RICS HQ
Parliament Square
London SW1P 3AD
United Kingdom

Worldwide media enquiries:
e pressoffice@rics.org

Contact Centre:
e contactrics@rics.org
t +44 (0)870 333 1600
f +44 (0)20 7334 3811

Advancing standards in land, property and construction.

RICS is **the world's leading qualification** when it comes to professional standards in land, property and construction.

In a world where more and more people, governments, banks and commercial organisations demand greater certainty of **professional standards and ethics**, attaining RICS status is the recognised **mark of property professionalism**.

Over **100 000 property professionals** working in the major established and emerging economies of the world have already recognised the importance of securing RICS status by becoming members.

RICS is an **independent** professional body originally established in the UK by Royal Charter. Since 1868, RICS has been committed to setting and upholding the **highest standards** of **excellence** and **integrity** – providing **impartial, authoritative advice** on key issues affecting businesses and society.

RICS is a **regulator** of both its individual members and firms enabling it to **maintain the highest standards** and providing the basis for **unparalleled client confidence** in the sector.

RICS has a worldwide network. For further information simply contact the relevant RICS office or our Contact Centre.

Europe (excluding United Kingdom and Ireland)
Rue Ducale 67
1000 Brussels
Belgium
t +32 2 733 10 19
f +32 2 742 97 48
ricseurope@rics.org

Asia
Room 2203
Hopewell Centre
183 Queen's Road East
Wanchai
Hong Kong
t +852 2537 7117
f +852 2537 2756
ricsasia@rics.org

Americas
One Grand Central Place
60 East 42nd Street
Suite 2810
New York 10165 – 2810
USA
t +1 212 847 7400
f +1 212 682 1295
ricsamericas@rics.org

United Kingdom
Parliament Square
London SW1P 3AD
United Kingdom
t +44 (0)870 333 1600
f +44 (0)207 334 3811
contactrics@rics.org

Africa
PO Box 3400
Witkoppen 2068
South Africa
t +27 11 467 2857
f +27 86 514 0655
ricsafrica@rics.org

Ireland
38 Merrion Square
Dublin 2
Ireland
t +353 1 644 5500
f +353 1 661 1797
ricsireland@rics.org

Oceania
Suite 2, Level 16
1 Castlereagh Street
Sydney, NSW 2000
Australia
t +61 2 9216 2333
f +61 2 9232 5591
info@rics.org.au

Middle East
Office G14, Block 3
Knowledge Village
Dubai
United Arab Emirates
t +971 4 375 3074
f +971 4 427 2498
ricsmenea@rics.org

India
48 & 49 Centrum Plaza
Sector Road
Sector 53, Gurgaon – 122002
India
t +91 124 459 5400
f +91 124 459 5402
ricsindia@rics.org

NOVEMBER 2012/DML/17488/RESEARCH

Report **November 2012**

RICS Research

Enhancing the Efficiency of the Infant Mortgage Finance Sector in Post-Revolution Egypt

RICS

rics.org/research

Enhancing the Efficiency of the Infant Mortgage Finance Sector in Post-Revolution Egypt

Report for Royal Institution of Chartered Surveyors

A report for Royal Institution of Chartered Surveyors

Report written by:

Monal Abdel-Baki, PhD

School of Business, The American University in Cairo
monalbak@aucegypt.edu

RICS Research team

Dr. Clare Eriksson FRICS
Director of Global Research & Policy
ceriksson@rics.org

James Rowlands
Global Research & Policy Project Manager
jrowlands@rics.org

Amanprit Johal
Global Research & Policy Project Officer
ajohal@rics.org

Auriel Fielder
Global Research Co-ordinator
afielder@rics.org

Published by:

RICS, Parliament Square, London SW1P 3AD
United Kingdom

rics.org/research

Funded by:

RICS Education Trust

Contents

List of Tables

List of Figures

Executive Summary

Introduction

Among the triggers of the popular Egyptian revolution were the marginalization, exclusion and the dilapidated living conditions of the poor. At the core of the upheaval are the demands for an end to the grave woes namely: political subjugation, unemployment, corruption, cronyism and massive poverty. At its centre lie the demands for social justice, better education, suitable healthcare, proper social security schemes and decent housing. However, with all the inherited socioeconomic problems and the additional incessant protests, the newly elected moderate Islamist government finds itself in a true dilemma. Should its priority be to fulfil the creed voiced out by the protestors on the 25th of January of 2011: “Bread, Freedom, Equity”, or should it tackle its own political quandaries and establish its long-awaited footprint in the political arena? Actually, any talk of political transformation has to proceed in tandem with economic restructuring. If the deprived population does not sense a prompt amelioration of its living conditions and an all-inclusive sustainable growth process, the credibility and popularity of the government per se and the democratization process at large will wane inevitably.

At the dawn of the new era, with all its uncertainties and intricacy, the immediate focus should be on upgrading the Egyptians’ living standards. Undeniably, solemn problems are apt to lurk beneath the surface if no efforts are exerted to bridge the housing gap that currently amounts to almost 3 million housing units. The augmentation of the mortgage sector, which accounts for no more than 3.4 per cent of GDP, is an imperative remedy to the housing predicament. It remains yet to be seen whether Egypt’s new political order will be accommodative enough to prompt a change in this direction.

However, with a highly concentrated mortgage finance market – where the four-firm concentration ratio amounts to 84.82 – and until more competitors emerge, there might be a higher opportunity for cost-inefficient mortgage firms to make profits. But the inevitable expansion of the mortgage market would make less efficient firms fall behind in the race. This report aims to identify the internal and environmental impediments that hamper the expansion of the mortgage finance sector in Egypt at a crucial time when Egyptians are fervently endeavouring to rebuild their institutional framework and address societal welfare. The policy recommendations are apt to prove useful to policymakers in Egypt and other developing and emerging economies that encounter similar socioeconomic conditions and housing shortages.

Methodology and Data

The problems facing mortgage bankers are multifaceted and can be categorized broadly into environmental barriers, regulatory requirements and firm-specific inefficiency problems. The most serious environmental impediment is the inability of Egyptian mortgage firms to access affordable funding. The Egyptian Financial Supervisory Authority (EFSA), the regulator of non-banking financial institutions, places stringent controls on mortgage securitisation. Moreover, the heightened political tensions and the exigent economic conditions have led to a higher yield on Egyptian sovereign bonds, tempting banks to hold the bulk of their assets in the form of government bonds. This obliges most of Mortgage Finance Firms (MFFs) to depend on capital and loans as their main sources of finance. Further challenges are to be imposed by the new capital adequacy requirements and liquidity management rules stipulated by Basel Accords II and III. This is apt to increase the risks of substantial deleveraging and condense the availability of loans to low and medium-income households. Hence, mortgage firms must maintain efficiency and operational performance because declining profits could lead to business failure.

This study utilises a three-stage empirical model to gauge the level of efficiency scores with the aim of identifying the sources of mortgage firms’ inefficiency. A field survey is piloted in the first stage of the model in order to detect the obstacles encountered by mortgage firms. In the second and third stages the efficacy of the nine mortgage firms is compared to that of their counterparts in emerging market economies (EMEs) using parametric and non-parametric approaches, namely the stochastic frontier analysis (SFA) and Data Envelopment Analysis (DEA). The sample comprises of 104 mortgage firms/banks from 22 EMEs in Asia, transition economies, Latin America, Africa, and the Middle East and North Africa (MENA). The period of the study extends from January 2004 till June 2012

Results

The results of the field survey help identify the main environmental barriers encountered by mortgage bankers. As shown in Figure 1, the three factors that impede the growth of the mortgage sector are the low level of property registration, the lack of formal proof of income due to labour market informality, and the fierce competition poised by real estate developers – who sell housing units to their customers on an instalment basis.

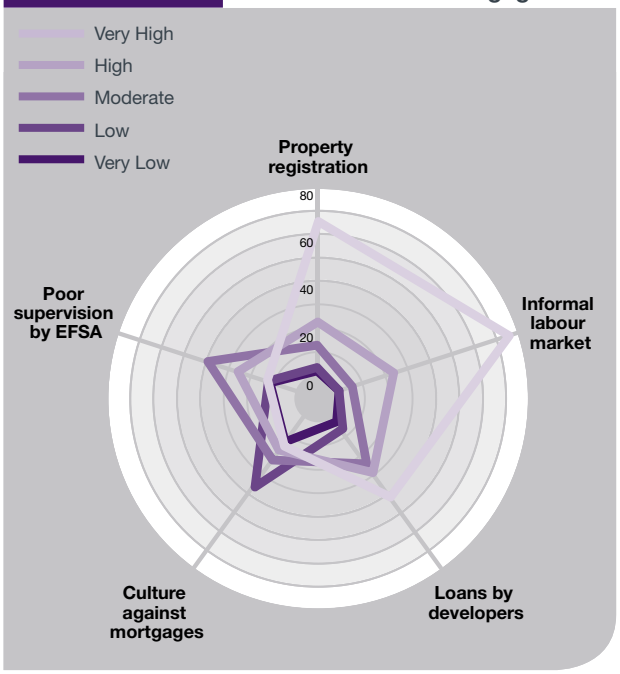
As displayed by Figure 2, the results of the field survey reveal that the most serious internal barrier is the high price at which mortgage firms access funds. In addition to the lack of adequate corporate governance (CG) processes and the fear of customer default, many mortgage firms lack qualified calibre. Most mortgage bankers attribute the lack of funding to the inability to issue mortgage-backed securities and the prohibition of accepting customer deposits. Moreover, the Central Bank of Egypt (CBE) refrains from extending loans to MFFs.

In the second and third stages of the model the SFA and DEA methods reap comparable and consistent results in terms of the ordering of the cost and profit efficiency scores. While cost efficiency could be improved, the main problem for Egyptian MFFs is low profit efficiency. This indicates that the Egyptian MFFs are better at controlling costs than at generating profits. The low linkage between cost and profit efficiency indicates that profit opportunities are quite significant in the mortgage market, even for cost inefficient banks. This is a common feature for highly concentrated markets. The high correlation between efficiency scores proves that the results are robust.

Two techniques are followed to investigate the cause of the lower levels of efficiency of Egyptian mortgage banks. First, the exercise is repeated on an annual basis during 2004-2012. Then, the efficiency scores are divided into technological and technical efficiency. By decomposing the total factor efficiency (TFE) scores into their components, the overall mortgage bank efficiency shows a major deterioration during the Global Financial Crisis. In comparison to other emerging economies, Egyptian MFFs suffer from low scale and technical efficiency.

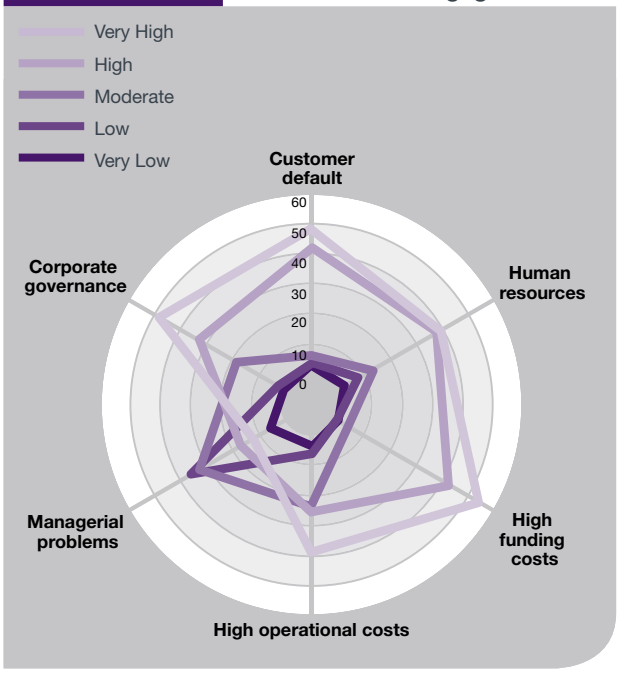
Second, the exercise is repeated after dividing MFFs by size of assets, ownership, corporate governance and regulations. The highest TFE is recorded by larger mortgage banks. When categorized by ownership, the least efficient MFFs are the state-owned and the highest efficiency scores are recorded by jointly-owned banks. The highest efficiency is scored by mortgage banks that strictly adopt and implement national corporate governance standards, followed by those that develop their own internal standards. Finally, regulatory controls result in higher efficiency scores.

