

WILL THE PROPOSED REGULATORY REFORMS BY THE BASEL COMMITTEE IMPROVE ECONOMIC PERFORMANCE IN EMERGING ECONOMIES? AN EMPIRICAL APPLICATION TO EGYPT AND UKRAINE

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Abstract

The aim of this research is to assess the efficacy of the prospective reforms proposed by the Basel Committee on emerging market economies. Egypt and Ukraine are selected as comparative case studies representing middle-income developing nations and transition economies that have shown diverse reactions to the global crisis. Using a small-scale DSGE model, the projected changes to capital adequacy measures, minimum liquidity requirements and Corporate Governance are tested on a set of macroeconomic outputs: GDP growth, employment, inflation and interest rates over the period of 2000:01-2010:03. The results reveal that the DSGE model is an inaccurate forecasting tool for both nations. Also, the impacts of the proposed regulatory reforms are quite detrimental for Ukraine, but better weathered by the Egyptian economy, implying that emerging nations that were well geared up through meeting requirements of Basel II will show more resilience to the costliness of future reforms.

JEL Classification: G17; G30; G320; G380; C320

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Introduction

The global financial crisis (GFC) and the ensuing economic turmoil erupted with waves of bewilderment on part of the global community and the supervisory authorities. The dejection was motivated by the uncovering of the delusion that the Basel Accord II, which was born to the collective international action of central bankers, has harmonized international banking practices and eliminated unconditional bank competition. Yet, it is unwarranted to primarily blame the current commotion on deregulation. Whilst a few heavily regulated emerging market economies (EMEs) were shielded from the financial turmoil many others were not spared its callous blow. The inefficacy of Basel Accord II to safeguard banking sectors in many nations has tempted monetary regulators round the world to introduce copious reforms. In response to the GFC, an international integrated collaboration between central bankers and top supervisors on the key calibrations of a package of banking reforms emerged throughout 2009-10. The Basel Committee for Banking Supervision (BCBS) engaged scores of bankers, academics and regulators and invited

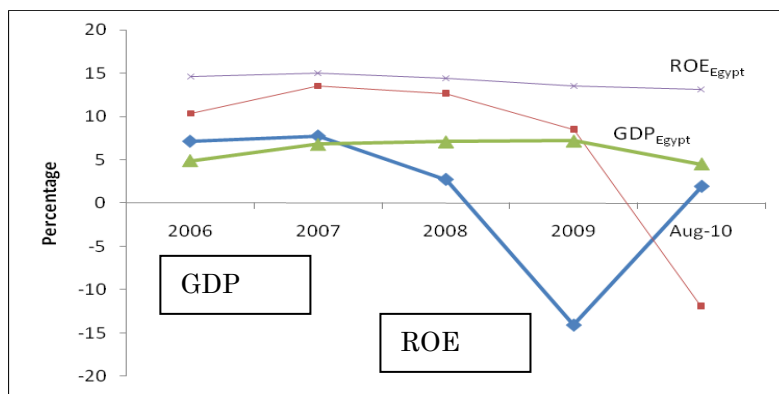
their comments on a set of consultative documents to augment the June 2006 accord. The impending regulatory framework is dubbed Basel III.

The most serious banking problems emanate from lax credit standards and reckless portfolio risk management, which may inherently lead to the eruption of the so-called “twin crises” engulfing a financial calamity and an economic downturn (Mishkin, 1994). For this reason, the Basel Committee initiated amendments, the most important being the introduction of new measures of capital adequacy, liquidity and leverage requirements and requisites for corporate governance. However, due to the vast disparity in the levels of skills and governance among emerging market regulators the final outcome is expected to vary from one economy to the other (Calomiris and Powell, 2000).

The main motivation of the study is to draw a comparison of the macroeconomic impacts of the prospected Basel III reforms on EMEs. Egypt and Ukraine are chosen as representative case studies of a middle-income developing nation and transition economies, respectively. Figure (1) shows that while Egypt adequately weathered the crisis, the Ukrainian

economy has shown signs of severe recession in 2009 and its banks are suffering from large losses. The paper is organized such that section (2) delves into macroeconomic developments and the evolution of corporate governance in both nations. Section (3) throws

light on the impending Basel III and sections (4) and (5) construct the DSGE model. Sections (6) and (7) draw forecasts and policy simulations. Finally, policy implications for both Egypt and Ukraine are outlined.



Sources: Databases of Central Bank of Egypt and National Bank of Ukraine.

Figure 1. Comparison of GDP Growth and Return on Equity (ROE) in Egypt & Ukraine

Macroeconomic, Regulatory and Corporate Governance Developments

In view of the substantial episodes of financial crises and bank failures since the turn of the century, serious attempts were undertaken by central banks of most transition and emerging economies to impose stringent capital adequacy requirements and consolidate the banking sector (Henry, 2009). However, the National Bank of Ukraine (NBU) failed to reduce the number of banks, which increased from 181 banks in 2005 to 194 as at August 2010 (NBU, 2010). On the other hand, the Central Bank of Egypt (CBE) forced banks into voluntary and involuntary mergers and acquisitions, hence reducing the number of Egyptian banks from 82 in 1991 to 39 in 2010. However, unlike the 19% foreign ownership in the Egyptian banking sector (EIU, 2009), it reached 45% in Ukraine in 2010 (NBU, 2010). While foreign ownership transfers banking knowhow and grants domestic branches access to ample liquidity from their foreign subsidiaries, it exposes the banking system to foreign shocks and crises (Mody and Taylor, 2007).

2.1 Regulatory Controls in Response to the GFC

The first step undertaken by the NBU in the way of taming the crisis was a moratorium on the withdrawal of deposits by individuals¹. Although breaching depositors' rights and jeopardizing future national savings, this decree provided a short-term solution to reduce deposit runs. Shortly afterwards, Ukrainian regulators raised the cap of deposit insurance to the equivalent of USD 28,000.

¹ This is in accordance with the Decree of the Board of the National Bank of Ukraine № 319, dated 11.10.2008, which also restricted the foreign currency loans to counterparts who do not generate income in foreign currency.

Additionally, towards the end of 2008, both the government and the NBU had to use a range of urgent measures to recapitalize and nationalize banks. The Financial Sector Recovery Urgent Measures Act was drafted, granting the NBU exclusive rights to make appointments of the temporary administrators of the nationalized banks. In spite of clearly violating the rights of shareholders in governing banks through the supervisory board elections, this was a necessary procedure in view of the large number of bank failures and insolvencies. Yet, since the National Bank of Ukraine was yet unprepared to implement the complicated capital adequacy requirements, it raised the minimal paid-in capital to USD 15-30 million. The act also required banks to cut administrative expenses and place a minimum of 50% of net profit in reserve funds.

In sheer contrast, Egypt did not endure bank insolvencies due to the strict compliance with the capital requirements of Basel Accord II. However, in the absence of explicit customer deposit insurance, the CBE publicly declared that it will inexhaustibly guarantee customer deposits in all private and public Egyptian banks. This came in response to the rapid exodus of deposits from private to state-owned banks. Yet, the CBE sternly advised its banking units that it will not forfeit the minimum capital requirements and liquidity ratios. Perhaps the only exception was exempting Egyptian banks that lend small and microenterprises from the 14% legal reserve requirement (LRR). In addition, banks were allowed to hold 10% of the LRR in the form of T-Bills, which was merely an expansionary monetary policy tool.

