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Financial sector development, economic growth and demography in MENA region

Yeganeh Moghadas Zadeh Forouheshfar

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THÈSE DE DOCTORAT

de l'Université de recherche Paris Sciences et Lettres
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Préparée à l'Université Paris-Dauphine

Financial sector development, economic growth and
demography in MENA region

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Spécialité Sciences économiques

Soutenue le **21.12.2017**
par **Yeganeh FOROUHESHFAR**

Dirigée par **Najat EL MEKKAOUI**

COMPOSITION DU JURY :

Mme Najat EL MEKKAOUI
Université Paris-Dauphine
Directrice de thèse

M. Hippolyte D'ALBIS
Ecole d'Economie de Paris
Présidente du jury

M. Mouez FODHA
Université Paris 1 Panthéon-Sorbonne
Rapporteur

M. Grégory PONTIERE
Université Paris Est (ERUDITE)
Rapporteur

M. Philippe DE VREYER
Université Paris-Dauphine
Membre du jury

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To Pari

To Omid

“Although the road is never ending take a step and keep walking, do not look fearfully into the distance... On this path let the heart be your guide for the body is hesitant and full of fear.”

-Rumi

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Introduction Générale

Le Moyen-Orient et l'Afrique du Nord (MENA) est une région à fort potentiel de développement. Malgré les défis géopolitiques actuels, les pays de la région bénéficient d'une situation géographique stratégique proche de l'Europe, de l'Afrique et de l'Asie. La structure démographique de la région est un autre atout, les taux de fécondité ont chuté à une vitesse fulgurante au cours des dernières décennies, ce qui rend ces pays enclins à atteindre le dividende démographique. Bien que les pays de la région aient des structures économiques très différentes, certains sont des exportateurs et d'autres importateurs de pétrole, ils ont tous un grand potentiel dans des secteurs tels que les énergies renouvelables, l'industrie manufacturière, le tourisme et les services aux entreprises.

Au cours des dernières années, les pays de la région ont mis en œuvre de nombreuses réformes afin d'accroître l'ouverture économique, la diversification et le développement du secteur privé. Ces réformes ont encouragé l'investissement, le commerce et la croissance économique, mais elles étaient également incomplètes et n'ont pas pleinement abordé les questions économiques et sociales plus larges. Des réformes plus globales sont nécessaires pour adopter des modèles de développement inclusifs et durables qui améliorent les possibilités offertes à tous, en particulier aux jeunes et aux femmes. Pendant ce temps, la région est confrontée à des défis continus, elle souffre de taux de chômage extrêmement élevés chez les jeunes. Parmi les chocs externes, la chute persistante des prix du pétrole frappe fortement l'économie des pays exportateurs de pétrole de la région MENA. Les conflits et la crise des réfugiés

dans la région sont source d'incertitude et exercent une pression sur toute la région, soulignant la nécessité de rétablir la stabilité, d'initier la reconstruction et de fournir des opportunités aux immigrants.

L'impact du développement du secteur financier sur la croissance a été largement étudié dans la littérature économique. De nombreux travaux de recherche mettent en avant le rôle important du secteur financier dans la promotion de la croissance économique. Cinq fonctions clés sont identifiées dans la littérature, Levine (2005) :

- Produire des informations ex-ante sur les investissements possibles et allouer du capital.
- Surveiller les investissements et contrôler la gouvernance d'entreprise
- Faciliter la négociation, la diversification et la gestion du risque
- Mobiliser et mettre en commun l'épargne
- Faciliter les échanges de biens et services

L'analyse historique conforte l'impact positif du développement financier sur la croissance économique. Sylla (2006), étudie le PIB historique par habitant par rapport à la moyenne mondiale à partir du XVI^e siècle et le relie au développement financier de chaque pays. Par exemple, l'Italie au XVI^e siècle avait le PIB par habitant le plus élevé, tandis que les villes-états italiennes ont été les pionnières des technologies financières modernes à l'époque médiévale et de la renaissance. Les Pays-Bas ont connu leur révolution financière au cours des XVI^e et XVII^e siècles et leur PIB par habitant a dominé le monde au XVII^e siècle. La révolution financière anglaise a commencé en 1688 et a duré jusqu'au milieu du XVIII^e siècle, juste avant la révolution industrielle. La même tendance est observée pour les États-Unis, la France, l'Allemagne et le Japon où les données historiques suggèrent que le développement financier a conduit à une meilleure performance économique et non l'inverse.