Figure 1 Major Environmrntal Barriers to the Growth of the Mortgage Sector



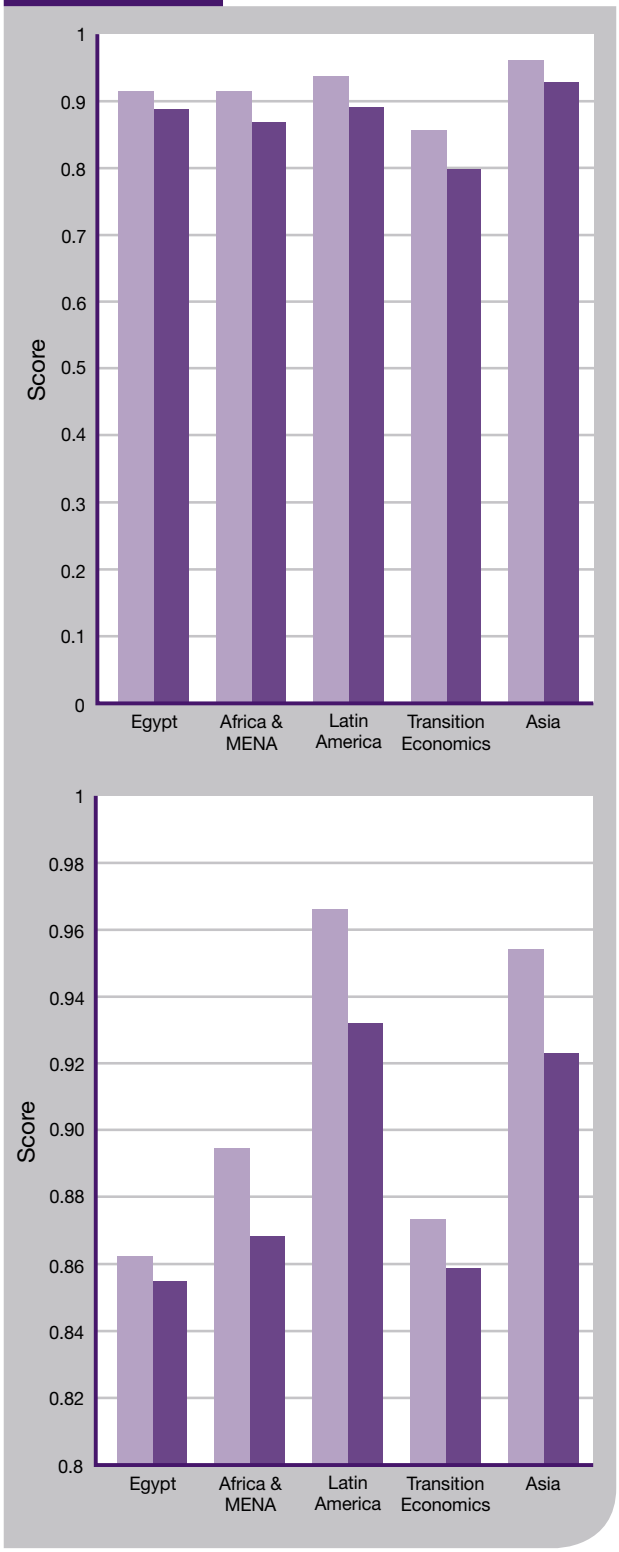
Source: Results of the field survey

Figure 2 Major Internal Barriers to the Growth of the Mortgage Sector



Source: Results of the field survey

Figure 3 Cost Efficiency and Profit Efficiency Scores (January 2004-June 2012)



Source: Results of the field survey

Policy Recommendations

As the Egyptian economy is transitioning towards political self determination, the first democratically elected government aims to address the demands of its burgeoning young population, specifically the pressing housing needs. Indeed, the most important step is to enhance and expand the mortgage finance sector. The reform roadmap rests on the following four pillars:

- Mortgage finance firms should utilize their productive inputs more efficiently by upgrading employee and managerial skills and setting forth a set of CG standards.
- The government and policymakers should implement sound macroeconomic policies in order to make interest rates affordable. Moreover, to expand households' access to mortgage funds, the government needs to simplify transactions and reduce registration costs.
- Regulators have to streamline and clarify the complicated regulatory capital and liquidity requirements and the complex oversight procedures. A full-fledged supervisory approach must be adopted to assess the risk profile of mortgage firms, gauge risks emanating from the mortgage sector, design a framework for early intervention, and coordinate with the central bank to resolve mortgage firms in an orderly way if they become illiquid. Less stringent controls on securitization will not only exempt mortgage firms from holding capital against high-risk loans, but will also attract more domestic and foreign savings.
- The financial infrastructure must be enhanced to accommodate mortgage-supportive institutions namely: mortgage insurance firms, real estate agents, appraisal experts and real estate valuation specialists.

1.0 Introduction

The 2011 Egyptian popular revolution that toppled Hosny Mubarak's 30-year-old allegedly stable regime has taken many by surprise. Below the superficially tranquil surface, a number of factors have shaped and initiated the climate for the irate rebellion. It may be true that the ancien régime had taken some corrective steps to uplift macroeconomic conditions, but the lack of redress of the true grievances of the people and the treatment of the citizens as passive recipients of public goods has widened the gap between the government and the people. In spite of the favourable macroeconomic performance during the last two decades, the compound economic, social, and political deficiencies led to a sense of injustice, marginalization and exclusion by the majority of the Egyptians who tolerated ever worsening income distribution and dilapidated living conditions. Instead of adopting an all-inclusive rectification mechanism, the previous regime resorted to a combination of political oppression of its radical opponents and unsynchronized sporadic reforms that benefited mostly the ruling elite and its business cronies. Moreover, both the media and the intelligentsia failed to use effectively the freedom of speech granted to them by the previous regime to promote a specific vision for change.

After incessant episodes of sporadic uprisings, the collective grievances of the Egyptian populace culminated in the eruption of the leaderless popular revolution. As soon as the euphoria over the political victory ended, the newly empowered Egyptian people came to the realisation that in order to consummate their triumph over Mubarak's autocratic regime, it is imperative to ameliorate social and economic conditions. Since the political and economic demands were intertwined and inseparable any talk of political reform must proceed in tandem with economic restructuring.

At one end of the political arena lie the highly organized once-subversive Islamist political parties; at the other end lie the unsynchronized secular civil society organizations and liberal political parties that yearn for a new social contract and crave for an effective and inclusive national dialogue. Scholars of political transitions and analysts of revolutions stipulate that it is the most organized and technically versed who have an impact during periods of political transformations. After the succession of the organized Muslim Brotherhood to the rule, the question that arises immediately is about the nexus between the changing nature of Egypt's political system, the imminent revamping of its institutional framework and the projected treatment of Egypt's socioeconomic malaise. In its own right, having the first democratically elected president marks an historical milestone for Egypt, fuelling hopes that the foundation for a more lasting solution to the economic crisis may be taking shape. But the ability to recognize the immense growth potential of the Egyptian economy hinges on the success of the new government to take decisive steps in addressing the societal woes.

One of the inherited gross and pressing challenges that jeopardise the social cohesion of the Egyptian community is the declining housing conditions for the lower segments of the population. With 1.8 per cent annual rate of population growth and a yearly urbanization level of 1.8 per cent, the housing market has succumbed to the mediocre urban governmental planning and suffered from deplorable imbalances that have translated into a glut in the luxurious sector and an immense shortage at both the mid and low-end levels (Everhart et al., 2006).

The number of low-end apartments, which range from 40 to 100 square metres, is far from fulfilling the needs of the desperately poor and the vulnerable households. Access to affordable home ownership for the majority of Egyptian households has been greatly constrained by an inefficient real estate registration scheme and an undeveloped housing finance system (Hassanein and El-Barkouky, 2008). The housing gap currently stands at an estimate of three million units, out of which approximately two million are needed to address the growing population and urbanization needs, and roughly one million to replace the ailing houses (Struyk and Brown, 2006). Thus, the success of bridging this housing gap hinges on a solid regulatory framework, supporting institutions and ancillary mortgage services. The role of regulatory institutions and government planners is to circumvent untamed speculation and real estate bubbles and to ensure the existence of a sound mortgage finance sector that addresses solely the housing shortage problem. Moreover, to build a rigorous mortgage finance sector, housing finance subsidies should not be allowed to distort financial market incentives. The new government has shown determination to address these twin challenges. With a new governance framework, there are solid grounds for trusting that reforms will be implemented swiftly to lay the foundations for future sustainable and balanced growth in the mortgage sector. The present situation provides a window of opportunity for the new government to accelerate efforts to enhance competitiveness in the mortgage sector. It also creates a benign environment for mortgage finance firms (MFFs) to strengthen their operations further.

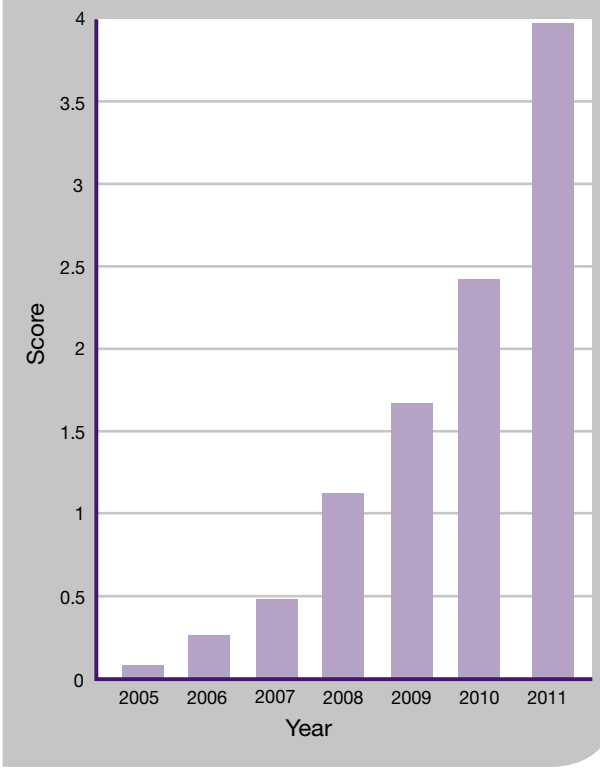
The aim of this report is to seek methods of enhancing the efficiency of the infant Egyptian mortgage finance sector. The rest of the report is divided as follows. The second section gives an overview of the primary mortgage market in Egypt. The third section reviews the factors impacting the efficiency of the mortgage firms. Section 4 introduces the three-stage empirical model. In the first stage of the model a field survey is piloted in order to detect the environmental, procedural and legal obstacles. In the second and third stages of the model, the efficiency of Egyptian mortgage firms is measured using the parametric and non-parametric methods. The research culminates in a set of policies to maximize the chances of the survival of these firms and to enhance their effectiveness in resolving the housing crisis in Egypt.