2.2 Corporate Governance

There is no doubt that in the case of a severe financial crisis the collective actions of both the monetary

authority by imposing regulatory controls and banks themselves through corporate governance (CG) is indispensable. While Basel Accord II is basically concerned with proper risk management, it merely viewed CG as the role of the Board of Directors (BOD).

2.2.1 Corporate Governance in Ukrainian Banks

National Bank of Ukraine enforces CG in accordance with the national legislation. There are three main legislative documents outlining the concepts and models of corporate governance, namely: the Civil Code of Ukraine, the Banks and Banking Act, and the Joint Stock Companies Act. All three documents complement one another with regard to the procedure of establishing the relationship between corporate governance bodies and the most powerful players, i.e. shareholders. Ukrainian banks use the monistic concept of corporate governance placing the key interests of shareholders at the forefront (Gourevitch, 2005). In the context of the existing legislation and practices, some different approaches to understanding the functions, powers or responsibilities of the Supervisory Board or Executive Board can be conjectured.

It could be safely inferred that the model of corporate governance in Ukrainian banks is Continental (German) according to the functional purpose of the board of directors under which the supervisory board performs the role of “a controller” (Kwok and Tadesse, 2006). Overall, Ukrainian banks use the two-tier board model, but in contrast to Germany, employees have no right to have a representative on the supervisory board (Licht et al., 2005). Moreover, Ukrainian minority shareholders have almost no ability to protect their own rights and interests. Another major concern that has to be immediately addressed by the various Ukrainian CG legislations pertains to the independence of the directors under the current board structure, since there are still no legislative requirements with regard to the share of independent directors on the supervisory board (Kostyuk et al., 2010).

Whilst many developing countries have their own CG banking codes, Ukraine lacks its own. There was one meager attempt in 2007 to implement some sort of recommendations by the National Bank of Ukraine called “Guidelines for Improving Corporate Governance in Banks”, but these did not extend beyond being a set of scanty and highly contradictory recommendations. Hence, there is ample scope for future development and augmentation of CG in Ukrainian banks. In all probability, regulatory capital requirements and direct impacts on bank governance have concerned the NBU much more than corporate governance standards. A new decree was passed in July 2009, prohibiting loss-making banks from paying dividends to shareholders, bonuses

and other material incentives to bank employees². These measures were very much in line with international practices of cutting bonuses for managers and prohibiting bank loans to insiders.

But the NBU has not paid adequate attention to the CG issues which could impact financial stability of banks. Thus, the independence of the members of the BOD has not been properly addressed. Moreover, the issue of the board committees has only been partly resolved in April 2009 when The Joint Stock Companies Act came into force and made it mandatory for every joint stock company including bank to establish an audit committee. Yet, no explicit reference has been made to other board committees which provide essential monitoring services to the bank, such as the nomination and remuneration of executives. The collective role of the market regulator, the audit committee and the supervisory boards are crucial to develop effective CG and risk management practices (Lys, 2009). Yet, the fact that both the state-owned and the recently nationalized banks are governed by temporary administrators appointed by the NBU conjures up this requirement. The lack of acceptable board committee practices in Ukraine reduces the role of supervisory boards to mere “rubber stamps”. Thus, the NBU regulatory measures conflict with the optimal global corporate governance practices.

Another point that is worth close attention is the issue of executive compensation. Kostyuk (2003, 2005, 2006) investigated board committee members’ remuneration in Ukrainian banks and concluded that there were very weak commotions by shareholders and supervisory board members in establishing the board committees. Similar to Ukraine, empirical evidence reveals the strong inclination of banks in transition economies to abide by the fixed salary of the board committee members with a link to the principle “pay for presence” as the remuneration disbursed for the attendance of the committee meetings by its members (Matoussi and Jardak, 2009). As a result, the issue of board committee members’ remuneration in transition economies is still beyond the scope of corporate governance in banks.

2.2.2 Corporate Governance in Egyptian Banks

In spite of the fact that, unlike Ukraine, Egypt opened up to foreign capital in the mid-seventies, it instigated the corporate governance mechanisms only in the mid-1990s. It took the initiative in promoting and developing a corporate governance code as late as June 2004. The Egyptian Ministry of Investment issued in 2005 The Code of Corporate Governance for enterprises listed on the stock market (EMOI, 2006).³ Yet, this code is neither

² Decree of 22.07.2009 №421 “About Important Issues of Banking in Financial Crisis”.

³ These rules are an addition to the Law on Shareholding Joint Stock Companies, Partnerships, and Limited Liability Companies issued by virtue of Law #159/1981; the Capital Market Law was issued by virtue

mandatory nor legally binding, but simply promotes responsible and transparent behavior in managing corporations to serve stakeholders' interests (CIPE, 2005). A second step was taken in 2006 where The Code of Corporate Governance for the Public Enterprise Sector was issued, based on the report of the Organization of Economic Cooperation and Development (OECD) working group on Privatization and Corporate Governance of State Owned Assets (Dahawy, 2009). The code introduces the principles of governing state-owned companies by presenting an organizational and legal framework for public companies.

These codes and guidelines included many provisions, the objectives of which were to enhance the effectiveness of the boards of directors and to guarantee the rights of shareholders and various stakeholders. Similar to Ukraine, the concept of CG in Egypt is monistic (Azab, 2007). The BOD is unitary and comprises of executive and non-executive members. Moreover, various committees should be created, of which the Audit Committee is part of the internal auditing system. The code specifies that the BOD is determined according to capital distribution and is nominated to represent shareholders (Elsayed, 2010). The Bank Reform Plan (BRP) that was adopted in 2004 enhanced CG through the adherence to the OECD Principles of Corporate Governance and Basel II requirements (Youssef, 2007). In a survey conducted in 2006, Egyptian banks were performing well in regard to CG of risk management, but lacked board independence and objectivity as well as measurable standards defining the relationship between remuneration and performance in a manner that emphasizes the long run interests of the bank (EBI, 2006).

However, a number of positive steps were taken lately to enhance corporate governance culture in Egypt. Firstly, the Egyptian Institute of Directors (EIOD) was formed and mandated through different ministerial decrees and currently falls under the umbrella of the Ministry of Investment, which is showering it with generous technical assistance and expertise. Second, the EIOD is working on designing CG training programs for all Egyptian companies, whether listed on the stock exchange or not. Thirdly, the guidelines for CG are now being widely spread through moral suasion and a CG index has been recently formulated. Moreover, different procedures are implemented to empower public companies' management and enhance the role of the General Assemblies (GAs) to track and appraise management decisions. Most importantly, the first steps of implementation have been taken since a CG manual has been drafted.

Conversely, EMEs that had a longer time horizon to benefit from gradual institutional evolution enjoy more mature CG norms. This is detailed in the Williamson institutional economics framework, which elucidates how

economic growth and development are affected by the governance structure of firms, which in turn significantly relies on the legal framework and the level of development of both formal and informal institutions (Stulz and Williamson, 2003). Hence, the lack of sufficient CG practices in emerging economies such as Ukraine and Egypt addresses a lot of claims to central bankers and shareholders of banks. This delivers the critical importance of corporate governance amidst of the financial crisis and begs for instant reforms.

Basel III

According to the aforementioned information, it was only anticipated that the international community should rise to promptly reform the banking sector. This was executed through

Basel III, which is the third materialization of the international agreement on bank capital rules. Basel Accord I was first devised by the Basel Committee of Global Banking Regulators in 1988. Basel II was drafted by the end of 2006, but was not implemented in most countries till 2008. It was often criticized on the premise that its capital requirements were inadequate and may result in frail banking systems (Benston, 2007). It was the events of the global financial crisis that overhauled Basel II as the BCBS persisted to provide bankers and regulators with guidelines for safe banking practices and corporate governance development. Three consultative documents were issued in 2010: Strengthening the Resilience of Banking System, International Framework for Liquidity Risk Measurement, Standards and Monitoring and Principles for Enhancing Corporate Governance. The said documents are currently consultative, yet some of the issues mentioned there should be highlighted in regard to new capital requirements, liquidity measures and corporate governance.

