2 shows the accumulated response of variables of interest to a 1 percent change in capital.⁴⁰ Similar to the BIS results, lending wedge increased in response to the increase in capital requirement, implying that banks may initially respond to the higher capital requirement by increasing their lending rates. A 1 percent increase in capital requirement is estimated to increase the lending wedge by 3.08 percent. Similarly, loan portfolio of banks increase in response to an increase in capital requirement, where a 1 percent increase in capital requirement leads to a 4.70 percent increase in loan volume. Finally, a 1 percent increase in capital requirement decreases real GDP by about 0.01 percent.

Table 2. Accumulated Responses of Lending Wedge, Loan Portfolio and Real GDP to a Unit Change in Capital Requirement, in %

Period	Lending Wedge	Loan Portfolio	Real GDP
Q1 - Q4	3.08	4.70	-0.01

Notes: Values were obtained from accumulated impulse response functions for the first 4 quarters after the shock, with Cholesky ordering: DLCAPITAL DLWEDGE DLLOANPORT RGDPGR

Figure 1. Impact of Increase in Bank Capital on Lending Wedge, Loan Portfolio and Real GDP Growth



Notes: Displayed are impulse response functions (IRFs). IRF traces out the effect of one standard deviation shock to one of the variables on current and future values of each of the endogenous variables in the system. For each plot, horizontal axis is number of quarters and vertical axis is percent change.

These results imply that higher interest income derived by banks from higher lending rates and loan volumes allow them to accumulate retained earnings and therefore meet the capital requirement. However, results also show that higher capital requirement may have a negative impact on real GDP. Nevertheless, the increased resiliency of banks due to higher capital may eventually have a positive impact on economic growth. According to the MAG (2011), soon after implementation of Basel III is complete, growth is expected to be somewhat faster than trend until GDP returns to its baseline. The impulse response function of real GDP growth to changes in bank capital confirms this as real GDP growth increases after the first year of the capital shock (5th-7th quarters) before it eventually returns to the baseline. Nevertheless, the impulse response of real GDP growth to changes in capital appears to be statistically insignificant for the entire period (third plot in Figure 1).

Meanwhile, the variance decomposition of real GDP growth shows that among the three variables – capital, lending wedge and loan portfolio – variations in lending wedge

⁴⁰ We divided the shocked variable (DLNCAPITAL) by its own standard deviation and expressed it in percent to obtain a 1 percent change. Responses of all the other variables were likewise divided by the standard deviation of the shocked variable to normalize the responses.

growth account for the largest in explaining variations in real GDP growth (Table 3). This suggests that the impact of changes in capital requirement on the real economy may be primarily felt through lending wedge increases. Figure 2 shows that real GDP growth is negatively correlated with lending wedge growth.

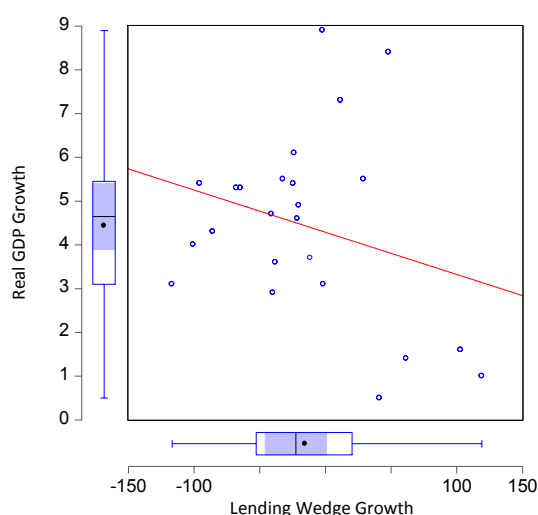
Table 3. Variance Decomposition of Real GDP Growth^{1/2/} (%)

Period	Capital	Lending Wedge	Loan Portfolio
1	0.11 (0.39)	4.32 (1.75)	0.78 (0.78)
4	0.12 (0.42)	10.00 (2.45)	5.06 (1.71)
8	0.17 (0.45)	11.85 (2.76)	4.75 (1.68)
12	0.17 (0.42)	13.90 (2.99)	4.76 (1.67)
16	0.15 (0.41)	15.72 (3.32)	4.54 (1.61)

Notes: 1/ Variance decomposition of real GDP growth 1, 4, 8, 12 and 16 quarters after the shock.