It may be true that the two specialized real estate Egyptian banks, Egyptian Arab Land Bank and Housing and Development Bank, have historically offered limited formal mortgage financing to households, yet this caters to upper and middle income groups. The reasons for the reluctance of commercial banks to give out loans to this sector are two-fold: almost 90 per cent of housing units in Egypt lack registration property titles, and most customer deposits are short-term (Nasr, 2010). It might be true that a few developers have also been providing term financing under a system of deferred instalment off-plan sale contracts, but the terms are excruciatingly harsh and the loan maturities are agonizingly too short for the underprivileged Egyptians.

The previous government had enacted the Mortgage Finance Law No. 140 of 2001, setting out the legal foundations for market-based housing finance and improving collateral enforcement and foreclosure processes. The Ministry of Investment was also given a mandate to develop the mortgage market and to encourage the formation of non-banking real estate lending or mortgage companies under the supervision of Egypt Financial Supervisory Authority (EFSA). Another important catalyst to reinforce and deepen the financial sector was the introduction of a remortgage firm that helped extend the maturity dates of mortgage loans from seven to fifteen years. Moreover, the Capital Markets Law was amended to strengthen the legal and institutional framework for mortgage securities. The government also established a Guarantee and Subsidy Fund in 2003 to provide low-income families with cooperative housing loans. While the beneficiaries of the fund have a maximum monthly income of EGP 2500, it is limited in scope since the subsidised loans cover merely 15 per cent of the market value of the housing units.

The financial reforms undertaken by the preceding government and the establishment of nine new mortgage finance firms have resulted in the growth of the number of loan beneficiaries from 333 in 2005 to 27,680 by the end of 2011 and a surge of mortgage loans from EGP 16 million in 2005 to over EGP 4 billion in 2011, as displayed by Figure 4. More importantly, by the end of 2011, the average mortgage loan value declined to approximately EGP 113,000 from EGP 270,000 in 2005, indicating that mortgage companies are moving towards financing lower market segments. In spite of all of these efforts, which have boosted the growth of mortgage loans at the compounded annual average growth rate of 173 per cent, the market remains small by international standards since it amounts to only 3.4 per cent of GDP.

Figure 4 The Growth of Mortgage Loans (2005-2011)



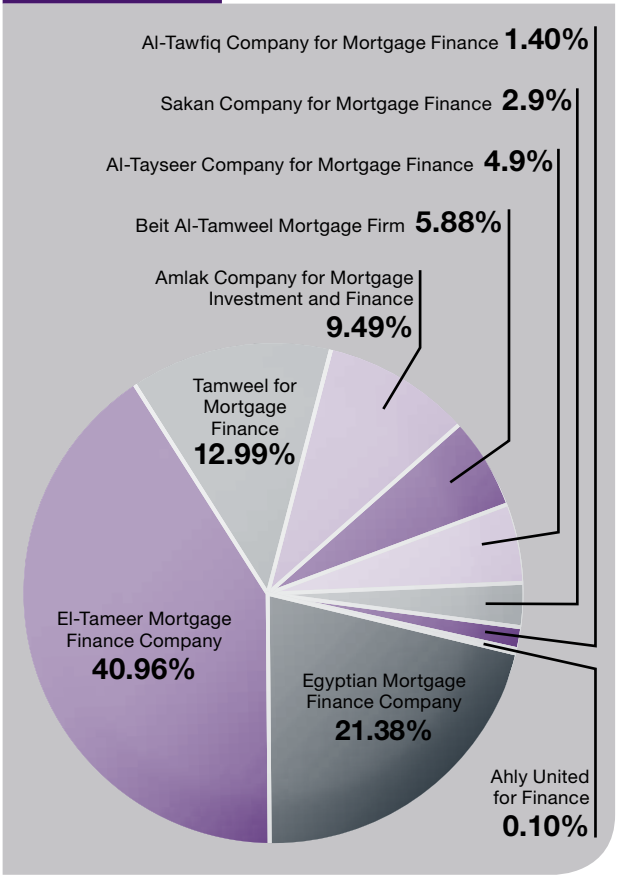
Source: Egyptian Financial Supervisory Authority Database

Not only is the mortgage market limited in scope, but it also suffers from a high concentration problem. As shown in Figure 5, the largest four mortgage firms capture 84.82 per cent of the mortgage loan market. All of the four largest MFFs depend on long-term loans from their holding companies. Although, in principle, the mortgage law permits the primary mortgage lenders to raise funds from the stock exchange, the high level of political instability in the region and the low levels of transparency hurdle the growth of a secondary mortgage market.

Higher levels of competition in the primary mortgage market lead to lower interest rates, longer loan-to-maturity (LTM) and higher loan-to-value (LTV), and hence more affordability for lower-end home buyers. Yet, the highly concentrated mortgage market has resulted in high mortgage rates that lie above the Treasury yield, as shown by Figure 6. Moreover, even though the Egyptian law allows 90 per cent LTV, the average loan to value has decreased from 54.93 per cent in June 2009 to 45.05 per cent in December 2010 and further to 42.33 per cent of the property value in March 2012 (HC Brokerage, 2012). The average LTM provided by mortgage companies in late 2011 was 15.43 years compared to 13.4 years in June 2009 (HC Brokerage, 2012).

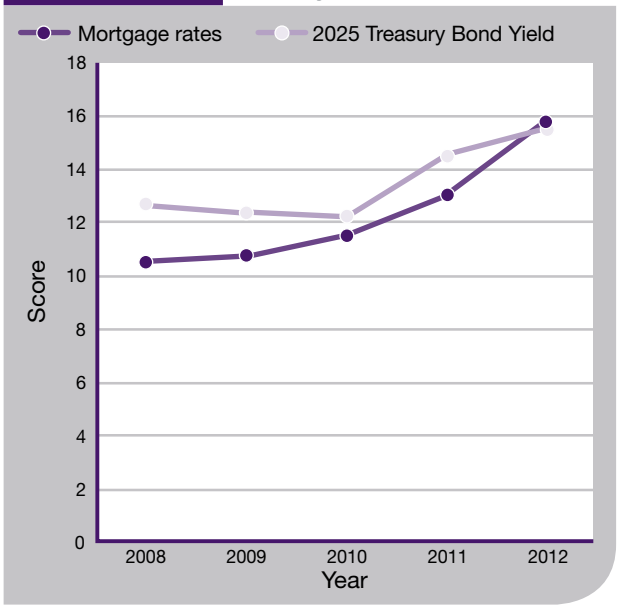
Despondently, the housing affordability ratio, which measures the ratio of house prices to household disposable income, currently stands at 1.2 for lower-end apartments, 3.9 for middle- level apartments to 5.3 for upper-end housing units and villas (Jones Lang LaSalle, 2011). This has resulted in the surge of informal housing, characterised by the illicit building over privately and publicly held agricultural land. Moreover, haphazard squatter-building has resulted in excessive urban congestion and poor living conditions in the overcrowded neighbourhoods. It suffices to say that 63.6 per cent of the population of Cairo occupies 17 per cent of its total area (Sims, 2011). The need to press on the reforms in a much shorter time frame and under perilous conditions renders the process of economic transition more contentious. There is also an urgency to scrutinize and inspect previous economic policies and models that failed to deliver.

Figure 5 **Market Share of Mortgage Firms by Size of Loans as at June 2012**



Source: Market Share of Mortgage Firms by Size of Loans as at June 2012

Figure 6 **Comparison of Mortgage and Treasury Bond Rates**



Source: Individual annual reports and financial statements of mortgage firms – Ministry of Finance (2012) *Annual Report*, MoF, Cairo

A large literature has focused on the decline of the role of the state as an economic actor (Jaffee and Russell, 1976) and the mounting dependence on markets and credit rationing to achieve human development and to resolve socioeconomic problems (Gilbert and Ward, 1985). The challenge of transitioning to the market mechanism is enormous for emerging market economies (EMEs) that are trying to enhance efficiency in the financial markets and to promote growth in the real economy (Tym, 1984). A vigorous construction boom has immense macroeconomic impacts on GDP growth, savings, job generation and forward and backward linkages (Hardoy and Satterthwaite, 1989). Tibaijuka (2009) uses empirical data to prove that a vibrant mortgage sector helps in condensing the housing shortage and leads to enhanced health standards, alleviated living conditions and reduced vulnerability. The configuration of state and society defines the role of the government either as a mere enabler or an active provider (Smith, 2006). The role of the civil society is inherent in establishing microfinance institutions to intermediate between financial institutions and the poor (Kyessi and Furaha, 2010). Public-private partnerships are another alternative to facilitate access to housing loans (Struyk et al., 2004).

As effective as the above policies may be, improving the performance of the mortgage sector is imperative to alleviate housing shortages (Wu and Birge, 2012).Yet, in spite of its renowned importance in installing sociopolitical stability and economic sustainability, housing finance remains immature in many emerging economies and residential lending is relatively expensive and inaccessible (Kaganova, 1996). Being unable to attract long-term funding, MFFs broach alternative sources of finance, mainly through securitization, Initial Public Offerings (IPOs) of common stock and issuance of long-term bonds (Integrated Financial Engineering Inc., 2007). But the stock market in many emerging economies is yet weak and under-developed and its enhancement hinges on the development of a strong legal and regulatory framework and a liberalized financial sector (Pollock, 1994; Chiquier et al., 2004). Moreover, EMEs show limited liquidity, high costs of generating mortgages and inherent risks due to low numbers of analysts (Schindler, 2011). The stifling administrative procedures and the high costs of banking institutions also reduce the potential of the poor to access mortgages (Abrahamsen, 2000). Thus, sound legal systems and regulations are crucial to protect lenders and to provide the necessary financial resources to mortgage lenders (Bardhan and Edelstein, 2008). The role of regulators is equally necessary to establish property rights, foreclosure procedures and real estate valuation schemes (Levine et al., 2000).

Due to these deficiencies, it is often alleged that mortgage firms in emerging market economies are less efficient than their counterparts in mature markets (Akinwunmi, 2008). Because mortgage lenders connect the real estate sector with the economy, inefficient intermediation increases risk exposure (Campbell and Cocco, 2003). Increasing the cost, product, profit and technical efficiency of mortgage finance firms is apt to make them more resilient to economic shocks and more capable of promoting economic growth (Renaud, 2009).

Data envelopment analysis (DEA) techniques have been used extensively to measure the efficiency of a banking unit in comparison to the sector. The DEA method is especially helpful in the estimation of upper and lower bounds for efficiency in situations of uncertainty (Camanho and Dyson, 2005) or in the case of comparing differential services offered by different financial institutions (Ward, 2009). The DEA model has been applied to mortgage lenders in developing and emerging economies, which were found to be inefficient due to their high risk exposures and lending to first-time homeowners vulnerable to foreclosures (Margaritis and Psillaki, 2007).

Using the stochastic frontier analysis (SFA), the absence of good corporate governance (CG) proves to seriously impair cost and profit efficiency in financial institutions (Khiari et al., 2007). Empirical studies also reveal that the higher the level of private ownership and the lower the rate of market concentration, the higher the efficiency (Lensink et al., 2008). Also, potential efficiency gains are possible via mortgage market expansion of banks (Al-Sharkas et al., 2008).

Pertaining to bank regulations, there is no consensus on the effect that capital adequacy regulations have on bank efficiency. Cross-country studies give mixed results, pointing to the fact that efficiency is a factor of a number of variables such as regulatory stipulations, environmental conditions, compliance with capital requirements, restriction on activities, and the disclosure of interest and non-interest income to regulators and the public (Pasiouras et al., 2009; Koutsomanoli-Filippaki et al., 2009). An extensive literature explores the impacts of the macroeconomic environment and the regulatory framework on bank efficiency in developed nations (Demirgüc-Kunt and Detragiache, 1998; Bos and Kool, 2006). For example, Ataullah et al. (2004) show that financial liberalization has a positive effect on the overall mortgage bank. Lozano-Vivas and Pasiouras (2010) find that the imposition of a stringent regulatory framework, which restricts bank risk-taking, improves cost and profit efficiency. But MFFs in EMEs are characterized by low levels of capitalization (Ebrahim et al., 2011). Thus, the literature reviewed shows that the impact of financial regulation on bank efficiency is inconclusive.