The main concern is the possibility of a substantial decline in lending and investment levels, where banking practitioners are skeptical that the implementation of Basel III would cut economic growth over the next five years in the United States, the Euro Zone and Japan by 3%, and shed 10 million jobs (IIF, 2010). In response, the Financial Stability Board challenges this assertion and demonstrates that every 1% increase in the capital ratio would cut the probability of crises in half, from 4.6% to 2.3%, which translates into an annual GDP growth rate of 1.4% (Cecchetti, 2010; FSB, 2010). Given these two polar outcomes, it is imperative to conduct a thorough forecast. The following sections are devoted to building an econometric model to assess the impact of the impending reforms on each of Egypt and Ukraine. To this avail, it is vital to throw some light on the core amendments and reforms proposed by Basel III.

3.1 Capital Requirements

Basel I and II did not guarantee the loss bearing capital outside insolvency. In many cases bank capital was inadequate and risky assets were introduced under the banner of innovative arbitrage. As capital was chipped off and balance sheets contracted in the wake of the GFC, the global community called for stringent regulatory controls to identify risks, challenge imprudent business models and take all necessary actions to preserve stability.

Under Basel II banks must meet a minimum of 4% of total risk-based assets as tier 1 capital and 8% tier 1 and tier 2 capital. If a bank fails to comply, its supervisor can apply increasingly severe limits on its operations to the extent that the bank can even be liquidated if it remains critically undercapitalized. This arrangement is known as prompt corrective action, and aims to assure that failing banks are closed before they become insolvent. Basel III imposes tighter stipulations since banks will have to hold a minimum core capital level of 4.5%.⁴ In addition, banks will be obliged to maintain a capital conservation buffer of 2.5% to withstand future periods of stress, bringing the total common equity requirement to 7%. The BCBS gives a detailed definition of the leverage ratio, as specified in equation (1), but leaves it up to the national jurisdictions to identify a target level.

However, many responses by the international financial community demand for a global harmonization of the leverage ratio (S&P, 2010). Although the total minimum capital requirement remains at 8%, the new buffer raises the effective capital requirement for banks to 10.5%. Banks will be given a grace period up to 2015 to fully implement the new common equity and Tier 1 capital requirements; up to 2019 to put the capital conservation buffer in place; and till 2023 to phase out hybrid securities that will no longer qualify as capital (BIS, 2010, a).

$$\text{Leverage ratio} = \frac{\text{Core capital}}{\text{On-balance-sheet assets} + \text{Off-balance-sheet assets}} \quad (1)$$

3.2 Liquidity Risk Coverage

Basel II does not focus on liquidity requirements, hence there are currently 25 different liquidity measures globally used by supervisors. To achieve international harmony, the Committee developed a set of common metrics to monitor bank liquidity risk profiles. Basel III also outlines regulatory standards for liquidity risk to achieve two separate but complementary objectives. Equation (2) displays the first metric, which aims to promote short-term liquidity resilience of banks to cover contingent liquidity effects⁵. The Liquidity Coverage

Ratio (LCR) comprises of high quality liquid assets and net cash outflows calculated after conducting multiple acute stress scenarios for one month (BIS, 2010, b)

$$\text{LCR} = \frac{\text{Stock of high quality liquid assets}}{\text{Net cash outflows over a 30-day time period}} \geq 100\% \quad (2)$$

The second objective is building long-term resilience by funding bank activities with more stable sources on an ongoing basis. This is known as the Net Stable Funding Ratio (NSFR), and is detailed in Equation (3). Available stable funding (ASF) is defined as the types and amounts of equity and liability financing that are reliable sources of funds over a one-year period under conditions of extended stress.⁶ While these two standards comprise of internationally harmonized parameters that use specific and concrete values, it is universally agreed that bank supervisors may use additional metrics in order to capture specific risks in their countries.

$$\text{NSFR} = \frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} \geq 100\% \quad (3)$$

3.3 Corporate Governance

Finally, the BCBS has determined that the third pillar is the internal governance of banking firms, which will enable them to satisfy the public interest of financial stability. The committee has issued a consultative document that focuses on six coherent points (BCBS, 2010, c):⁷

- The responsibilities of the board of directors should be adequately exercised and effective oversight of senior management must be exercised to ensure the proper implementation of the bank's business and risk strategy, organization, financial soundness and governance.
- Senior management is held responsible for the extent of risk tolerance, overall bank strategy and policies of the board.
- The appointment of a risk management department to act as an independent unit, albeit possessing necessary timely communication with the board.

the time that this paper was written, but this research will count the following as high quality liquid assets: cash; central bank reserves; and high quality 0% weighted-risk sovereign paper, high quality corporate bonds or covered bonds (receiving 20% or 40% haircut). The term high-quality includes assets with intact liquidity-generating capacity even in periods of severe idiosyncratic and market stress.

⁶ ASF is calculated as: capital; preferred stock with maturity of equal to or greater than one year; liabilities with maturity of equal to or greater than one year; and non-maturity deposits and term deposits with maturities of less than one year that are expected to stay with the institution for an extended period in an idiosyncratic stress event.

⁷ Basel III contends that additional CG requirements are not treated as imposing additional financial costs on banks.

⁴ Banks are required to hold core capital in the form of common equity as it is the highest loss-absorbing capital.

⁵ High quality liquid assets are easily and immediately converted into cash at little or no loss of value. The definition has not been reached till

- Board member and senior management remuneration has to be properly set forth according to national and Financial Stability Board guidelines (FSB, 2009).
- The adoption of a transparent corporate structure by the board and the senior management.
- Disclosure and transparency are the most important methods of a sound CG practice.

A number of objections are directed to the impending guidelines. First, since there is extensive discussion of quantifying risks, one would have assumed that the submission and place of Chief Risk Officer (CRO) in the CG structure of banks would be accurately delineated. Yet, the document does not address the method of reporting and interaction between the CRO and the BOD. Another issue that is not thoroughly broached by the BCBS is that of executive remuneration. Thirdly, the document shows an attempt to connect risk taking and compensation, but has not distinctly defined the circle of employees who deserve the compensation whether these are the directors, the CEO or others. The range of possible risks is not clarified and this is apt to make some room for rule-bending. Also, there is dire need to develop governance scores to test the relation between corporate governance and bank efficiency (OECD, 2010).

For the purpose of this research paper, Corporate Governance will be measured in accordance with the extent to which the BOD adopts and adheres to economic value alignment (EVA), which is based on the concept that a successful firm should earn at least its cost of capital. Earlier forms of CG imposition adopted measures similar to economic value added or value-based management, but recent studies reveal that EVA is more enriching since it measures the value added of overall costs, which is virtually the productivity of all factors of production (Lander and Reinstein 2005). Any deviation from the norms and standards calls for immediate corrective action. In other words, EVA aligns the expected value added concept to the entire management of the bank. It can be expressed as the following equation:

$$\text{EVA} = \text{Net Operating Profit After Taxes (NOPAT)} - (\text{Capital} \times \text{Cost of Capital}) \quad (4)$$

$$\begin{aligned} \text{NOPAT} = & \text{Net Operating Profit} - (\text{Depreciation} \\ & + \text{Implied Interest Expenses} \\ & + \text{Opportunity Costs of Non-earning assets} \\ & + \text{Opportunity Costs of Earning assets} \\ & + \text{Goodwill Amortization}) \end{aligned} \quad (5)$$

Adjustments made to operating earnings reflect the investments made by the banking firm or capital employed to achieve targeted profits. Since Basel III fails to set forth such yardsticks, the proposed proxy benchmarks that will be employed by this paper for EVA and NOPAT are calculated in accordance with banking units that barely abide by the new liquidity, leverage and

capital ratios. The extra expenses of imposing EVA will be treated as an additional shock to the banking system and to the entire economy. This is further elucidated in section 7.