La théorie économique met aussi en avant que le développement des marchés

financiers favorise la croissance. Saint-Paul (1992), développe un cadre théorique pour analyser l'interaction entre les marchés financiers et le choix technologique. Ses résultats mettent en avant la nécessité de l'intervention du gouvernement pour encourager le développement du secteur financier. Selon Saint-Paul (1992), les retombées positives du secteur financier vers l'économie proviennent d'une meilleure diversification des risques, laquelle permet aux agents d'investir dans des projets plus risqués, plus novateurs et plus productifs. Ainsi, un secteur financier développé conduit à une croissance plus élevée.

Les études empiriques qui analysent la relation entre les marchés financier et la croissance trouvent cependant des résultats contradictoires. Levine et al. (2000) constatent une relation causale positive du développement financier sur la croissance dans 71 pays étudiés au cours de la période 1961-1995. Rajan and Zingales (1998) trouvent également la relation causale positive et excluent la causalité inverse.

De nombreuses études ont mis en avant des résultats plus contrastés et ce particulièrement durant la crise financière de 2008-2009. Rousseau and Wachtel (2002) montrent que la finance n'a aucun effet sur la croissance dans les pays où l'inflation est à deux chiffres ; Demetriades and Hook Law (2006) examinent 72 pays sur la période de 1978 à 2000 et constatent que le développement financier n'affecte pas la croissance dans les pays à institutions défaillantes. De Gregorio and Guidotti (1995) est l'une des premières études qui constatent que la relation finance-croissance peut être spécifique. Ils montrent que dans ans pays développés, la profondeur financière est positivement corrélée avec la croissance (au cours de la période 1960-1985), alors que, lorsqu'ils se concentrent sur un panel de 12 pays d'Amérique latine, ils trouvent plutôt une corrélation négative entre la profondeur financière et la croissance. Rousseau and Wachtel (2011) montrent que la corrélation positive entre la finance et la croissance constatée dans les études précédentes n'est pas robuste lorsque des données plus récentes sont appliquées. Arcand et al. (2015) constatent que l'effet marginal du développement financier sur la croissance du PIB devient négatif lorsque le

crédit au secteur privé dépasse 100% du PIB.

La littérature empirique se concentre sur la profondeur financière et utilise presque toujours le “crédit au secteur privé”, comme la mesure de la taille du secteur financier, ce qui ne correspond pas nécessairement aux canaux théoriques par lesquels la finance devrait affecter la croissance économique, c’est pourquoi la nouvelle littérature sur la finance et la croissance explore des mesures alternatives du développement financier Laeven et al. (2015) introduisent l’innovation financière dans un modèle de croissance schumpétérien traditionnel et concluent que l’innovation financière est un moteur de croissance économique. Beck et al. (2014) utilisent la mesure traditionnelle de l’intermédiation financière (le logarithme du “crédit au secteur privé”) avec un nouvel indicateur de la taille du système financier calculé comme la part de la valeur ajoutée du système financier dans le PIB et constatent que la taille du secteur financier n’est plus statistiquement significative. Ils concluent qu’une expansion du secteur financier n’a pas d’effet à long terme sur la croissance. Cependant, à court terme, un secteur financier développé stimule la croissance au prix d’une plus grande volatilité dans l’économie.

Certaines études vont encore plus loin et affirment que le développement financier a un impact négatif sur l’économie réelle par une mauvaise allocation des ressources, Bolton et al. (2016), Tobin (1984) et Kneer (2013) suggèrent que les salaires élevés dans le secteur financier peuvent en effet avoir des retombées négatives sur les entreprises non financières, car une plus grande absorption des talents dans le secteur financier a un effet négatif sur la productivité dans des industries qui, pour des raisons technologiques, dépendent de la main-d’œuvre qualifiée.

La théorie économique souligne l’importance du développement du secteur financier sur la croissance. A partir d’un certain niveau de développement, l’impact peut être neutre ou négatif, et ce particulièrement dans les pays développés. Dans le cadre des pays en développement, de nombreux auteurs mettent en avant l’impact positif du développement des marchés sur la croissance économique. Les institu-

tions internationales recommandent la promotion du secteur financier dans les zones en développement. Il en est ainsi du Fonds Monétaire International (FMI) et de la Banque mondiale. Selon le FMI, Creane et al. (2006) "Afin de promouvoir une croissance rapide dans les pays MENA, la réforme du secteur financier doit être une priorité dans l'agenda des gouvernements".¹

L'objectif principal de cette thèse est d'analyser l'influence du secteur financier sur la croissance économique dans la région MENA. La thèse cherche donc à répondre aux questions suivantes : Les marchés financiers de la région MENA contribuent-ils au développement économique ? Comment la structure démographique peut-elle influencer cette relation ? Que révèlent les séries chronologiques à long terme sur cette relation et pourquoi ? Quelle est la meilleure façon de mesurer le développement du secteur financier pour les pays de la région ? En quoi les pays de la région diffèrent-ils en termes de développement financier ?