However, while most studies concentrate on the macroeconomic effects on efficiency in developed nations, this paper investigates the Egyptian case to serve as an imperative indicator to the policy-makers at a crucial period when Egyptians are fervently endeavouring to rebuild their institutional framework, address the legitimate societal welfare demands, and revamp the mortgage sector. While the analysis focuses on the Egyptian case, the implications would prove constructive to other EMEs facing similar predicaments.

4.0 The Three-Stage Empirical Model

The speed and extent of the transformation of the mortgage finance sector in emerging economies is dependent on the prevalent financial and macroeconomic environments. The ability of mortgage banks to access funding at affordable costs are among the important determinants of the total loanable funds (Thoraneenitiyan and Avkiran, 2009). The regulatory conditions, GDP per capita, inflation, and job generation are the prime macroeconomic determinants of housing indebtedness (Bank for International Settlements, 2008; Lozano-Vivas and Pasiouras, 2010).

Given the fact that the production technology and the barriers encountered by mortgage firms are not known, they should be estimated from observations in practice. To compare the efficiency of Egyptian MFFs with their counterparts in emerging economies, a three-stage model is employed. First, a field survey is conducted to understand the main barriers facing mortgage firms. Second, the stochastic frontier approach is used to evaluate and compare cost and profit efficiency of MFFs in the sample. Third, the nonparametric technique of Data Envelopment Analysis is employed to evaluate the production structure of MFFs.

4.1 Data Collection

The sample comprises of 104 mortgage finance firms and mortgage banks from 22 emerging market economies. As displayed by Table 1 the sample covers Asia, transition economies, Latin America, Africa and the Middle East and North Africa (MENA) region. The period of the study extends from January 2004 to June 2012, which is the life span of the newly established Egyptian MFFs. The financial data for the nine Egyptian MFFs is collected from their individual financial statements and the database of the Egyptian Financial Supervisory Authority. As for other EMEs, the mortgage bank data is obtained from their individual balance sheets and income statements as well as BANKSCOPE database. The macroeconomic statistics and data are collected from the database of the World Bank and the International Financial Statistics published by the International Monetary Fund (IMF). To solve the nonlinear chance constrained programming problem, the General Algebraic Modelling System (GAMS) software is employed, and the Frontier-41 software is used to run the stochastic frontier analysis.

Table 1 Sample of Mortgage Firms and Banks Included in the Analysis

EMEs in Africa and MENA Region		Latin American EMEs		Transition Economies		Asian EMEs		
Egypt	9	Argentina	5	Russia	4	India	8	
Turkey	6	Brazil	9	Ukraine	5	Malaysia	6	
South Africa	8	Venezuela	3	Romania	4	Pakistan	7	
Nigeria	2	Chile	3	Poland	3	Indonesia	5	
Bahrain	2	Mexico	4			Thailand	2	
Israel	2	Columbia	3			Hong Kong	4	
	29		27		16		32	Total = 104

4.2 Methodology

4.2.1 First Stage of the Model: The Field Survey

In order to best understand the major impediments encountered by Egyptian MFFs, the first stage of the model comprises a field survey, soliciting the direct input of practitioners in the field. The survey was conducted during the period 23 January to 14 May 2012 and garnered 118 responses, representing the views of managers of mortgage financial institutions. Over 70 per cent of the respondents are senior credit department heads, portfolio managers, or company strategists, while 30 per cent are senior executives. Table 2 reports the questions and responses.

Table 2 Survey Questions and Responses

1 What is likely to happen to lending conditions over the next 2 years for mortgage firms and banks?

	Standards will tighten further	Standards will not change	Standards will loosen moderately	Standards will loosen significantly
Mortgage firms	11	52	37	0
Banks	27	59	14	0

2 Please rate the degree of risk posed by the following factors to the mortgage credit market over the next 12 months

	Very High	High	Moderate	Low	Very Low
Anticipation of Basle II/III regulatory overhaul	8	12	30	22	28
Geopolitical risk	34	28	23	15	0
Foreign debt	32	32	28	8	0
Domestic debt	38	42	19	1	0
Unemployment	34	32	21	13	0
Inflation	41	25	32	2	0

3 How important are the following factors to credit quality over the next 12 months?

	Very High	High	Moderate	Low	Very Low
Macroeconomic slump	45	33	22	0	0
Stimulus withdrawal	21	19	44	12	4
Regulation	1	9	20	23	47
Property exposure	8	10	21	27	34
Access to funding	42	33	25	0	0

4 Please rate the level of challenge that each of the following factors pose to your access to mortgage credit financing.

	Very High	High	Moderate	Low	Very Low
Lack of securitization	45	33	22	0	0
Lack of deposit-based funding	44	21	19	12	4
Illiquid interbank market	1	9	20	23	47
Property exposure	8	10	21	27	34
Access to central bank funding	42	33	25	0	0

5 What policies and procedures do you propose to overcome these financing barriers?

	Very High	High	Moderate	Low	Very Low
Loans from EMRC*	41	32	17	8	2
Loans from mother firm	61	33	6	0	0
Mergers and Acquisitions	45	33	22	0	0
Bank loans	44	21	19	12	4
Securitization	1	9	20	23	47

* Egyptian Mortgage Refinance Company is a wholesale institution that makes loans to primary mortgage lenders collateralized by mortgage loans. It raises funds through bond markets, equity contributions and long-term loans from institutional investors.

6 What are the most challenging environmental constraints encountered by your firm?

	Very High	High	Moderate	Low	Very Low
Property registration	66	21	11	1	1
Informal labour market	75	23	2	0	0
Loans by developers	23	28	42	4	3
Culture against mortgages	15	18	21	34	12
Poor supervision by EFSA	13	26	38	12	11

7 What are the main internal problems that you encounter?

	Very High	High	Moderate	Low	Very Low
Customer default	48	41	6	3	2
Human resources	39	38	13	8	2
High funding costs	54	42	4	0	0
High operational costs	39	25	23	8	5
Managerial problems	13	17	32	33	5
Corporate Governance	48	32	18	2	0

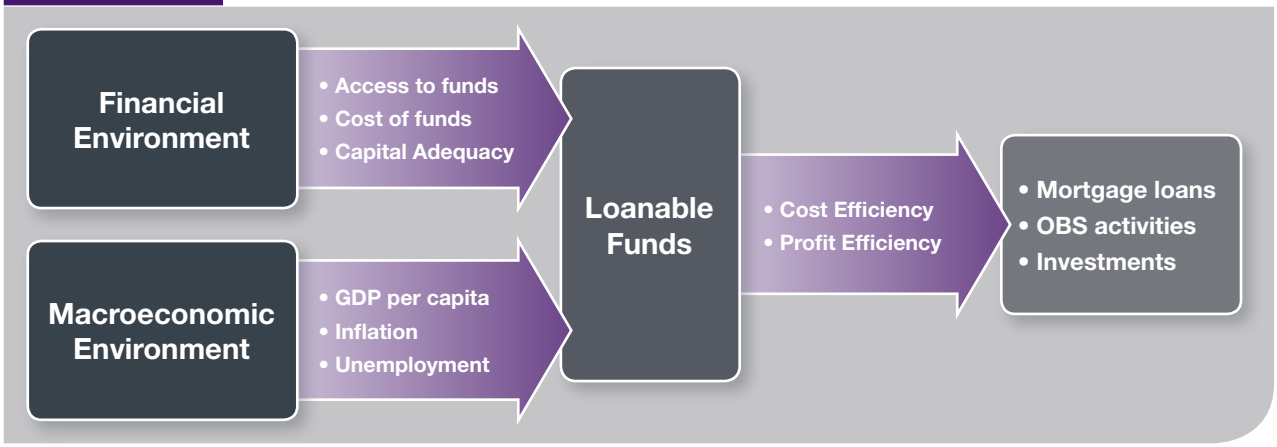
8 In your opinion, how effectual would the following solutions prove?

	Very Effectual	Effectual	Moderately Effectual	Ineffectual
Quantitative easing	12	37	48	3
Securitization of mortgages	63	23	13	1
Lenient capital requirement	51	38	9	2
Property registration	72	22	6	0
EFSA supervision	10	23	33	34
Credit rating	75	25	0	0
Internal controls	39	33	22	6
Training	44	43	13	0

The results of the field survey indicate clearly that there are a number of internal and external factors that raise the financing and operational costs and increase the risks for mortgage firms. Among the most stringent external barriers are the low level of real estate property registration, the lack of formal proof of income due to labour market informality, and the fierce competition poised by real estate developers. The main peril of the latter is the lack of regulation of this lending scheme, which can cost homebuyers their deposits. The other serious concerns of mortgage bankers are the high rates of inflation, unemployment and the economic slump in the wake of the popular uprisings. Another popular complaint is that the Central Bank of Egypt (CBE) refrains from lending MFFs. In addition, a number of serious internal barriers raise the operational cost and reduce efficiency. First, the high prevailing market interest rates reduce the ability of MFFs to charge their customers affordable interest rates. This makes it most difficult for the Egyptian Mortgage Refinance Company (EMRC) to raise funds through bond issuance at reasonable rates, which it could pass on to mortgage banks. In addition to the lack of adequate corporate governance processes and default risks, most mortgage firms are deficient in trained calibre.

Thus, in accordance with the input of the experienced practitioners surveyed, the inputs and outputs are selected and used in the second stage of the model to measure the cost and profit efficacy of mortgage firms. Figure 7 outlines the various financial and macroeconomic prerequisites that mortgage bankers stipulate necessary for their access to affordable loanable funds. These include a stable financial environment with adequate liquidity and proper regulations, sustainable macroeconomic growth, job generation and stable prices. In turn, the efficiency of MFFs is the key determinant of the volume of mortgage loans and other ancillary financial services. The second and third stages of the model gauge mortgage firm efficiency.

Figure 7 **Factors Impacting the Availability and Costs of Mortgage Loans**



4.2.2 Second Stage of the Model: Stochastic Frontier Approach (SFA)

To obtain an unbiased systematic measure of efficiency across countries, the stochastic frontier approach is employed. The SFA allows the control of general environmental factors by estimating simultaneously the parameters of the stochastic frontier and the inefficiency model. The effect of macroeconomic factors on bank inefficiency (u_{kt}) is first estimated using the methodology of Battese and Coelli (1995).

(1) $u_{kt} = \gamma z_{kt} + W_{kt}$

where,

z_{kt}: the macroeconomic variables causing bank inefficiency

δ: parameters of the inefficiency frontier models

W_{kt}: truncation of the normal distribution with zero mean and variance σ^2

The general cost function is given by equation 2. The stochastic element of the model allows some observations to lie above the cost function, making the model less vulnerable to outliers in comparison to deterministic frontier models.

(2) $y_{kt} = \alpha_0 + \alpha_1 X_{kt} + \alpha_2 Z_{kt} + \varepsilon_{kt}$

where,

y_{kt}: total cost of mortgage firm k at time t in logs

X_{kt}: matrix of outputs and input prices in logs

Z_{kt}: bank-specific and country variables for bank k at time t

The stochastic frontier is known as the composed error model, as per equation 3, because it postulates the error term ε_{kt} as two independent error components, v_{kt} and u_{kt}, denoting the random error and inefficiency terms respectively.