Methodology

In the last few decades the roles of macroeconomic models have extended to cover forecasting with the aim of designing reliable and sustainable policymaking *modus operandi* (Meyer, 1997). Simultaneous-equations structural models have been habitually used to forecast the macroeconomic impact of specific variables. However, Cooley and LeRoy (1985) stipulate that such models are poorly suited to forecasting since future values are needed for the exogenous variables in the system. A better forecasting model is the Vector Autoregressive (VAR) model whose coefficients can be combinations of structural coefficients (Zellner, 1979). But since both the standard econometric models and the VARs, are linear they fail to take account of the nonlinearities in the economy. It was for this reason that the dynamic stochastic general equilibrium (DSGE) models were developed since they are capable of handling both the possibilities of structural changes and the issues of nonlinearities (Christiano et al., 2005).

Central banks commonly employ the DSGE model since it is flexible enough to include many macroeconomic variables or even to lump them up into categories (Edge et al., 2010). However, these models may be misspecified in some dimensions, undermining their forecasting performance (Del-Negro et al., 2005). This has tempted many economists to take combinations across many econometric models to hedge against such instabilities (Eklund and Karlsson, 2007; Clark and McCracken, 2010). However, Bache et al. (2009) combine a VAR model with a policymaking DSGE model by allowing for structural breaks in the VAR to reduce weight on the DSGE, and produce well-calibrated forecast densities. Also, recent studies (Smets and Wouters, 2007; Sims, 2008) suggest that advances in Bayesian estimation methods have made DSGE models capable of providing informative forecasts.

4.1 DSGE Model

This paper uses a small-scale DSGE model for Egypt and Ukraine to forecast the effects of the three proposed reforms of Basel III: capital requirements, liquidity ratios and corporate governance practices on real GDP growth, employment, inflation and interest rates. The study covers the period 2000:01-2010:03. The economy is divided into three agents: utility maximizing households, firms that seek to maximize profits, and monetary authorities with the explicit nominal anchor of price stability and the implicit goal of output growth and financial stability. The IS curve, the forward looking Phillips curve and the monetary policy rule further explain the model. The system is put to motion by structural demand, supply and

monetary shocks.

4.1.1 Households

The model assumes that there are (i) households that aspire to maximize utility (U_t). Households decide on consumption expenditure (C_t) and saving instruments (S_t), which could be resold at the discount rate ($1/R_t$). The decision leads to the following dynamic IS-curve:

$$\left(\frac{H_t^i}{A_t}\right)^{-\sigma} = \beta U_t \left\{ \left(\frac{\varepsilon_{t+1}^D}{\varepsilon_t^D}\right) \left(\frac{R_t}{\Pi_{t+1}}\right) \left(\frac{A_t}{A_{t+1}}\right) \left(\frac{H_{t+1}^i}{A_{t+1}}\right)^{-\sigma} \right\} \quad (6)$$

where, β is a time-invariant discount factor. The individual household habit H_t^i is adjusted for the growth rate of technology g_t . Present consumption C_t is a fraction of past consumption C_{t-1} .

$$H_t^i = C_t^i - \lambda(1 + g_t)C_{t-1} \quad (7)$$

At is a deterministic trend in technology, such that

$$\ln A_t = g_t \quad (8)$$

ε_t^D is a demand shock affecting the household's decisions of the levels of consumption and savings. It follows an AR(1) process with η_t^D being an i.i.d. white noise disturbance as follows:

$$\varepsilon_t^D = (1 - \rho^D)\varepsilon^D + \rho^D \varepsilon_{t-1}^D + \eta_t^D \quad (9)$$

and Π_t is the change in the inflation measured by the consumer price index (CPI),

$$\Pi_t = \frac{\text{CPI}_t - \text{CPI}_{t-1}}{\text{CPI}_{t-1}} \quad (10)$$

The following is the labour supply curve:

$$\frac{W_t}{P_t A_t} = v_L \left(\frac{H_t^i}{A_t}\right)^\sigma \left(L_t^i\right)^\phi \quad (11)$$

4.1.2 Firms

The model is assumed to operate with monopolistically competitive (j) firms of mass 1 producing differentiated intermediate goods (Y_t^j) and firms producing final goods

(Y_t); $\theta > 1$ is the elasticity of substitution between the goods.

$$Y_t = \left[\int_0^1 (Y_t^j)^{\frac{\theta-1}{\theta}} dj \right]^{\frac{\theta}{\theta-1}} \quad (12)$$

Producers of final goods minimize costs, but take the price of intermediate goods as given. The consumer price of the final product is denoted as:

$$P_t = \left[\int_0^1 (P_t^j)^{1-\theta} dj \right]^{\frac{1}{1-\theta}} \quad (13)$$

Firms face a downward sloping demand curve, i.e. quantity demanded of (j) is inverse to price.

$$Y_t^j = \left(\frac{P_t^j}{P_t}\right)^{-\theta} Y_t \quad (14)$$

The expected discounted profit (π_t^j) for a firm that can re-optimize its price is given by:

$$\pi_t^j = (P_t^j - MC_t^N) \left(\frac{P_t^j}{P_t}\right)^{-\theta} \left[Y_t - \frac{P_t Y_t}{\theta} \right] \quad (15)$$

where, the nominal marginal cost (MC_t^N) per unit is given by:

$$MC_t^N = \frac{W_t}{A_t \varepsilon_t^s} \quad (16)$$

and

$$Y_t^j = A_t \varepsilon_t^s L_t^j - \frac{Y_t}{\theta} \quad (17)$$

The supply shock

$$\varepsilon_t^s = (1 - \rho^s)\varepsilon^s + \rho^s \varepsilon_{t-1}^s + \eta_t^s \quad (18)$$

and η_t^s is an i.i.d. white noise disturbance.

Staggered price setting à la Calvo (1983) is assumed where (ξ) denotes the probability that the firm is unable to set its own prices and the price is automatically adjusted by a steady inflation rate (Π). The implied price

duration is $1/1-\xi$. Accordingly, firms that cannot optimize their price follow the following indexation rule:

$$P_{t+s}^j = P_t^j \left(\frac{P_{t+s-1}}{P_{t-1} \bar{\Pi}^s} \right)^\delta \left(\bar{\Pi} \right)^s \quad (19)$$

Conversely, banks that are able to re-optimize their price and to maximize the present value of their discounted profits in period t operate according to the following rule:

$$\max_{P_t^j} \pi_t^j \left\{ \sum_{s=0}^{\infty} \xi^s Q_{t,t+s} \pi_{t+s}^j \right\} \quad (20)$$

where, $Q_{t,t+s}$ is a time-dependent stochastic discount factor.