2/ Values in () are standard errors.

Figure 2. Correlation between Lending Wedge and Real GDP Growth



Note: Correlation based on 2006-2011 quarterly GDP growth and lending wedge of 33 UK/Bs

Meanwhile, estimation of equation (2) reveals that the sum of the income and risk indicators has an overall negative impact on expected default frequency, similar to the BIS findings.⁴¹ This implies that indicators referring to banks' income capacity have a negative relationship with the expected default frequency. This suggests that while higher risk exposure increases a bank's default probability, higher income capacity reduces its expected default.

In quantifying the benefits of Basel III, the coefficient of the sum of income and risk indicators, 0.10%, is multiplied by the cost of crisis, which is assumed to be 21%.⁴² This produces an annual benefit of 0.02% to GDP.

⁴¹ Results are in the Appendix.

⁴² Based on an earlier study of the Center for Monetary and Financial Policy (CMFP), the output loss in the event of a crisis is estimated at 21 percent of GDP. Thus, instead of following the 19 percent assumption of MAG (2011), we use 21 percent, which is specific to the Philippine case.

Results show that for the Philippines, higher capital requirements may have a negative impact on real GDP upon its implementation. Nevertheless, this may be offset by the benefit of strengthening banks, making them better prepared for financial crises and mitigating the output losses associated with them. Table 4 summarizes the estimated benefit, cost and net impact on GDP of meeting Basel III requirements.

Table 4. Macroeconomic Effect of Basel III in the Philippines

Benefit	Cost	Net Impact to GDP
0.10%*21% = 0.02%	-0.01%	0.01%

In contrast to other studies (see Appendix Table 3), the impact of Basel III implementation in the Philippines is relatively small and is positive. This may be due to the fact that Philippine U/KBs are already well-capitalized, as mentioned earlier. Based on existing BSP guidelines, the actual capital ratios of Philippine U/KBs are about 7-9 percentage points above the existing BSP minimum requirements (column g in Table 1).⁴³ This implies that balance sheet adjustment of banks may not be sizeable in order to meet the new regulations.

As a caveat, MAG (2010a) mentions that estimated impact of Basel III may differ from actual results since there may be factors not captured by the models used. For instance, international spillover effects can aggravate the negative impact since banks that lend across-borders also need to comply with Basel III requirements. Or international spillover effects can possibly mitigate the negative impact of Basel III implementation; for instance, monetary easing by major central banks, such as the US Fed and ECB, could drive capital flows to and increase domestic liquidity in other economies that may temper increases in lending wedge. Likewise, the possibility that domestic monetary policy may be used to dampen any contractionary impact of the reforms on the macroeconomy and the use of other methods to meet capital requirements, apart from increasing lending rates, were not considered.

4.3 How robust are the results?

MAG (2011) generally found that the VAR approach in estimating the macroeconomic effects of Basel III produced less stable and less reliable estimates than other approaches. While the AR Roots Table shows that our VAR is stable, the Autocorrelation LM Test reveals the presence of autocorrelation (See Appendix 4), which makes our estimates less precise.⁴⁴ Nevertheless, we report the results with this caveat in mind.

⁴³ As of September 2011

⁴⁴ We have explored several means to reduce autocorrelation. Increasing the lag order beyond 10 makes the model unstable and does not eliminate autocorrelation. Adding dummy variables likewise do not significantly reduce the extent of autocorrelation.