(3) $\varepsilon_{kt} = v_{kt} + u_{kt}$

The random error term v_{kt} is assumed to be i.i.d., normally distributed and independent of the explanatory variables. The mortgage firm level inefficiency is given by the unconditional mean distribution of v_{kt} whereby ε_{kt} is $\{E[\exp(u_{kt})|\varepsilon_{kt}]\}^{-1}$ and lies between 0 and 1. The translog specification of the cost efficiency frontier is shown by equation 4. Table 3 gives the details of the explanatory variables.

(4) $$1nTC_{kt} = \beta_0 + \sum_{m=1}^{3} \beta_{1m} \ln Q_{mkt} + \frac{1}{2}\sum_{m=1}^{3}\sum_{l=1}^{3} \beta_{2ml}\, 1nQ_{mkt}\, 1nQ_{lkt} + \sum_{m=1}^{7}\sum_{l=1}^{3} \beta_{3ml}\, 1nP_{mkt}\, 1nQ_{lkt} + \sum_{m=1}^{7} \beta_{4m}\, 1nP_{mkt} + \frac{1}{2}\sum_{m=1}^{7}\sum_{l=1}^{7} \beta_{5ml}\, 1nP_{mkt}\, 1nP_{lkt} + \varepsilon_{kt}$$

Table 3 **Explanatory Variables**

Variable	Explanation
Inputs (P)	
Human capital	Price of labour = personnel expenses/total assets
Physical capital	Price of physical capital = capital expenses/total fixed assets
Cost of funds	Price of loanable funds = (Interest rates for borrowed funds + Dividends for shares)/total loanable funds
Capital adequacy	Cost of compliance with Basel II (tier 1 + 2 capital/risk weighted assets)
Outputs (Q)	
Mortgage loans	Interest income on mortgage loans
Off balance sheet activities (OBS)	Aggregated non-interest income as proxy of the OBS fee and commission income
Investments	Investments with subsidiaries

The profit efficiency method employed in this study is the non-standard profit efficiency model, which is reported by the literature to provide the most workable results (Berger and Mester, 1997; DeYoung and Hasan, 1998; and Khumbakar et al., 2001). The profit function is similar to the cost function. The function profits before taxes (PBT_{kt}) ignores output price data by assuming imperfect competition and is given by equation 5.

(5) $PBT_{kt} = \ln(\pi + |\pi^{min}| + 1)$ where,

$|\pi^{min}|$ is the minimum absolute value of PBT over all banks in the sample

The error term is: $\varepsilon_{kt} = v_{kt} - u_{kt}$

The mortgage firm specific profit efficiency is defined as the mean of the unconditional distribution of $-u_{kt}$ given ε_{kt} is $E[\exp(-u_{kt})|\varepsilon_{kt}]$ and lies between 0 and 1.

Equation 5 defines both mortgage firm cost and profit inefficiency scores (u_{it}) for MFFs in country I at time t, as a function of the macroeconomic variables contributing to bank efficiency. Table 4 details the definition and means of measuring these macroeconomic variables.

Table 4 Description of the Macroeconomic Variables

Macroeconomic Variables	
GDP per capita (GDP)	Real per capita GDP = nominal GDP deflated with the GDP deflator
Velocity of money (V)	M2/GDP
Inflation (CPI)	Consumer Price Index
Unemployment (U)	Calculated according to the International Labour Organization method
Interest rate (I)	T-Bill rate
Market structure (MS)	Three-firms concentration ratio by size of assets
Financial market depth (MC)	Stock market capitalization/GDP
Household borrowing (HH)	Household credit/GDP

To calculate the individual mortgage firm efficiency in equation 4 and to examine the determinants of inefficiency in equation 6, a single-step estimation procedure is used. The parameters of the stochastic frontier and the inefficiency model are simultaneously estimated, where the general environmental factors are controlled. This method is superior to a two-step procedure, wherein the estimated efficiency scores obtained from the stochastic frontier are regressed on a set of explanatory variables (Coelli et al., 2005).

(6) $$u_{it} = \delta_0 + \delta_1 GDP_{it} + \delta_2 CPI_{it} + \delta_3 U_{it} + \delta_4 I_{it} + \delta_5 MS_{it} + \delta_6 MC_{it} + \delta_7 HH_{it} + \delta_8 V_{it} + \varepsilon_{it}$$

Mortgage banking efficiency is expected to be positively related to GDP per capita. Higher per capita income, especially in the existence of high velocity of money circulation, would translate to higher affordability ratios. A negative relationship is expected in the case of inflationary pressures as well as high unemployment levels, since MFFs would incur higher operational expenses. Similarly higher interest rates are apt to raise the operational costs of the mortgage firm. According to the efficient-structure hypothesis, more concentrated markets that allow for growing firms, show superior efficiency through cost reduction (Wu and Birge, 2012). Stock markets development enables MFFs to raise more funds through securitization. Conversely, high household borrowings could hinder profit efficiency of mortgage firms as creditworthy borrowers would find alternative sources of funding (Grigorian and Manole, 2006).

4.2.3 Third Stage of the Model: Data Envelopment Analysis (DEA)

In the third stage of the model the DEA investigates the sources of mortgage bank efficiency. DEA compares the relative efficiency of mortgage firms by determining efficient firms as benchmarks and by measuring the inefficiencies in input combinations (slack variables) in other firms relative to the benchmark. The inefficiency levels of firms are compared with the best practice units using the estimated frontier. Equation 7 shows the cost efficiency for a firm producing the output vector y_k .

(7) $C_k = \dfrac{p_k + c_k}{p_k + x_k}$

where,

p_k is the input price vector

c_k is the cost minimizing input vector

Since the model shows that mortgage firms produce four outputs (*i*) using three inputs (*j*), the minimum cost is shown by Equation 8, which is calculated by linear programming as follows:

(8) $\text{Min} \sum_{i=1}^{4} p_{ik}\, x_{ik}$

Equation 9 denotes the best practice inputs and outputs respectively

(9) $y_{jk} \le \sum_{j=1}^{3} \mu_k\, y_{jk}$ and $x_{jk} \le \sum_{i=1}^{4} \mu_k\, x_{jk}$; subject to $\sum_{k=1.2}^{n} \mu_k = 1$

where,

p_i is the input (I) price

$\mu k \ge 0$ signifies the intensity variables, which allows convex combinations of observed input and output quantities

k is the bank index

n is the number of observations

5.1 Cost and Profit Efficiency Scores

To allow the comparison of mortgage firm efficiency scores, average efficiency scores for SFA and DEA are computed and presented as the arithmetic means of yearly efficiency scores for the eight years of the study and reported in Table 5. The results are consistent for both the DEA and SFA methods. However, the SFA technique provides higher estimations for all countries, which is in line with the literature (Lozano-Vivas et al., 2002; Weill, 2004). The reason is that the SFA technique relies on distributional assumptions for both components of the residual to separate them, while DEA assumes that the residual represents the inefficiency term.

The average values of the estimates indicate that mortgage banks in Asia are, on average, the most cost efficient while those in Latin American have the lowest cost efficiency. Using the SFA method, Asian mortgage banks could have employed only 96.1 per cent of their resources to produce their services, in comparison to 89.7 per cent for Latin American banks. Egyptian mortgage firms would be able to reduce costs by 8.6 per cent (or 11.7 per cent using DEA) relative to a best-practice bank.

But there are a number of alarming observations when it comes to profit efficiency scores. First, the average profit efficiency scores are generally lower than the cost efficiency scores for most firms in the sample, except for Latin America. This suggests that most mortgage firms manage costs relatively efficiently, but suffer from significant inefficiencies in profit generation. The highest average profit efficiency score of 96.6 per cent is reported by Latin American firms, indicating that they earn an estimated 96.6 per cent of the profits of a best practice mortgage bank producing the same bundle of services under the same environmental conditions. Transition economies are the furthest from the best practice frontier – let it be for cost or profit efficiency – and Asian mortgage firms are rather good performers. The second surprising finding is that in spite of their relatively high cost efficiency, Egyptian mortgage firms have considerably low average profit efficiency scores.

Table 5 Efficiency Scores of MFFs in the Sample (2004-2012)

	COST EFFICIENCY				PROFIT EFFICIENCY			
	Mean	Min	Max	SD	Mean	Min	Max	SD
	EGYPT (n=234)							
SFA	0.914	0.527	0.968	0.075	0.813	0.311	0.942	0.087
DEA	0.883	0.518	0.904	0.055	0.796	0.431	0.911	0.079
	AFRICA AND MENA REGION (n=754)							
SFA	0.912	0.397	0.973	0.223	0.894	0.355	0.981	0.133
DEA	0.869	0.471	0.936	0.161	0.867	0.332	0.912	0.281
	LATIN AMERICA (n=702)							
SFA	0.938	0.316	0.986	0.014	0.966	0.455	0.996	0.145
DEA	0.891	0.318	0.952	0.179	0.932	0.518	0.968	0.211
	TRANSITION ECONOMIES (n=416)							
SFA	0.857	0.389	0.945	0.037	0.803	0.432	0.967	0.041
DEA	0.797	0.286	0.975	0.221	0.759	0.595	0.884	0.312
	ASIA (n=624)							
SFA	0.961	0.563	0.994	0.157	0.959	0.614	0.985	0.095
DEA	0.926	0.427	0.971	0.311	0.921	0.516	0.954	0.261

5.2 Robustness Test

Prior to detecting the cause of the low level of profit efficiency of Egyptian MFFs, the robustness of the results must be examined. First, to test the robustness of profit efficiency scores across parametric and non- parametric approaches, correlations between the frontier techniques are computed. The correlation tests that are reported in Table 6 show a significant and positive relationship between SFA and DEA scores for all countries.

Table 6 **Correlation of DEA and SFA Efficiency Scores**

	EGYPT	
	SFA	DEA
SFA	1.0000	0.8905**(0.0001)
DEA		1.0000

	TRANSITION ECONOMIES	
	SFA	DEA
SFA	1.0000	0.8797**(0.0001)
DEA		1.0000

	AFRICA AND MENA REGION	
	SFA	DEA
SFA	1.0000	0.8816***(0.0001)
DEA		1.0000

	ASIA	
	SFA	DEA
SFA	1.0000	0.8629***(0.0001)
DEA		1.0000

	LATIN AMERICA	
	SFA	DEA
SFA	1.0000	0.8375***(0.0001)
DEA		1.0000

*, **, *** denote an estimate significantly different from 0 at the 10%, 5% or 1% respectively

5.3 Detecting Sources of Inefficiency: Malmquist Productivity Index (MPI)

To extract public policy conclusions, the Malmquist Productivity Index (MPI) is employed in order to understand the reason behind the low profit efficiency of mortgage firms in Egypt. This will help determine whether the efficiency scores are related to the environment in which the MFFs operate, the economic shocks such as the Global Financial Crisis, or particular MFF characteristics – such as size or type of ownership. While DEA and SFA provide averages, the MPI examines efficiency performance from year to year. The output-oriented Malmquist productivity change index is adopted and formulated in Equation 10. The productivity function (M) is the product of a measure of technical change (*TC*) measured by a change in efficiency (*TE*) over the period (*t+1*) and (*t*), while D is the output distance function. If the evaluated MFF is efficient, the distance function is equal to one; if it is inefficient it is less than one. Following the methodology of Fare et al. (1994), the output orientation refers to the emphasis on the equi-proportionate increase of outputs, within the context of a given level of input.