Substituting (19) and (20) in (15) yields the following:

$$\max_{P_t^j} \pi_t^j \left\{ \sum_{s=0}^{\infty} \xi^s Q_{t,t+s} \left[\left(P_t^j \left(\frac{P_{t+s-1}}{P_{t-1}} \right)^\delta \bar{\Pi}^s - MC_t^N \right) \left(\frac{P_t^j \left(\frac{P_{t+s-1}}{P_{t-1}} \right)^\delta \bar{\Pi}^s}{P_{t+s}} \right)^{-\theta} - \frac{P_{t+s}}{\theta} Y_{t+s} \right] \right\} \quad (21)$$

Accordingly, the expected discounted profit yields:

$$\pi_t \left\{ \sum_{s=0}^{\infty} \xi^s Q_{t,t+s} Y_{t+s} \left(P_t^j \left(\frac{P_{t+s-1}}{P_{t-1}} \right)^\delta \bar{\Pi}^s - \frac{\theta}{\theta-1} MC_{t+s}^N \right) \right\} = 0 \quad (22)$$

where, P_t^j is the security price that maximizes the value of its future returns. Households are owners of the bank and receive capital gains and profits, and hence they make their decisions based on both current and future expectations of marginal costs. The following is the price level:

$$P_t = \left[\xi \left(P_{t-1} \left(\frac{P_{t-1}}{P_{t-2}} \right) - \bar{\Pi} \right)^{1-\theta} + (1-\xi) \left(P_t^j \right)^{1-\theta} \right]^{\frac{1}{1-\theta}} \quad (23)$$

4.1.3 Central Bank

As mentioned earlier, the nominal anchor of both the NBU and the CBE is inflation targeting, while the implicit targets are GDP growth and financial stability. Again, the higher costs of production are simulated for the period of the study and the monetary agents are expected to use the overnight interest rate as the operational target to offset the effects of these higher costs that are apt to affect both the implicit and explicit targets. In accordance with Rudebusch (2002) interest rate smoothing (γ) is introduced into the monetary policy reaction function.

$$\frac{R_t}{\bar{R}} = \left(\frac{R_{t-1}}{\bar{R}} \right)^\gamma \left[\left(\frac{\bar{\Pi}_t}{\bar{\Pi}} \right)^{\gamma \cdot \Pi} \left[\frac{Y_t}{Y_{t-1}(1+g)} \right]^{\gamma \Delta y} \right]^{(1-\gamma)} e^{\eta_t^M} \quad (24)$$

where, η^M is an i.i.d. white noise disturbance.

The market clearing condition for the domestic economy requires that:

$$Y_t = C_t + C_t^f \quad (25)$$

where, the left-hand-side is the supply of domestic goods and the right-hand-side comprises of domestic demand (C_t) and export demand from the rest of the world (C_t^f).

$$C_t^f = \kappa \left(\frac{P_t^j}{P_t} \right)^{-\eta^f} Y_t^f \quad (26)$$

and, (κ) represents the share of foreign imports to total foreign output.

Results

Table (1) reports the DSGE parameter estimates for prior and recursive posterior distributions. Parameters are estimated with a1 and up to 4 lag length, and with a rather tight prior distribution for a grid of values: $\lambda \in \{0.67, 0.8, 1, 1.5, 2, 3, 5, 10, 100\}$. Also, in accordance with Justiniano and Preston (2008) the model is estimated without accounting for misspecification. The value of the

discount factor (β) was calibrated at 0.995 as per Hansen (1985). While habit formation plays a very small role, inflation indexation is quite prominent, which is in accordance with Christiano et al. (2005). The parameter for price stickiness takes a particularly high value, which means that prices adjust quite sluggishly. These findings regarding prices are especially important due to the stubborn inflation in both countries. The supply shock persistence is higher than that for demand.

Table 1 Structural Parameters

	Prior Distribution		Median	Recursive Mode of Posterior		
	Mean	SD		Mean	Min.	Max.
Discount factor (β)	0.995					
Habit formation (H)*	0.49	0.10	0.51	0.52	0.42	0.64
Labour supply elasticity (ν)♦	1.68	0.67	1.45	1.5	1.41	1.62
Elasticity of substitution (θ)♦	0.98	0.41	0.69	0.68	0.55	1.21
Calvo prices (ξ)*	0.84	0.19	0.69	0.69	0.51	0.65
Inflation indexation (δ)*	0.83	0.15	0.37	0.38	0.30	0.45
Int. rate smoothing (γ)*	0.79	0.19	0.65	0.65	0.55	0.71
Inflation response ($\gamma\pi$)♦	1.71	0.41	1.65	1.78	1.58	1.71
GDP growth response ($\gamma_{\Delta v}$)♦	0.29	0.1	0.21	0.23	0.23	0.25
Demand shock persistence ρ^D *	0.78	0.1	0.61	0.6	0.56	0.64
Supply shock persistence ρ^S *	0.88	0.09	0.98	0.99	0.88	0.99
Supply shock SD (σ^S)•	0.41	2	0.81	1.08	1.07	1.25
Demand shock (σ^D)•	0.22	2	0.85	1.34	1.22	1.97
Monetary shock (σ^M)•	0.12	2	0.09	1.17	1.11	1.79

*Beta distribution

♦Normal distribution

• Inverse gamma distribution

The stylized facts of the data are compared to the baseline model in Table (2). The baseline model properly emulates most of the stylized facts. There are two noticeable problems, the first is that the baseline model underestimates the variability of inflation for both nations; the standard deviation (SD) of inflation is 3.33% in the baseline model, while it amounts to 10.11% for Egypt and 9.03% for Ukraine. Secondly, the model underestimates the variability of the interest rate. Also, in regard to the interest rate, the model records 97%

correlation with output, in comparison to 11% for Egypt and only 1% for Ukraine. All other results appear to be consistent with previous research. For example, output is more variable than consumption. Moreover, the high volatility of investment in relation to output is in line with the previous literature, since there are more important determining factors of investment such as contagion effects of financial crises, foreign direct investment, interest rates and financial stability (Moguillansky 2002).

Table 2 Baseline Model and Actual Data

	Baseline Model			Egypt			Ukraine		
	SD	SD/GDP	Corr.	SD	SD/GDP	Corr.	SD	SD/GDP	Corr.
GDP	2.22	1.00	1.00	2.27	1.00	1.00	1.98	1.00	1.00
Inflation	3.33	4.29	0.91	10.11	6.71	0.88	9.03	5.34	0.69
Employment	1.21	0.78	0.99	1.39	0.76	0.81	1.92	0.71	0.55
Consumption	0.77	0.39	0.81	0.83	0.45	0.74	0.79	0.50	0.46
Investment	7.41	5.12	0.97	8.31	4.82	0.95	9.72	3.89	0.71
Interest rate	0.09	0.1	0.97	1.39	1.56	0.11	2.34	2.61	0.01

The impulse response functions are displayed by Figures (2) and (3) for demand, supply and monetary shocks for both nations. While monetary policy appears

to have played a role in inflation and disinflation, a negative demand shocks contributes to low inflation. But demand and productivity shocks have only limited effects