Le développement financier de la région s'accompagne d'une meilleure intégration régionale et internationale des marchés. Ces améliorations s'inscrivent dans le cadre du lancement d'un processus de rapprochement économique avec la création du Conseil de coopération du Golfe (CCG) en 1981, la signature du Traité instituant l'Union du Maghreb arabe (UMA) en 1989, la création de La Grande zone arabe de libre-échange (GZALE) sous l'égide de la Ligue arabe depuis 2005 et la signature de plusieurs accords de coopération et de partenariat entre les pays de la région ou entre eux et le monde occidental, y compris l'Union européenne. Ces intégrations restent différentes selon les pays de la région.

La thèse commence par un état des lieux de la situation économique et financière de la région. Un modèle théorique est développé et simulé pour quantifier l'impact de l'amélioration de l'efficacité du secteur financier sur la croissance et le chômage. Une analyse empirique est ensuite menée afin de tester les résultats théoriques obtenus. Un indice de développement du secteur financier est créé pour procéder à une

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évaluation plus approfondie de l'évolution des marchés financiers et des institutions financières dans les pays de la région.

Actuellement, la plupart des pays de la région MENA subissent des tensions démographiques, dans un contexte macroéconomique défavorable (taux de chômage des jeunes très élevé), ce qui est considéré par différents experts comme une des sources principales d'instabilité politique. La plupart des décideurs politiques de la région estiment qu'une croissance économique plus forte est un élément crucial de toute stratégie visant à lutter contre les taux de chômage toujours élevés dans la région.

Plusieurs pays de la région ont réalisé de nombreuses réformes structurelles dans le secteur bancaire et financier au cours de ces deux dernières décennies. Les marchés financiers de la région ont connu une croissance relativement importante. En particulier, la profondeur et la liquidité des marchés ont fortement augmenté en raison de la vague de privatisation dans le secteur industriel et manufacturier qui a débuté au début des années 90. Ce processus a contribué à l'expansion de la capitalisation boursière totale régionale, multipliée par 9 entre 1993 et 2011. Parallèlement, le nombre de sociétés cotées a augmenté d'environ 60% entre 1993 et 2002.

Le taux de rotation des échanges des actifs financiers est passé de 34% en moyenne dans les années 1990 à plus de 74% dans les années 2000. Pourtant, la taille relative des systèmes financiers locaux par rapport aux économies nationales reste faible. Ainsi, la capitalisation boursière totale de la région atteint 64% du PIB contre une moyenne de 72% dans les pays à revenu intermédiaire, la moyenne mondiale étant de 88%. De même, le ratio de la valeur des transactions boursières par rapport au PIB est de 31% dans la région MENA contre 68% pour les pays à revenu moyen et 106% de la moyenne mondiale. Le développement des marchés de la région MENA reste limité par la domination des banques commerciales, caractéristique commune aux pays de la région.

L'amélioration des performances du système financier dans la région est indis-

pensable à la croissance. Le développement des marchés est nécessaire dans les économies de la région dominée par une forte proportion de jeunes dans la population active. Au cours des prochaines années, selon les estimations des Nations Unies, près de 4 millions de personnes entreront sur le marché du travail de la région. La région MENA se distingue par des taux de chômage très élevés et ce particulièrement pour les jeunes relativement bien éduqués, sans expérience, situés dans les zones urbaines. Le chômage des jeunes (âgés de 15 à 24 ans) atteint 40% en Tunisie, Jordanie, Egypte, Algérie et Iran. Dans la région, l'éducation n'est pas une garantie contre le chômage. Il est aussi observé que le chômage est plus élevé pour les jeunes les plus éduqués. D'après les travaux du FMI sur la région, les pays importateurs de pétrole de la région ont le taux de chômage des jeunes le plus élevé au monde. De nombreux spécialistes le considèrent comme l'une des principales causes des révoltes connu sous le nom de "Printemps arabe".