(10) $$M_k^{t+1}(y^{t+1}, x^{t+1}, y^t, x^t) = \frac{D_k^{t+1}(y^{t+1}, x^{t+1})}{D_k^t(y^t, x^t)} \times \left[\frac{D_k^t(y^{t+1}, x^{t+1})}{D_k^{t+1}(y^{t+1}, x^{t+1})} \times \frac{D_k^t(y^t, x^t)}{D_k^{t+1}(y^t, x^t)} \right]^{1/2}$$

Profit maximization does not only require a reduction in the costs of production, but it also requires a mortgage firm to be technologically, technically and managerially efficient. As defined in Equations 11 through 15, five Malmquist indices are defined for period *t+1* relative to period *t*. Total factor productivity index (*TFPI*) is decomposed into the technological change index (*TCI*) and the technical efficiency index (*TEI*), which is further decomposed into pure technical efficiency index (*PTEI*) – at variable returns to scale (*VRS*) – and scale efficiency index (*SEI*). *PTEI* measures the proportional reduction in input usage until inputs are not wasted, while *SEI* measures the proportional reduction until the mortgage firm achieves constant returns to scale (*CRS*).

(11) $$TFPI = TEI \times TCI = \frac{D_k^{t+1}(y^{t+1}, x^{t+1})}{D_k^t(y^t, x^t)} \left[\left(\frac{D_k^t(y^{t+1}, x^{t+1})}{D_k^{t+1}(y^{t+1}, x^{t+1})} \times \frac{D_k^t(y^t, x^t)}{D_k^{t+1}(y^t, x^t)} \right) \right]^{1/2}$$

(12) $$TCI = \left[\frac{D_k^t(y^{t+1}, x^{t+1})}{D_k^{t+1}(y^{t+1}, x^{t+1})} \times \frac{D_k^t(y^t, x^t)}{D_k^{t+1}(y^t, x^t)} \right]^{1/2}$$

(13) $$TEI = \frac{D_k^{t+1}(y^{t+1}, x^{t+1})}{D_k^t(y^t, x^t)} \text{ at CRS}$$

(14) $$PTEI = \frac{D_k^{t+1}(y^{t+1}, x^{t+1})}{D_k^t(y^t, x^t)} \text{ at CRS}$$

(15) $$SEI = TEI \div PTEI = \frac{D_k^{t+1}(y^{t+1}, x^{t+1})}{D_k^t(y^t, x^t)} \div \frac{D_k^{t+1}(y^{t+1}, x^{t+1})}{D_k^t(y^t, x^t)}$$

The Malmquist Index components take an initial score of 1.000 for 2004, which is the reference year. Hence, any score greater than 1.000 in subsequent years indicates an improvement, while any score lower than 1.000 indicates a worsening in the relevant measures. Annual values of the TFPI and its components are provided in Table 7.

In general, most MFFs show a marked decline during the global financial crisis. Latin American and Asian mortgage firms display high efficiency, followed by transition economies. The case of Egypt is similar to that of African mortgage banks that show the lowest levels of efficiency. However, contrary to the African case, the decomposition of the efficiency index into technological and technical efficiency suggests that the dominant source of the decline in Egyptian MFF efficiency during the study period is technically related rather than technologically related. Moreover, while pure technical efficiency, which measures performance due to managerial activity, increased for most banks in the sample it decreased by 6.5 per cent for Egyptian mortgage banks since their inception in 2004. Likewise, scale efficiency decreased by 8.6 per cent. This is because the global removal of regulatory restrictions, mainly by allowing securitization since the 1980s in most nations has enabled mortgage banks to progressively attain high levels of capacity utilization. The only exception is for Latin American banks. In other words, the main problem with Egyptian MFFs is the managerial inefficiency as well as operating at the wrong scale.

Table 7 Decomposing Total Factor Productivity in Mortgage Finance Firms (2004-2012)

	EGYPT				
	TFPI	TCI	TEI	PTEI	SEI
2004	1.000	1.000	1.000	1.000	1.000
2005	1.004	1.018	0.975	0.989	0. 939
2006	1.005	1.020	0.979	0.998	0.937
2007	1.015	1.023	0.981	0.999	0.936
2008	1.016	1.026	0.989	0.998	0.938
2009	0.992	1.001	0.935	0.963	0.911
2010	0.994	1.005	0.939	0.957	0.923
2011	0.980	1.005	0.922	0.932	0.914
2012	0.985	1.008	0.928	0.937	0.921
Mean	**0.999**	**1.011**	**0.961**	**0.975**	**0.935**

	TRANSITION ECONOMIES				
	TFPI	TCI	TEI	PTEI	SEI
2004	1.000	1.000	1.000	1.000	1.000
2005	0.994	0.991	1.001	1.017	0.969
2006	1.013	0.995	1.007	1.025	0.955
2007	1.013	0.996	1.017	1.024	0.956
2008	0.995	1.005	0.991	0.998	0.994
2009	0.987	0.979	1.000	1.005	0.944
2010	1.003	1.000	1.001	1.015	0. 984
2011	1.009	1.006	1.001	1.016	0.989
2012	1.008	1.058	1.008	1.085	0.967
Mean	**1.002**	**1.003**	**1.002**	**1.021**	**0.973**

	AFRICA AND MENA REGION				
	TFPI	TCI	TEI	PTEI	SEI
2004	1.000	1.000	1.000	1.000	1.000
2005	1.006	0.922	1.025	1.011	1.029
2006	1.008	0.998	1.013	1.012	1.032
2007	1.012	0.998	1.022	1.016	1.034
2008	0.981	0.989	1.001	0.992	0.988
2009	0.990	0.994	0.999	0.986	1.014
2010	1.000	0.924	1.014	1.004	1.016
2011	1.002	0.963	1.015	1.006	1.020
2012	1.005	0.982	1.018	1.009	1.024
Mean	**1.001**	**0.975**	**1.012**	**1.004**	**1.017**

	ASIA				
	TFPI	TCI	TEI	PTEI	SEI
2004	1.000	1.000	1.000	1.000	1.000
2005	1.010	1.013	1.005	1.006	1.003
2006	1.015	1.015	1.009	1.005	1.001
2007	1.021	0.956	1.017	1.018	1.010
2008	1.001	0.969	1.000	1.017	0.986
2009	0.992	0.994	0.998	1.010	0.985
2010	1.010	1.013	1.005	1.006	1.003
2011	1.014	1.008	1.002	1.002	1.000
2012	1.110	1.026	1.014	1.004	1.018
Mean	**1.018**	**0.999**	**1.006**	**1.008**	**1.001**

	LATIN AMERICA				
	TFPI	TCI	TEI	PTEI	SEI
2004	1.000	1.000	1.000	1.000	1.000
2005	1.018	0.991	1.001	1.017	0.969
2006	1.032	0.995	1.007	1.025	0.955
2007	1.041	0.996	1.017	1.024	0.956
2008	0.989	1.005	0.991	0.998	0.994
2009	0.995	0.979	1.000	1.005	0.944
2010	1.016	1.000	1.001	1.015	0. 984
2011	1.017	1.006	1.001	1.016	0.989
2012	1.094	1.058	1.008	1.085	0.967
Mean	**1.017**	**1.003**	**1.002**	**1.021**	**0.973**

Explanatory Note: The mean scores of the Total Factor Productivity Index (TFPI) and its components for mortgage firms and banks in the sample: Technological Change Index (TCI) and Technical Efficiency Index (TEI), which is further decomposed into Pure Technical Efficiency Index (PTEI) and Scale Efficiency Index (SEI).

5.4 Analysis of Efficiency Estimates

In order to extract practicable solutions, it is functional to investigate whether the efficiencies vary by size, type of ownership, regulatory controls and governance standards. Banks in the sample are divided into categories and the results are reported in Figure 8. On the whole, bank efficiency has shown substantial decline during the Global Financial Crisis.

Figure 8.1 measures bank size by assets. The results report higher efficiency for mortgage banks as they gain size. This may be explained by the fact that as the size increases banks develop better means of risk management and restructure their balance sheets towards riskier and profitable assets (Sufian and Abdul Majid, 2009).

When categorized by ownership, Figure 8.2 displays that the least efficient MFFs are the state-owned and the highest efficiency scores are recorded by jointly-owned banks. Foreign mortgage banks are not as efficient as private domestic ones. The main distinguishing feature for private mortgage banks, however, is their flexibility and ability to expand into a wider range of banking and non-banking activities, which is apt to help them diversify risks and maximize profits (Penny, 2004).

As for Corporate Governance (CG), mortgage firms are divided according to whether they comply with their own internal code of CG, the national code, moderate compliance with at least two codes or no CG requirements. The main items used to assess CG implementation and observance is in regard to: (1) the degree of separation of ownership and control; (2) accountability of management towards the Board of Directors; (3) the adoption of a proper disclosure and transparency system; (4) internal governance mechanism of sophisticated financial transactions; and (5) the implementation of recommendations of internal and external auditors. Figure 8.3 shows that the highest efficiency scores are for mortgage banks that strictly adopt and implement national CG standards, followed by those that develop their own internal standards. The results are in conformity with the literature, where CG standards are found to significantly enhance bank efficiency (Ammann et al., 2011).

Generally speaking, regulatory controls on financial markets should result in higher efficacy since it enhances the macroeconomic environment and mitigates systematic risks (Fitch Ratings, 2011). Figure 8.4 reveals that efficiency scores show a major decline after the global meltdown. This result makes sense intuitively, since residential and commercial mortgages are among the asset classes that experienced extended periods of relatively low credit losses prior to the crisis, but then incurred sharp increases in loss rates during the crisis. MFFs operating under strict capital and liquidity regulations – Basel 2.5 – show the highest levels of performance, followed by the ones that necessitate only capital requirements, while efficiency is lowest in countries with low regulatory requirements.