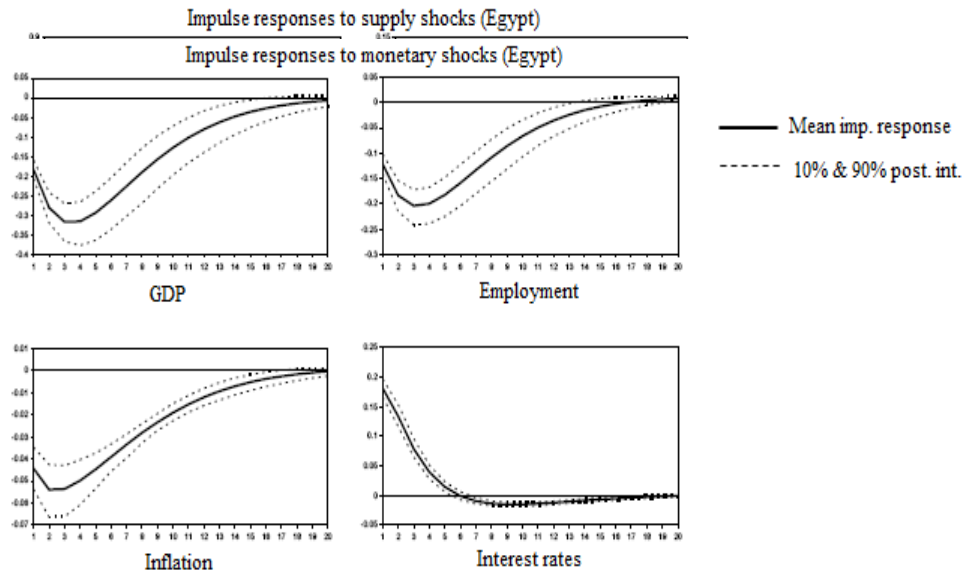
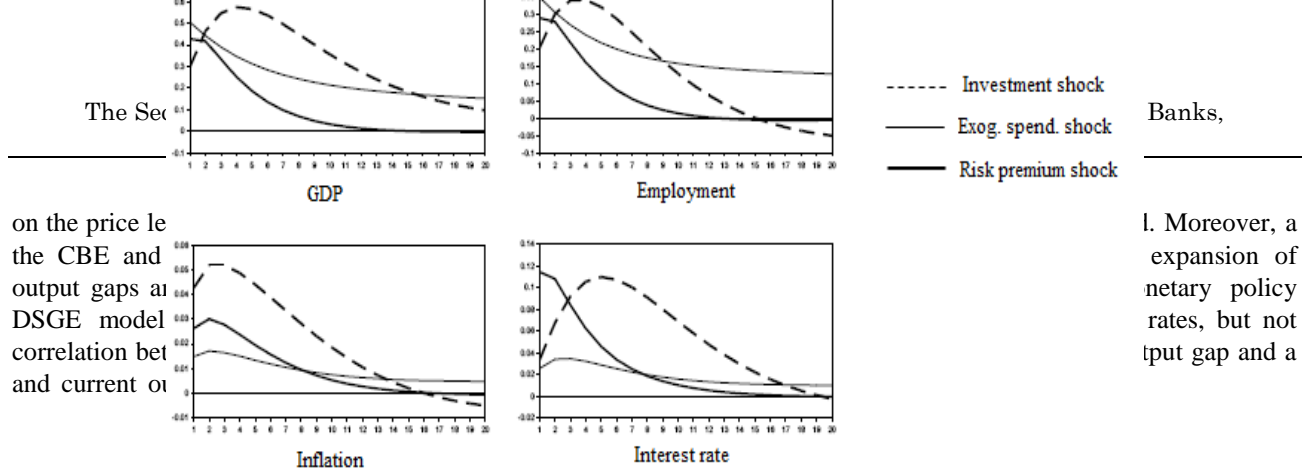
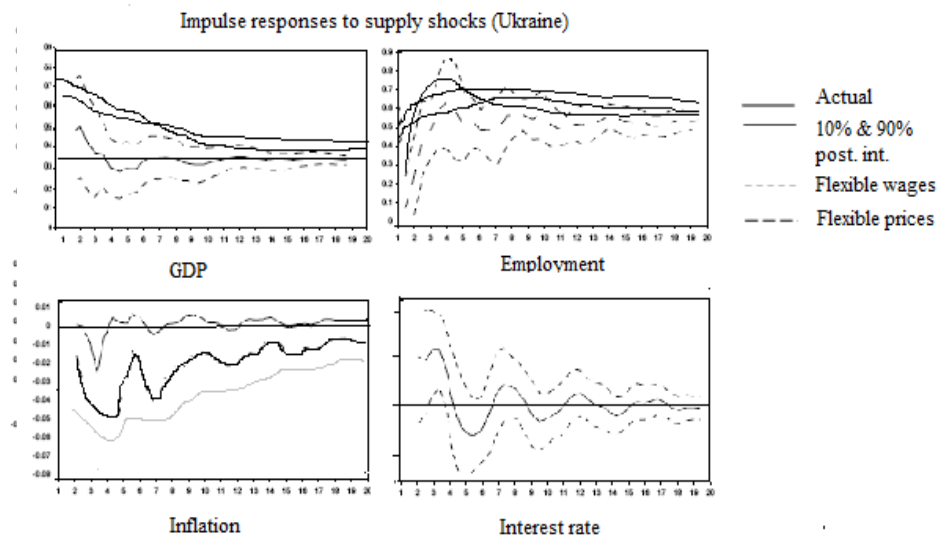


Figure 2. Impulse Responses to Shocks (Egypt)



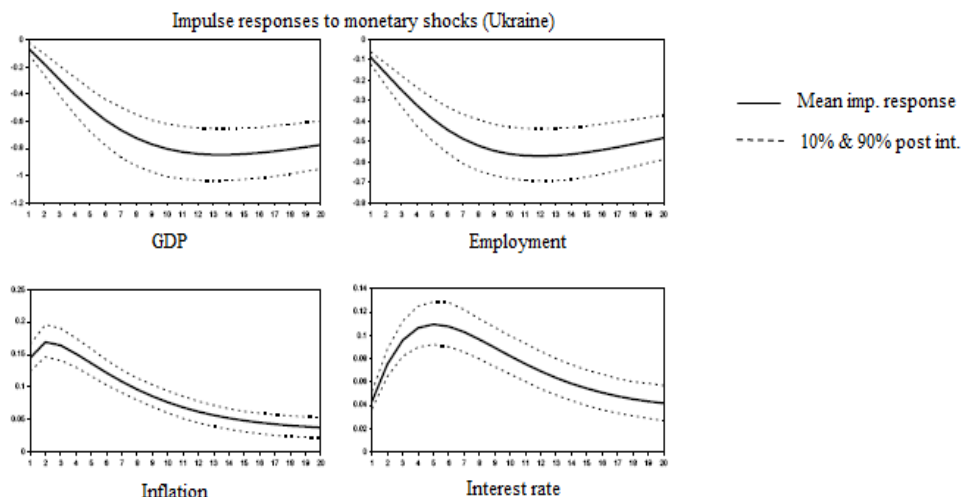


Figure 3. Impulse Responses to Shocks (Ukraine)

Forecasts using the BVAR Model

The out-of-sample forecasting performance of the DSGE model could be tested by using the Bayesian VAR in terms of the Mean Absolute Percentage Errors (MAPEs). This means that the coefficients are assumed to have a prior distribution, which implies that after applying the data the coefficients will get posterior distribution.

$$\chi_t = \nu_0 + \nu_1(L)\chi_t + \omega_t \quad (27)$$

where, ν_0 is an $(n \times 1)$ vector of constants, χ_t is an $(n \times 1)$ vector of variables that are to be forecasted, ω_t is an $(n \times 1)$ vector of white-noise error terms.

$$\nu_1(L) = \nu_{11}(L) + \nu_{12}(L)^2 + \nu_{13}(L)^3 + \dots + \nu_{1n}(L)^n \quad (28)$$

The forecasts of the VAR model have been widely criticized for the inclusion of too many variables and lags, many of which may be insignificant. The multi-collinearity and the loss of degrees of freedom lead to inefficient estimates and a rapid deterioration of forecasts as the time horizon becomes longer. Bayesian techniques can overcome this problem by imposing restrictions for all coefficients with decreasing standard deviations (SD) as lags increase. This could be done by specifying Minnesota prior distributions with zero means and standard deviations (Litterman, 1986).⁸ The one-to-eight period ahead forecasts are performed for the period 2000:01-2010:03. In accordance with Lesage (1999), the pertinent hyper-parameters for overall tightness (w) are set at 0.2, 0.1 for the harmonic lag decay (d) of 1 and 2. Furthermore, following Dua and Ray (1995) $w=0.3$ and $d=0.5$ is also measured. All variables are in logs, except for inflation and interest rates. Tables (3) through (6) summarize the MAPEs for the DSGE and the BVAR for GDP, employment, inflation and interest

rates.