Les modèles mobilisés en économie montrent en général que les rendements d'équilibre des actifs financiers varieront en fonction de l'évolution de la structure par âge de la population. Néanmoins, il est délicat de démontrer ce résultats empiriquement. L'impact de la démographie sur l'économie réelle ne doit pas être négligé. En effet, le vieillissement de la population peut influencer les marchés financiers dans le mesure où le comportement d'épargne des agents économiques évolue au cours de cycle de vie. Les modèles du cycle de vie montrent une relation positive entre les flux sortants des marchés boursiers et la part des personnes âgées (65 ans et plus). Aussi, une relation négative entre les flux sortants et la part des individus âgés de 45 à 64 ans. Selon Bloom and Canning (2004) depuis le début des années 1980, la littérature a mis en avant l'indépendance de la démographie sur la croissance économique. Les auteurs ont par la suite souligné que les besoins et la contribution des individus à l'économie varient tout au long de leur cycle de vie, ainsi la structure démographique de l'économie et plus précisément la structure par âge jouent un rôle central dans la croissance économique. Favero et al. (2011) et Favero et al.

(2015), emploient des données américaines et fournissent des preuves empiriques de l'importance d'inclure la structure par âge de la population dans les modèles macro-financiers. Liao (2011) souligne l'importance de la transition démographique en tant que moteur de la croissance et montre que plus d'un tiers de la croissance de PIB à Taïwan au cours des quatre dernières décennies peut être attribué à la transition démographique. Boucekkine et al. (2002), étudient l'impact d'une amélioration de l'espérance de vie sur la croissance et concluent que, même si des probabilités de survie plus élevées conduisent à une meilleure scolarisation et à une retraite plus tardive, elles ne conduisent pas nécessairement à une croissance économique plus élevée. D'Albis (2007) détermine l'impact d'un changement démographique sur le capital par tête et conclut que cette relation est plutôt non monotone, contrairement aux modèles classiques à générations imbriquées qui établissent une relation décroissante entre l'accumulation de capital et la structure par âge. Martins et al. (2005) étudient l'impact du vieillissement dans les pays de l'OCDE, et impliquent que le changement de la structure par âge de la population affecte l'offre sur les marchés des capitaux, les marchés du travail et aussi la productivité ; ils concluent que la structure démographique a un impact réel sur les taux de croissance du PIB.

Littérature théoriques traitant des marchés financiers et de la démographie, souvent, étudie l'effet du changement démographique sur les prix des actifs. Un cadre commun est celui des modèle à générations imbriquées (OLG) qui nous permet d'étudier la dynamique d'accumulation de capital. Geanakoplos et al. (2004) montre que les changements démographiques pourraient avoir un impact sur le prix des actifs ; Abel (2003) montre que le baby-boom finira par introduite une baisse dans les prix des actions quand la génération actuelle du baby-boom prendra sa retraite. La relation entre l'évolution démographique et les pris des actifs financiers repose ainsi sur l'hypothèse du cycle de vie, qui suggère que les jeunes (de 20 à 39 ans) sont probablement des emprunteurs. Ainsi, les prix des actifs financiers diminueraient ou ne seraient pas affectés à mesure que la proportion de ce groupe d'âge augmente

dans la population total. Le groupe à l'âge moyen (40-64 ans) joue un rôle important dans l'accumulation du capital et demande des actifs. Cela s'explique par le fait que leur revenu est le plus élevé et qu'ils épargneront probablement pour leur période de retraite. Une augmentation relative de la taille de ce groupe entraînerait une forte demande d'actifs financiers, par exemple des actions et des obligations, ce qui entraînerait une hausse des prix des actifs financiers. Hors, quand cette génération prend sa retraite (65 ans et plus), ils commencent à réduire leur richesse. Par conséquent, les prix des actifs financiers pourraient subir des pressions à la baisse.

Les chapitres de cette thèse sont les suivants. Le premier chapitre présente un aperçu général de la région, en mettant l'accent sur les perspectives économiques, démographiques et financières de la région. Dans le deuxième chapitre, nous présentons un modèle à générations imbriquées, qui lie la croissance économique, les marchés financiers et la démographie. Le modèle est simulé pour trois pays de la région présentant des tendances démographiques différentes et les résultats montrent qu'un secteur financier plus efficace conduit à une meilleure performance économique et à des taux d'emploi plus élevés, notamment pour les jeunes. Le troisième chapitre teste empiriquement l'influence du secteur financier sur le secteur réel et trouve un impact négatif du développement du secteur financier sur la croissance économique. Ces résultats mettent en évidence l'inefficacité du secteur financier dans la région, étant donné qu'un développement plus élevé du secteur financier ne parvient pas à transmettre le capital à son utilisation la plus productive et à contribuer à la croissance. Cette étude souligne la nécessité de réformer le secteur pour le rendre plus efficace. Le quatrième chapitre est consacré au développement d'un indice financier dédié aux pays de la région qui regroupe les différents aspects du développement financier. L'indice est non seulement limité à la taille, à l'accès et à l'efficacité des marchés financiers et des institutions financières, mais il tient également compte de l'environnement macroéconomique du pays.