Figure 8.1 TFPI Efficiency Scores by Size

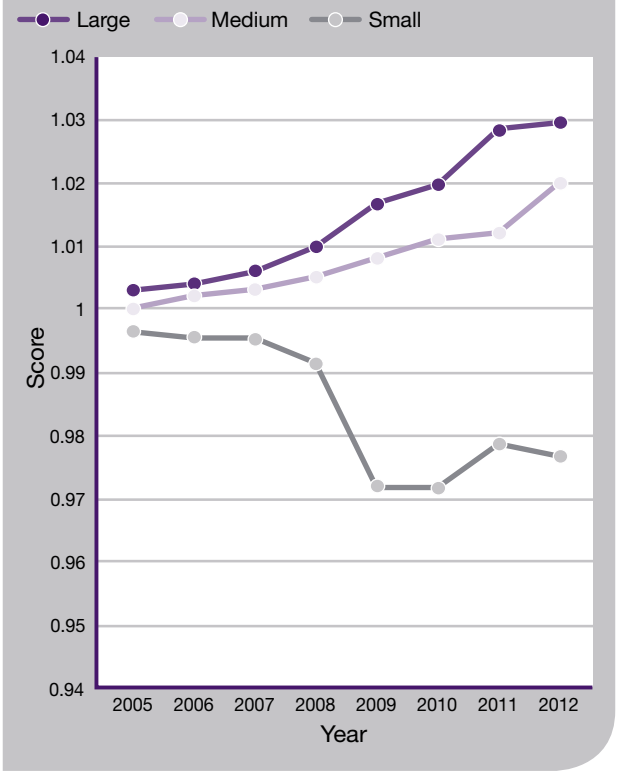


Figure 8.2 TFPI Efficiency Scores by Type of Ownership

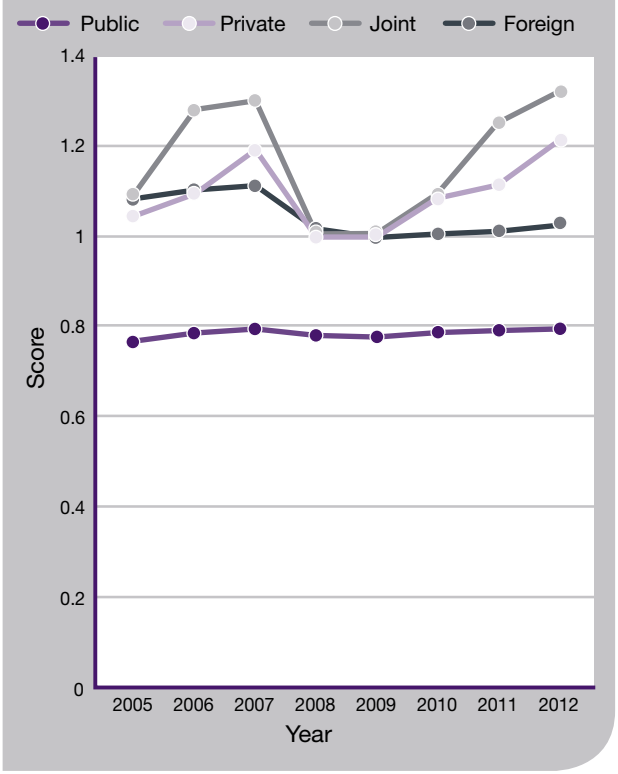


Figure 8.3 TFPI Efficiency Scores by Compliance to Corporate Governance

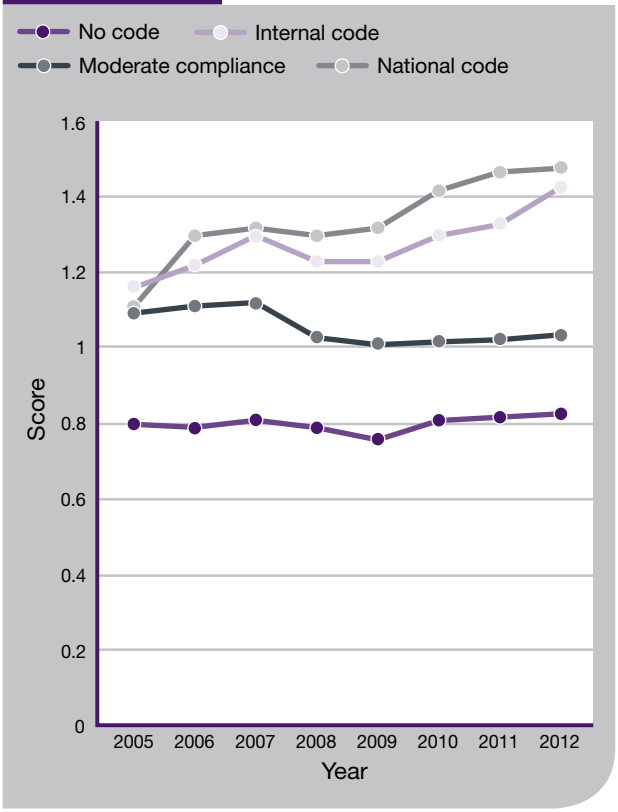
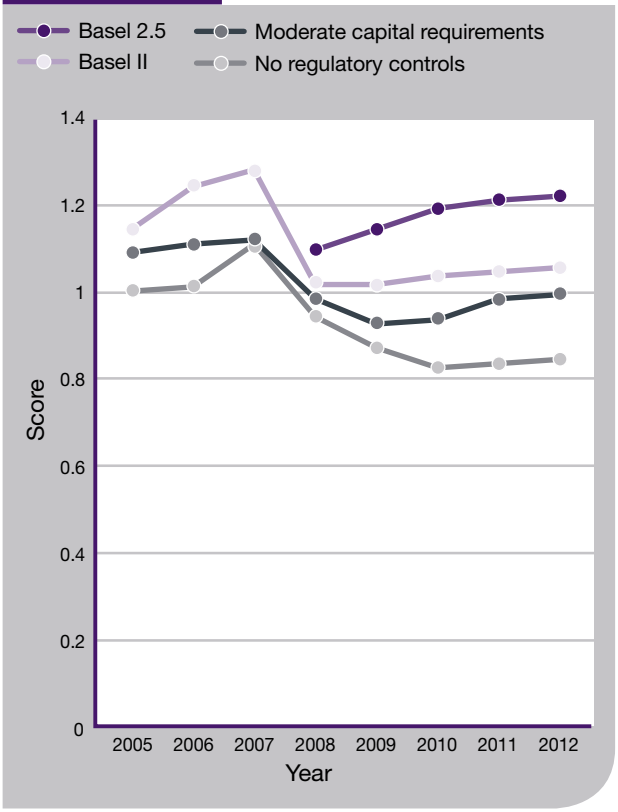


Figure 8.4 TFPI Efficiency Scores by Regulatory Controls



6.0 Policy Recommendations

In spite of the Egyptian economy reaping a high compounded GDP growth rate of 5 per cent since the turn of the millennium, the macroeconomic fruits were confined to the uppermost income groups. Basic necessities of the poor were left unresolved – a situation that has not helped address the housing needs of the 600,000 yearly marriages (Struyk, 2007). If not appropriately attended to, the demoralized youth and the devastated poor are apt to cause episodic outbursts in Egypt. Any talk of political reform needs, therefore, to proceed in tandem with addressing the societal housing needs. Mortgage firms are key elements in salvaging the botched housing sector. Yet, a number of barriers need to be eliminated in order to enhance long-term efficiency of MFFs in a manner that satisfies the interests of the mortgage institutions and their clients and to meet the national financial and social agendas.

Among the intriguing results reported by the empirical study in this report are the apparent low profit and cost efficiency of Egyptian mortgage firms in comparison to their counterparts in emerging economies. More peculiarly, profit efficiency scores are much lower than cost efficiency. This prompts the need to check total factor efficiency, which reveals that pure technical efficiency and scale efficiency are not only apparently low, but are deteriorating. Combining these results with the feedback of respondents to the field survey, a roadmap that rests on four broad pillars is outlined in Figure 9. Hopefully, the recommendations would provide policy options and help the management of mortgage firms to improve the way in which they allocate resources.

The first obligation lies on the MFFs. There is room for significant cost savings and efficiency gains if mortgage firms utilize their productive inputs more efficiently. Upgrading employee and managerial skills is imperative. Equally important is the need to set forth a set of CG standards that separate ownership from control and limit executive pay in order to avoid high risk exposure. Moreover, the financial competences of managers and members of the board of directors need to be ensured and regularly augmented. Also, better shareholder rights and representation are apt to result in healthier financial outcomes.

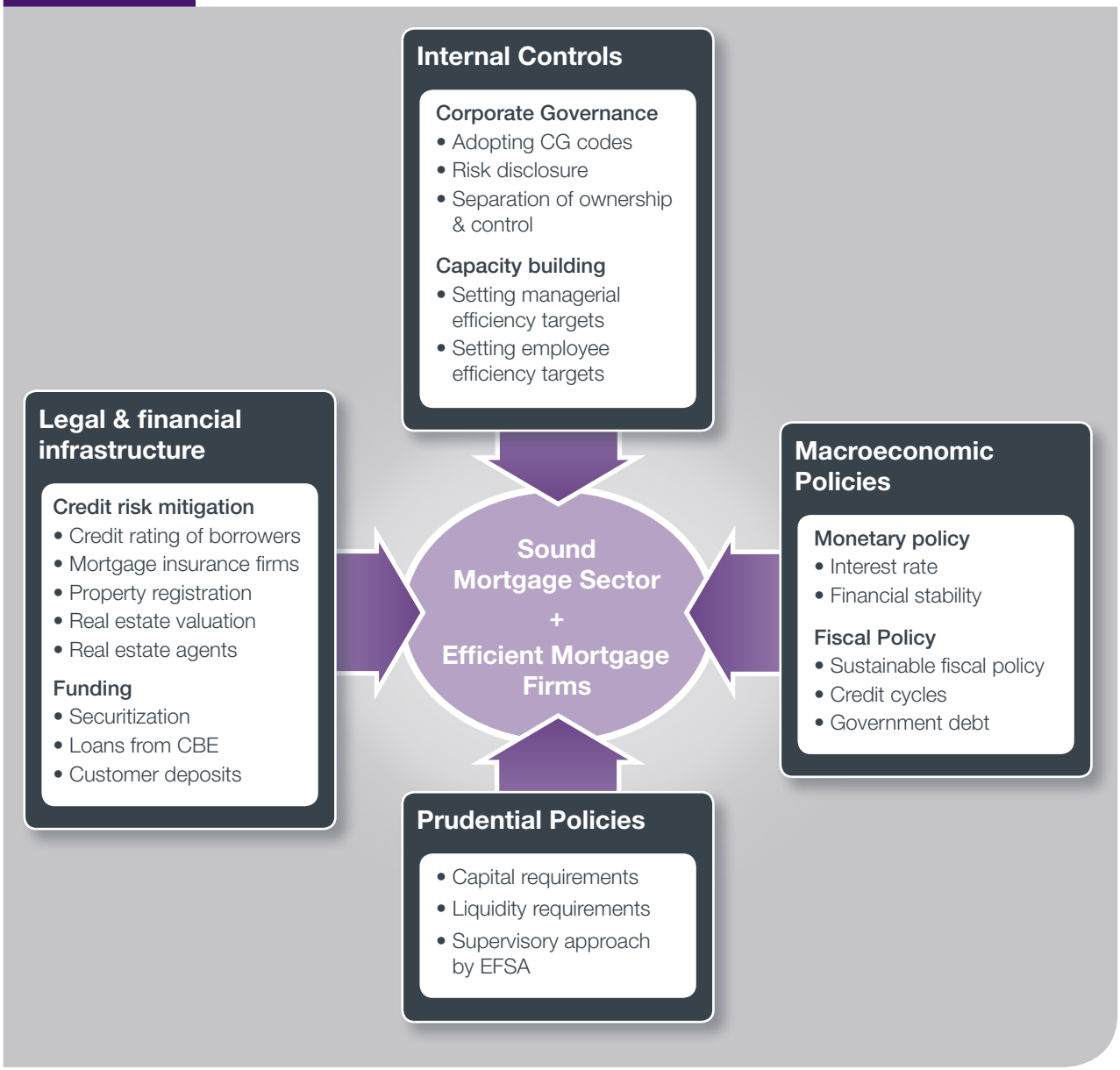
Substantial duty lies on the shoulders of the government, regulators and policymakers. This is because the efficiency of mortgage firms emanates from the soundness of the entire mortgage sector. To a large extent, the inability to generate profits may be a result of unhealthy macroeconomic policies and regulatory distortions (Hassanein and El-Barkouky, 2009). Thus, monetary and fiscal agents should carefully consider the repercussions of their policies on the mortgage sector. Interest rate spreads should be lowered by the CBE, basically by making more funds available through the credit window. It is equally important to avoid unwarranted public debt, especially given the excessively high yield on Egyptian sovereign bonds.

The third pillar is the need for EFSA to streamline and clarify the complicated regulatory capital and liquidity requirements and the complex oversight procedures. EFSA also has to adopt a full-fledged supervisory approach: to assess the risk profile of mortgage firms, gauge risks emanating from the mortgage sector, design a framework for early intervention, and coordinate with the CBE to resolve MFFs in an orderly way if they become illiquid.

The final requisite for enhancing the mortgage finance sector is to mitigate credit risks and help MFFs tap new sources of funding and capital. This is a very important issue, given that the results of the empirical study reveal that larger mortgage banks in the sample are able to reap economies of scale, and hence augment their efficiency. Additionally, methodological enhancements must be introduced, especially with regards to measuring the creditworthiness of borrowers. Financial institutions in Egypt are required to follow risk management procedures in accordance with Basel Accord II. However, since more than 30 per cent of the Egyptian GDP is produced in the informal sector, borrowers are unable to present official proof of income. This is an additional barrier to real estate development in most emerging economies. More stringent barriers are the lack of mortgage insurance firms, appraisal experts, real estate agents and real estate valuation specialists. Through its training academy, EFSA needs to immediately build calibres in these vital fields. Moreover, to expand households' access to mortgage funds, the government needs to simplify transactions and reduce registration costs. Securitization will not only exempt MFFs from holding capital against high-risk loans, but will also attract more domestic and foreign savings, especially that the political arena has finally stabilized and investors are reassured that the new moderate Islamist government aims to pursue an all-inclusive sustainable development economic model (Oxford Business Review, 2012).