We exclude from the sample the top 10 U/KBs in terms of assets – these banks comprise 75 percent of the total assets of U/KBs – to eliminate the possibility that these top banks are driving the results of the VAR. Results are qualitatively similar to the results using the entire sample of 33 U/KBs.⁴⁵

Next, we obtain an alternative measure of lending wedge by using each bank's weighted average interest rate on savings deposits instead of the central bank rate (RRP rate) as the borrowing rate. Results of the VAR similarly show that lending wedge and loan portfolio increase following an increase in capital requirement. More importantly, real GDP declined by the same magnitude (-0.01 percent) as when the central bank rate was used. These results suggest that the findings from VAR are robust to changes in the measure of lending wedge.

Finally, we test whether it is appropriate to use cross-section fixed effects in estimating equation (2). Both the F-test and the Chi-square test strongly reject the null hypothesis that the cross-section effects are redundant or unnecessary (See Appendix 2), suggesting that it is appropriate to use fixed effects estimation.

5. Conclusion

Basel III presents a new framework aimed to address both bank-specific and systemic risks. Its implementation is expected to considerably increase the quality and required level of banks' capital, as well as, strengthen banks' capacity to absorb risks and reduce the risk of future banking crises. However, the higher capital requirements of Basel III may be implemented by banks in ways that can have a negative impact on the economy - for instance, an increase in lending rates.

Based on our estimates, the higher capital requirements imposed by Basel III may have an initial negative impact on the economy similar to results of other studies. Nevertheless, this is expected to be only temporary since once adjustment is done, real GDP is anticipated to return to its baseline. Moreover, the initial decline in GDP may not actually materialize since Philippine U/KBs are already well-capitalized. On balance, the new Basel III framework is expected to further strengthen Philippine U/KBs and therefore produce the benefit of preventing output losses that are associated with financial crisis.

On the policy side, since Basel III implementation is predicted to have a small and temporary negative impact on GDP, then it may be optimal for monetary policy not to respond. Nevertheless, if the actual impact is contrary to predicted and the negative impact is significant and prolonged, then appropriate monetary policy may be used to dampen any contractionary impact of the reforms. For instance, monetary easing could offset the probable negative impact of increase in lending wedge. Nonetheless, the short-term negative impact on GDP may not actually materialize since banks may use strategies other than increasing lending rates to raise capital; for instance, issue new equity and shift to non-interest (fee) income generating activities. In addition, though banks are still the primary source of funds in the Philippines, enterprises can shift to the capital market for

⁴⁵ We likewise see an increase in lending wedge and decline in real GDP.

funding needs. In such case, debt-financed consumption and investment, and hence GDP may not necessarily be negatively affected.

The results of our study are limited by the fact that we do not have detailed information on actual capital position of individual banks based on the new Basel III guidelines and the adjustments that they plan to undergo to meet the requirements. Hence, the results of our study may be confirmed by using these bank-specific data. From thereon, more precise forecasts on the effects of Basel III in the economy can be made. Nevertheless, uncertainties on the reaction of markets and the monetary response remain, which may make the results of any study differ from actual results.

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Appendix 1. BSP Memo on Basel III Implementation Plans



BANGKO SENTRAL NG PILIPINAS

**OFFICE OF THE DEPUTY GOVERNOR
SUPERVISION AND EXAMINATION SECTOR**

MEMORANDUM NO. M - 2012 - 002

To : All Universal and Commercial Banks and their Subsidiary Banks and Quasi-Banks

Subject : Implementation Plans for Basel III Standards on Minimum Capital Requirements

The Monetary Board, in its Resolution No. 33 dated 5 January 2012, approved the BSP's implementation plans for the capital standards in the Basel Committee on Banking Supervision (BCBS) document "Basel III: A global regulatory framework for more resilient banks and banking systems"¹, as follows:

The Basel III standards shall be incorporated in the risk-based capital adequacy framework for universal and commercial banks (U/KBs) and their subsidiary banks and quasi-banks (QBs) under Circular No. 538 dated 04 August 2006. Broadly, these consist of the following:

- The BSP shall adopt the new categorization of the capital base under Basel III. As such, Tier 1 shall be composed of Common Equity Tier 1 (CET1) Capital and Additional Going Concern Capital, while the subcategories of Tier 2 capital shall be eliminated.
- The eligibility criteria for each category of capital that is not yet included in Circular No. 709 dated 10 January 2010 shall likewise be adopted.
- The existing limits on eligible Hybrid Tier 1, Lower Tier 1 and total Tier 2² capital will be removed.
- The BSP shall adopt the regulatory deductions in Basel III, as applicable. Such deductions will be taken out of CET1 capital in full, as against the current practice of deducting the same from Tier 1 and Tier 2 capital on a 50:50 basis.
- The minimum capital adequacy ratio (CAR) shall remain at 10.0%. However, the BSP will adopt a minimum CET1 ratio of 6.0%, a minimum Tier 1 ratio of 7.5%, and the capital conservation buffer of 2.5%. The table below compares these

¹ Can be accessed at www.bis.org

² Eligible Hybrid Tier 1 capital is limited to 15% of total T1 capital (net of deductions). Eligible Lower Tier 2 and Tier 2 capital (sum of Upper Tier 2 and Lower Tier 2) is capped at 50% and 100% of total Tier 1 capital (net of deductions), respectively.

requirements with Basel recommendations as well as the existing guidelines of the BSP:

Capital requirements	Under Basel III		BSP guidelines		
	Minimum ratios	With conservation buffer	Existing minimum ratios	Proposed minimum ratios	Proposed minimum with conservation buffer
a. CET1 ratio	4.5%	7.0%	None	6.0%	8.5%
b. Tier 1 ratio	6.0%	8.5%	5.0% (6.0% as trigger for PCA)	7.5%	10.0%
c. CAR	8.0%	10.5%	10.0%	10.0%	12.5%

- The BSP envisions the full adoption of the new minimum ratios, including the capital conservation buffer, beginning 1 January 2014. The regulatory deductions shall likewise be deducted in full from CET1 on this date. Regulatory capital instruments that will be rendered ineligible under the minimum conditions of Basel III shall be allowed to qualify as regulatory capital only until the end of 2013. In sum, the new capital requirements for U/KBs and their subsidiary banks and QBs shall come into force at a single date, in contrast to the Basel Committee's recommended staggered implementation timeline and gradual phase-out of ineligible capital instruments.
- Covered banks and QBs shall likewise be subject to the enhanced disclosure requirements pertaining to regulatory capital.

In addition, the risk-based capital adequacy framework will incorporate provisions of the Basel Committee's enhancements on risk measurement related to securitizations and market risk, which were released in July 2009, and provisions in Basel III pertaining to the use of third party credit assessment agencies. These shall likewise be effective on 1 January 2014.

The draft of the implementing guidelines covering the foregoing changes will be exposed by the first quarter of 2012. Covered banks and QBs shall be given three months (i.e., the second quarter of 2012) within which to submit comments. Moreover, such entities will be required to participate in a quantitative impact study during the exposure period. The final guidelines are intended to be issued by the third quarter of 2012. This will allow one full year for a parallel run of the old and new guidelines before the new standards come into force on 1 January 2014. The parallel run period will enable the BSP to address any issues or make adjustments as warranted pertaining to the implementing guidelines.

The BSP will release further implementation plans and guidelines later in 2012 covering other aspects of Basel III. This will include the adoption of provisions pertaining to counterparty credit risk, as well as the implementation of the leverage ratio for monitoring purposes. At this point, the BSP does not yet envision adopting the countercyclical capital buffer; this shall be the subject of further study.

Covered banks and QBs are enjoined to consider the forthcoming regulatory changes in capital planning exercises and conduct preliminary assessments of the likely impact of the changes.

For information and guidance.