The BVAR model outperforms the DSGE model in terms of MAPE estimates. The best estimates are given by the loosest prior ($w = 0.3$, $d = 0.5$) for interest rates and employment; by the slightly tighter prior ($w = 0.1$, $d = 1$) for GDP and inflation. In other words, better estimates are provided by the looser rather than the tighter priors. This is in accordance with the findings of Dua and Ray (1995).

⁸ The only exception is the mean of the first own lag is equal to unity since it is assumed that own lags account for most of the variation of the variable.

Table 3 MAPEs for GDP in Logs (2000:01-2010:03)

Quarter Ahead	DSGE	BVAR				
		<u>w =0.3,d=0.5</u>	<u>w=0.2,d=1</u>	<u>w=0.2,d=2</u>	<u>w=0.1,d=1</u>	<u>w=0.1,d=2</u>
1	6.9912	0.00002	0.00004	0.00039	0.00023	0.00041
2	6.8191	0.00121	0.00434	0.00491	0.00398	0.00589
3	7.4132	0.00344	0.00219	0.00419	0.00329	0.00298
4	7.1129	0.00511	0.00478	0.00391	0.00026	0.00410
5	7.3210	0.00491	0.00593	0.00388	0.00173	0.00561
6	6.8923	0.00397	0.48321	0.00099	0.00234	0.00311
7	7.5612	0.00010	0.00290	0.00417	0.00316	0.00298
8	7.8931	0.00101	0.00832	0.00421	0.00391	0.00341

Table 4 MAPEs for Employment in Logs (2000:01-2010:03)

Quarter Ahead	DSGE	BVAR				
		<u>w =0.3,d=0.5</u>	<u>w=0.2,d=1</u>	<u>w=0.2,d=2</u>	<u>w=0.1,d=1</u>	<u>w=0.1,d=2</u>
1	36.0212	0.00223	0.00134	0.00149	0.00122	0.00378
2	34.2101	0.00621	0.00194	0.00301	0.00321	0.00391
3	37.0041	0.00444	0.00259	0.00281	0.00289	0.00429
4	37.1921	0.00591	0.00691	0.00323	0.00344	0.00512
5	36.1211	0.00547	0.00521	0.00298	0.00128	0.00529
6	36.1523	0.00303	0.00631	0.00641	0.00381	0.00582
7	32.7812	0.00561	0.00811	0.00678	0.00512	0.00599
8	34.5611	0.00001	0.00889	0.00789	0.00412	0.00628

Table 5 MAPEs for Inflation (2000:01-2010:03)

Quarter Ahead	DSGE	BVAR				
		<u>w =0.3,d=0.5</u>	<u>w=0.2,d=1</u>	<u>w=0.2,d=2</u>	<u>w=0.1,d=1</u>	<u>w=0.1,d=2</u>
1	34.2314	0.03512	0.03891	0.03834	0.03956	0.03867
2	32.1278	0.06378	0.03487	0.03278	0.04001	0.03856
3	28.1325	0.04541	0.02987	0.03653	0.04213	0.03978
4	27.1229	0.01280	0.03348	0.03818	0.04389	0.04356
5	27.3261	0.05617	0.03712	0.03967	0.05123	0.04778
6	26.23667	0.03873	0.03845	0.04389	0.06578	0.04987
7	27.0112	0.02313	0.04923	0.05612	0.07534	0.05128
8	27.1912	0.05482	0.05561	0.06978	0.07612	0.06778

Table 6 MAPEs for Interest Rates (2000:01-2010:03)

Quarter Ahead	DSGE	BVAR				
		<u>w =0.3,d=0.5</u>	<u>w=0.2,d=1</u>	<u>w=0.2,d=2</u>	<u>w=0.1,d=1</u>	<u>w=0.1,d=2</u>
1	40.2342	0.24325	0.30010	0.21389	0.44233	0.00041
2	46.9101	0.43561	0.38934	0.34488	0.43198	0.43589
3	47.2234	0.49234	0.44519	0.44190	0.41329	0.34198
4	41.5639	0.51001	0.46719	0.43491	0.44910	0.39101
5	47.3110	0.49111	0.42978	0.45698	0.41397	0.41291
6	56.4523	0.30097	0.45198	0.47189	0.49311	0.54221
7	42.1006	0.32910	0.62289	0.45121	0.42440	0.34129
8	45.4421	0.31101	0.71534	0.78194	0.32001	0.39867

Policy Experiments and Ex Ante Growth Impacts

The next step is to impose the proposed regulatory

reforms as an additional shock to the balance sheet of the banking sectors of both nations. Due to the new requirements, banks will pass on this constriction of their profit margins to borrowers. As the bank credit supply to

the private sector is reduced, real GDP growth and employment are apt to be affected. It is true that credit is available through other formal and informal financial channels, but it must be mentioned that in nations where the banking sector accounts for more than 75% of lending, like Ukraine and Egypt, nominal GDP growth is supported by nominal credit growth.

Basel III allows banks till 2015 to meet the new common equity and Tier 1 capital requirements, and till 2019 to meet the capital conservation buffer requirements. Hence, the rise in the real lending rate charged to the private sector due to the regulatory changes will peak in 2013-14 and 2017-18. These are the two periods where both GDP and employment are projected to be severely affected. As households and firms react to the rise in

borrowing rates, monetary authorities are also expected to intervene through credit and liquidity easing. The reactions are displayed in the form of demand, supply and monetary shocks. Thus, it is imperative to calculate the ex ante growth impacts where a number of regulatory changes are imposed. In this regard, nominal GDP growth is highly dependent on bank credit growth to businesses and households, as well as to credit growth from other sources. The path of nominal GDP (GDP_n) growth is deflated to produce a path for real GDP (GDP_r) growth as follows:

$$CR = \phi_0 + \phi_1 CR_B + \phi_2 CR_{NB} + \phi_3 CR_{Inf} + e_0 \quad (29)$$

$$CR_B = \phi_{11} CR_{cons} + \phi_{12} CR_{res} + \phi_{13} CR_{comm} + \phi_{14} CR_{cons} + \phi_{15} CR_{ind} + \phi_{16} CR_{agr} + \phi_{17} CR_{serv} + e_1 \quad (30)$$

$$CR_{NB} = \phi_{21} CR_{SE} + \phi_{22} CR_{INS} + \phi_{23} CR_{other} + e_2 \quad (31)$$

$$\frac{\Delta GDP_n}{GDP_n} = f\left(\frac{\Delta CR}{CR}\right) dx, \text{ where } f' > 0 \quad (32)$$

Figure (4) shows the three types of shocks, while Figure (5) elucidates that the largest GDP impacts are reported during the periods of meeting the capital buffer

requirements and the CG stipulations in accordance with the measurement techniques that were previously clarified in section 3.3. But the drag fades notably over time and Ukraine appears to be most vulnerable to the impact of regulatory reform. Intuitively, this should not be too surprising, since Ukraine is more geared to debt rather than equity financing. However, it should be mentioned at this point that this is only a reduced form approach of macroeconomic modeling.