After an 18-month political struggle, the Egyptian economy has finally enjoyed its first democratically elected president. Akin to many emerging markets that have transitioned towards democracy, the Egyptian economy has considerable potential. Its large and young population points toward the need to significantly expand the construction and real estate sectors, which produce 15 per cent of GDP on the average. Indeed, the subsequent step to tap this potential is to increase and broaden access to mortgage loans.

Figure 9 A Roadmap for Enhancing the Mortgage Sector and Efficiency of MFFs



7.0 References

Abrahamsen, R. (2000) *Disciplining Democracy: Development Discourse and Good Governance in Africa*, Zed Books, London and New York, N.Y.

Akinwunmi, A.A. (2008) "Mortgage Insurance and Housing Finance in Emerging Economies," Working Paper Series, University of Wolverhampton.

Al-Sharkas, A.A., Hassan, M.K. and Lawrence, S. (2008) "The Impact of Mergers and Acquisitions on the Efficiency of the US Banking Industry: Further Evidence," *Journal of Business Finance and Accounting*, 35(1&2): 50-70.

Ammann, M., Oesch, D. and Schmid, M.M. (2011) "Corporate Governance and Firm Value: International Evidence," *Journal of Empirical Finance*, 18, 1: 36-55.

Ataullah, A., Cockerill, T. and Le, H. (2004) "Financial Liberalization and Bank Efficiency: A Comparative Analysis of India and Pakistan," *Applied Economics*, 36: 1915-1924.

Bank for International Settlements (2008) "Central Bank Operations in Response to the Financial Turmoil," Committee on the Global Financial System Papers, No. 31, BIS, Basel.

Bardhan, B. and Edelstein, R.H. (2008) "Housing Finance in Emerging Economies: Applying a Benchmark from Developed Countries," in Ben-Shahar, D., Leung, C. and Ong, S.E. (eds.) *Mortgage Markets Worldwide*, Wiley-Blackwell, New York, pp. 7-26.

Battese, G.E. and Coelli, T.J. (1995) "A Model for Technical Inefficiency Effects in a Stochastic Frontier Production Function for Panel Data, *Empirical Economics*," 20: 325-332.

Berger, A. and Mester, L. (1997) "Inside the Black Box: What Explains Differences in the Efficiencies of Financial Institutions?" Journal of Banking and Finance, 21: 895-947.

Bos, J.W.B. and Kool, C.J.M. (2006) "Bank Efficiency: The Role of Bank Strategy and Local Market Conditions," *Journal of Banking and Finance*, 30: 1953-1974.

Camanho, A.S. and Dyson, R.G. (2005) "Cost Efficiency Measurement with Price Uncertainty: A DEA Application to Bank Branch Assessments," *European Journal of Operational Research*, 161: 432-446.

Campbell, J.Y. and Cocco, J.F. (2003) "Household Risk Management and Optimal Mortgage Choice," *Quarterly Journal of Economics*, 118: 1449-1494.

Chiquier, L., Hassler, O. and Lea, M. (2004) "Mortgage Securities in Emerging Markets," Policy Research Working Paper No. WPS3370, The World Bank, Washington, D.C.

Coelli, T.J., Prasada R., D.S., O'Donnell, C.J. and Battese, G.E. (2005) *An Introduction to Efficiency and Productivity Analysis*, second ed., Springer, N.Y.

Demirgüc-Kunt, A. and Detragiache, E. (1998) "Financial Liberalisation and Financial Fragility," International Monetary Fund Working Paper No. 98/83, IMF, Washington, DC.

De Young, R. And Hasan, I. (1998) "The Performance of de Novo Commercial Banks: A Profit Efficiency Approach," *Journal of Banking and Finance*, 22: 565-587.

Ebrahim, M.S., Shackleton, M.B. and Wojakowski, R.M. (2011) "Participating Mortgages and the Efficiency of Financial Intermediation," *Journal of Banking and Finance*, 35 (11): 3042-3054.

Everhart, S., Heybey, B. and Carleton, P. (2006) "Egypt: Overview of the Housing Sector," *Housing Finance International*, 20 (4): 9.

Fare, R., Grosskopf, S., Norris, M., and Zhang, Z. (1994) "Productivity Growth, Technical Progress and Efficiency Change in Industrialized Countries," *The American Economic Review*, 84: 66-83.

Fitch Ratings (2011) "Basel III Correlations: An Empirical Analysis Reflecting the Financial Crisis," *Fitch Ratings Special Report*, Fitch Ratings Inc., New York.

Gilbert, A. and Ward, P. (1985) *Housing, the State, and the Poor*, Cambridge University Press, Cambridge.

Grigorian, D. A. and Manole, V. (2006) "Determinants of Commercial Banks Performance in Transition: An Application of Data Envelopment Analysis," *Comparative Economic Studies*, 48: 497-522.

Hardoy, J. and Satterthwaite, D. (1989) *Squatter Citizen: Life in the Urban Third World*, Earthscan Publications Limited, London.

Hassanein, A.G. and El-Barkouky M.G. (2008) "The Egyptian Mortgage Practice," *International Journal of Managing Projects in Business*, 1 (2): 260-278.

Hassanein, A.G. and El-Barkouky M.G. (2009) "A Suggested Mortgage System Model for Egypt," *Journal of Real Estate Literature*, 17 (2): 249

HC Brokerage (2012) *Egypt Real Estate*, HC Egypt, Cairo.

Integrated Financial Engineering Inc. (2007) *Mortgage Securitization: Lessons for Emerging Markets*, U.S. Department of Housing and Urban Development, Washington, D.C.

Jaffee, D. and Russell, T. (1976) "Imperfect Information, Uncertainty and Credit Rationing," *Quarterly Journal of Economics*, 90 (4): 651-666.

Jones Lang LaSalle (2011) Affordable Housing in MENA: Why Affordable Housing Matters, Jones Lang LaSalle, Chicago, Il.

Kaganova, O. (1996) *Russian Homebuilding in Transition*, The Urban Institute, Washington, D.C.

Khiari, W., Karaa, A. and Omri, A. (2007) "Corporate Governance Efficiency: An Indexing Approach Using the Stochastic Frontier Analysis," *Corporate Governance*, 7 (2): 148-161.

Khumbakar, S.C., Lozano-Vivas, A., Lovell, C.A.K. and Hasan, L. (2001) "The Effects of Deregulation on the Performance of Financial Instituions: The case of Spanish Savings Banks," *New Jersey Institutive of Technology Working Papers*, New Jersey.

Koutsomanoli-Filippaki, A., Margaritis, D. and Staikouras, C. (2009) "Efficiency and Productivity Growth in the Banking Industry of Central and Eastern Europe," *Journal of Banking and Finance*, 33: 557-567.

Kyessi, A. and Furaha, G. (2010) "Access to Housing Finance by the Urban Poor: The Case of WAT-SACCOS in Dar Es Salaam, Tanzania," *International Journal of Housing Markets and Analysis*, 3 (3): 182-202.

Lensink, R., Meesters, A. and Naaborg, I. (2008) "Bank Efficiency and Foreign Ownership: Do Good Institutions Matter?" *Journal of Banking and Finance*, 32: 834-844.

Levine, R., Loayza, N. and Beck, T. (2000) "Financial Intermediation and Growth: Causality and Causes," *Journal of Monetary Economics*, 46: 31-77.

Lozano-Vivas, A. and Pasiouras, F. (2010) "The Impact of Non-Traditional Activities on the Estimation of Bank Efficiency: International Evidence," *Journal of Banking & Finance*, 34: 1436-1449.

Lozano-Vivas, A., Pastor, J. T. and Pastor, J. M. (2002) "An Efficiency Comparison of European Banking Systems operating under Different Environmental Conditions," *Journal of Productivity Analysis*, 18(1): 59-77.

Margaritis, D. and Psillaki, M. (2007) "Capital Structure and Firm Efficiency," *Journal of Business Finance and Accounting*, 34 (9-10): 1447-1469.

Ministry of Finance (2012) *Annual Report*, MoF, Cairo.

Nasr, S. (2010) "Affordable Mortgage Finance in Egypt: Challenges and Prospects," Paper presented at the 2010 Oxford Business and Economics Conference, June 28-30, Oxford.

Oxford Business Review (2012) "Egypt: Lifting the Economy," *Oxford Business Group Report*, OBG, Dubai.

Pasiouras, F., Tanna, S. and Zopounidis, C. (2009) "The Impact of Banking Regulations, on Banks' Cost and Profit Efficiency: Cross-Country Evidence," *International Review of Financial Analysis*, 18: 294-302.

Penny, N. (2004) "X-Efficiency and Productivity Change in Australian Banking," *Australian Economic Papers*, 43: 174-191.

Pollock, A. (1994) "Simplicity versus Complexity in the Evolution of Housing Finance Systems," *Housing Finance International*, March.

Renaud, B.M. (2009) "Mortgage Finance in Emerging Markets: Constraints and Feasible Development Paths," in Ben-Shahar, D., Leung, C. and Ong, S.E. (eds.) *Mortgage Markets Worldwide*, Wiley-Blackwell, New York, pp. 253-288.

Schindler, F. (2011) "Market Efficiency and Return Predictability in the Emerging Securitized Real Estate Markets," *Journal of Real Estate Literature*, 19 (1): 111-50.

Sims, D. (2011) *Understanding Cairo: The Logic of a City Out of Control*, The American University in Cairo Press, Cairo.

Smith, D.A. (2006) "Housing the World's Poor: The Four Essential Roles of Government" *Harvard International Review*, June 3.

Struyk, R. (2007) "Egyptian Consumers' Knowledge of Mortgage Finance and Property Registration," *Housing Finance International*, 22 (2): 33-43.

Struyk, R. and Brown, M. (2006) "Update on Egyptian Mortgage Lending," *Housing Finance International*, December: 33-36.

Struyk, R., Roy, F., Rabenhorst, C. and Kopeiken, A. (2004) "Emerging Mortgage Finance in Armenia," *Housing Finance International*, December: 3-10.

Sufian, F. and Abdul Majid, M.Z. (2009) "Post-Crisis Productivity Change in Non-Bank Financial Institutions: Efficiency Increase or Technological Progress?" *Journal of Transnational Management*, 14:124-154.

Thoraneenitiyan, N. and Avkiran, N.K., (2009) "Measuring the Impact of Restructuring and Country-specific Factors on the Efficiency of Post-crisis East Asian Banking Systems: Integrating DEA with SFA," *Socio-Economic Planning Sciences*, 43: 240-252.

Tibaijuka, A. K. (2009) *Building Prosperity: Housing and Economic Development*, Earthscan, London and Sterling, VA.

Tym, R. (1984) "Finance and Affordability," in: Payne, G. (Hg.), *Low-Income Housing in the Developing World – The Role of Sites and Services and Settlement Upgrading*, John Wiley & Sons Ltd., New York., pp. 209-220.

Ward, D.M. (2009) "Product Differentiation and Consumption Efficiency in Mortgage Markets", *Journal of Business Research*, 62 (8): 805-809.

Weill, L. (2004) "Measuring Cost Efficiency in European Banking: A Comparison of Frontier Techniques," *Journal of Productivity Analysis*, 21, 133-152.

Wu, D.D. and Birge, J.R. (2012) "Serial Chain Merger Evaluation Model and Application to Mortgage Banking," *Decision Sciences*, 43 (1): 5-36.