NESTOR A. ESPENILLA, JR.
Deputy Governor

10 January 2012

Appendix 2. Estimation of Benefit

Dependent Variable: EDF
 Method: Panel Least Squares
 Sample (adjusted): 2008M03 2009M07
 Periods included: 17
 Cross-sections included: 12
 Total panel (unbalanced) observations: 99

	Coefficient	Std. Error	t-Statistic	Prob.
C	5.417963	0.696588	7.77786	0
(ROA+ROE+RE)+(RISKALLO+RISKASSETS)+ (RISKALLO*RATIO+RISKASSETS*RATIO)	-0.101926	0.053671	-1.899108	0.0609
R-squared	0.91379	Mean dependent var		4.148889
Adjusted R-squared	0.90176	S.D. dependent var		6.243337
S.E. of regression	1.956863	Akaike info criterion		4.302416
Sum squared resid	329.3209	Schwarz criterion		4.643189
Log likelihood	-199.9696	Hannan-Quinn criter.		4.440293
F-statistic	75.96331	Durbin-Watson stat		0.44104
Prob(F-statistic)	0			

Note: According to MAG (2011), other factors that are not easily quantifiable such as business model and bank's strategy which may all influence the perceived risk of each bank are captured through the intercept term of the EDF specification model. This is reflected in the constant term, c, above.

Redundant Fixed Effects Tests
 Equation: EQ05FIXEDRATIO
 Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	71.708183	(11,86)	0.0000
Cross-section Chi-square	229.644022	11	0.0000

Appendix 3. Basel III Impact in Other Countries

Countries Covered	Author	Impact of a one percentage point increase in capital requirement on GDP during Basel III implementation period
United States, Euro Area, Japan	Slovik and Cournede (2011)	Decrease in GDP by 0.20%
Italy	Locarno (2011)	Decrease in GDP by 0.33%
United States	Angelini et.al (2011)	Decrease in GDP by 0.09%
United States, Euro Area, Japan, UK and Switzerland	Institute of International Finance (2011)	Decrease in GDP by 3.2%
France	Sy (2011)	Decrease in GDP by 0.30%
Emerging Economies	Abdel-Baki (2012a)	Decrease GDP by 3 percentage points

Appendix 4. VAR Stability and Residual Tests

Stability Test

Roots of Characteristic Polynomial
Endogenous variables: DLNCAPITAL DLNWEDGE DLNLOANPORT RGDPGR
Exogenous variables: C CRISIS
Lag specification: 1 8

Root	Modulus
-0.389067 + 0.865956i	0.949344
-0.389067 - 0.865956i	0.949344
0.396935 + 0.851479i	0.939454
0.396935 - 0.851479i	0.939454
0.782065 + 0.514978i	0.936391
0.782065 - 0.514978i	0.936391
-0.748011 + 0.486294i	0.892189
-0.748011 - 0.486294i	0.892189
0.458755 - 0.743586i	0.873714
0.458755 + 0.743586i	0.873714
0.759355 - 0.404979i	0.860597
0.759355 + 0.404979i	0.860597
-0.460455 - 0.699432i	0.837391
-0.460455 + 0.699432i	0.837391
-0.771565 + 0.203787i	0.798024
-0.771565 - 0.203787i	0.798024
0.737233 + 0.216493i	0.768362
0.737233 - 0.216493i	0.768362
0.339931 - 0.518713i	0.620175
0.339931 + 0.518713i	0.620175
0.505139 + 0.275311i	0.575293
0.505139 - 0.275311i	0.575293
-0.185212 + 0.535232i	0.566371
-0.185212 - 0.535232i	0.566371
-0.478936 + 0.223996i	0.528729
-0.478936 - 0.223996i	0.528729
0.092573 + 0.509775i	0.518113
0.092573 - 0.509775i	0.518113
0.477548	0.477548
-0.307305 + 0.345024i	0.462037
-0.307305 - 0.345024i	0.462037
-0.445863	0.445863

No root lies outside the unit circle.
VAR satisfies the stability condition.

Autocorrelation Test

VAR Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Sample: 2006Q1 2011Q4
Included observations: 528

Lags	LM-Stat	Prob
1	151.8594	0
2	166.0127	0
3	96.72476	0
4	164.775	0
5	61.9938	0
6	92.56619	0
7	81.71287	0
8	139.9658	0
9	60.97744	0
10	287.5473	0

Probs from chi-square with 16 df.