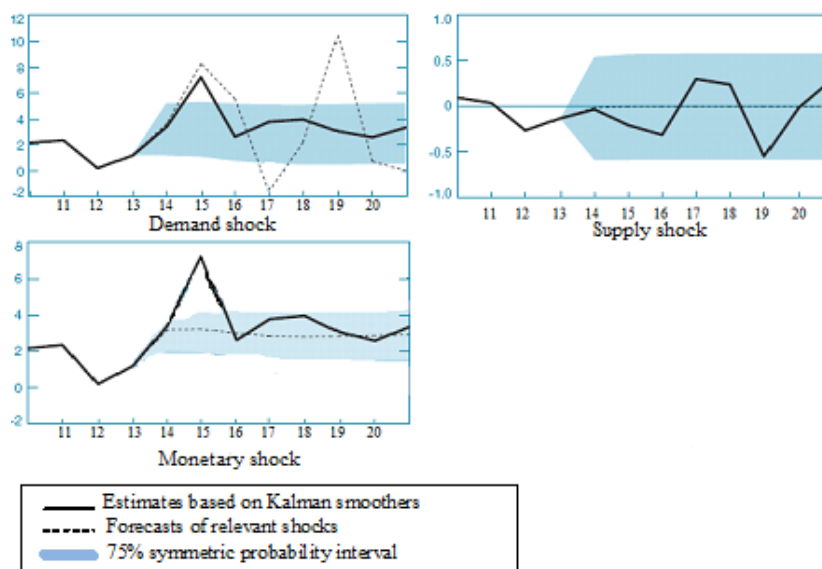
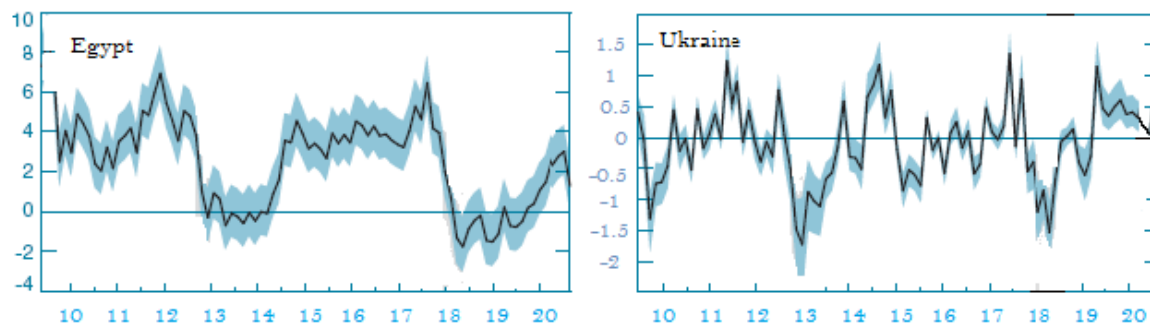


Figure 4. Forecasts of Shocks



Kalman smoother estimate conditional on posterior mean of parameters; shaded areas represent the interval between the 5th and 95th percentiles

Figure 5. GDP Forecast

Future Research and Recommendations

This paper attempted to study the costs of conforming to Basel III for Egypt and Ukraine when macroeconomic performance is appraised in terms of output growth, stabilizing prices and job creation. The DSGE model was utilized to forecast the expected impact of the adoption of Basel III requirements of capital adequacy, liquidity constraints and CG in both nations. The study used historical real-time data to explore the effects of demand, supply and monetary shocks on the set of macroeconomic variables. The DSGE calibrations were further tested using the BVAR model. The results reveal that the BVAR model produces more accurate forecasts than the DSGE model, rendering the latter an inaccurate forecasting tool for both nations. Then the estimated model was used for the policy experiment of imposing the Basel III restrictions. A subset in the DSGE model was employed as policy parameters to allow their values to be chosen. Both the DSGE and the BVAR models were re-simulated and output growth was re-evaluated.

The results reveal that the collective impacts of meeting capital adequacy, liquidity and corporate governance requirements are better weathered by the Egyptian economy. Ukrainian GDP shows a slowdown throughout the period 2013-18, after which recovery is realized. This is a very important result that shows that the vigilance of Egyptian supervisory agents was a pertinent source of enhancing and sustaining macroeconomic performance. Also, the costs of the proposed regulatory reforms will be quite detrimental for Ukraine, but are forecasted to be better sustained by the Egyptian economy, implying that emerging nations that were well geared up through meeting Basel II requirements will show more resilience to the costliness of future reforms. The general recommendation to enhance the resilience of the Ukrainian banking sector is to expedite bank regulatory reforms and complement them with proper corporate governance practices. Probably, the most problematic issue in that way is the lack of detailed and well-understood standards of corporate governance in banks introduced by legislation and the National Bank of Ukraine. Ukraine reports the

lack of requirements and even guidelines in such issues as the directors' independence, board committees' system, a link of executive remuneration to the risks of the banks and other issues allowing the risk management and control system in banks to operate effectively. Also, Ukraine lacks an independent structure that is responsible for initiating all those reforms like Institute of Independent Directors in Egypt in 2005. Since it is overwhelmed with an array of regulatory duties, the National Bank of Ukraine has fallen short of attaining the appropriate degree of competence in introducing the advanced corporate governance standards for banks.

Some other policy implications can be induced from the results. Firstly, since the DSGE model proved to be an inaccurate forecasting tool, the CBE ought to replace it with a more reliable model. Moreover, given the high levels of vulnerability and macroeconomic instability in Ukraine, it is recommended that the NBU should start employing a suitable forecasting tool. Given the success of other emerging economies in using the DSGE-VAR model, future research must be geared towards testing its efficacy as an alternative forecasting tool.

Secondly, this study opens the door to more exhaustive research in order to better assess the overall macroeconomic impacts and costs of the impending Basel III. Some of the variables that were exogenously set need to be calibrated and made endogenous to allow feedback mechanisms and interactions to develop. For example, while the expected monetary shock and the changes in the policy rate were examined, the forecasted changes and interactions of the government bond yield were ignored. Also, given the relative levels of immaturity of financial markets in EMEs, the informal non-bank credit channels need to be examined in more detail.

Thirdly, future research has to carefully study the behavior of banks in reaction to liquidity requirements. For example, banks may reduce the maturities of loans that they grant to corporations and direct loans to sectors that do not trigger economic growth. More studies need to be conducted especially after the elapse of the observation period for the liquidity coverage ratio, which extends from 2011 to 2014, and the net stable funding ratio that will be imposed in 2018.

Furthermore, this research may have taken account of the estimated costs of the reforms, but it has totally ignored the expected benefits of introducing financial stability. Amongst these benefits are enhanced national savings and investment expenditure as well as avoiding the usage of public funds to finance unconventional tools of monetary policy. If these are taken into consideration, the capital buffers, liquidity requirements and internal corporate governance costs may be found to be loss bearing in the long run.

Finally, the proposed new institutional and regulatory framework has limited the role of monetary authorities to a judgment-focused approach including a micro and macro prudential view, stress testing and the use of recovery and resolution planning. Yet, it is also important to assess the implications for the conduct of monetary policy and the demand for central bank refinancing, which may affect monetary transmission mechanisms.

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