General Introduction

The Middle East and North Africa (MENA) is a region with great potential for development yet to be accomplished. Despite the current geopolitical challenges, the countries of the region benefit from a strategic geographical location close Europe, Africa and Asia . The young population is another asset in the region, the fertility rates have dropped strikingly fast in the past decades, unlike any other region in the world making these countries prone to attain the demographic dividend. Although the countries in the region have very different economic structures, some are oil exporters others importers, they all show great potential in sectors such as renewable energies, manufacturing, tourism and business development services.

In recent decades, MENA countries have implemented reforms to increase economic openness, diversification and private sector development. These reforms encouraged investment, trade and economic growth; but they were also incomplete and did not fully address broader economic and social issues. More comprehensive reforms are needed to adopt inclusive and sustainable development models that offer better opportunities for all, especially for the youth and for women. There is still high demand from the society for effective changes. Meanwhile the region faces continuous challenges, it suffers from extremely high unemployment rates for youth. Among the external shocks, the persistent fall in the oil prices hits hard the economy of MENA oil-exporting. More importantly, conflicts and refugee crisis in the region is a source of uncertainty and put pressure on all the region highlighting the need to regain stability, initiate reconstruction and provide opportunities for immigrants.

The economic theory is often in favor of the positive impact of the financial sector on growth. Hence, many believe that one key solution to partially overcome these challenges is to promote the financial sector, and policies in this direction are frequently recommended specially by international institutions such as the International Monetary Fund and the World Bank. For instance, Creane et al. (2006) argue : “ As countries in the Middle East and North Africa consider ways to promote rapid and lasting economic growth, further financial sector reforms should be high in their agenda.”

The main goal of this thesis is to analyze this commonly held view point, that is, to examine whether there is a significant positive influence of the financial sector on economic growth in the region. The thesis seeks to answer the following questions : Do the financial markets in the MENA region contribute to economic development ? How can an evolving demographic structure affect this relationship ? What do long-term time series, reveal regarding this relationship and why ? As we take into account the specificities of the region, what is the best way to measure the financial sector development ? How do the countries in the region differ in terms of financial development ?

The financial development of the region is accompanied by improvements in regional and international market integration. These improvements are in line with the launch of an economic rapprochement process with the creation of the Gulf Cooperation Council (GCC) in 1981, the signing of the Treaty Establishing the Arab Maghreb Union (AMU) in 1989, the establishment of the Arab Free Trade Area (AFTA) under the auspices of the Arab League and the signing of several agreements of cooperation and partnership between the countries of the region themselves or between them and the Western world, including the European Union. This integration remains uneven across different countries of the region.

The thesis , initially gives an overview of the region’s economic and financial status. A theoretical model is introduced and simulated to quantify the impact of

the financial sector efficiency improvement on growth and unemployment, followed by an empirical approach and a deeper look into the available data to test these theoretical findings. An index for the financial sector development is introduced in the last chapter in order to better assess the development of the financial markets and institutions in the countries of the region.

Currently, most MENA countries are enduring demographic tensions leading to very high youth unemployment which is argued to be a source political instability. Most policymakers in the region agree that stronger economic growth is a crucial component of any strategy to address the region's persistently high levels of unemployment and raises its living standards.

The region has been the subject of many structural reforms in the banking and financial sector during the past two decades. In fact, financial markets in the region have grown relatively large, and in particular, depth and liquidity of the market have risen sharply due to the wave of privatization that began touching the industrial and manufacturing sector in the first half of the 90s. This process has contributed to the expansion of the regional total market capitalization, multiplying it by 9, between 1993 and 2011. In parallel, the number of listed companies increased by about 60% between 1993 and 2002. The turnover ratio has also doubled from 34% on average in the 1990s to more than 74% during the 2000s. Yet, the relative size of local financial systems compared to domestic economies remains small. Thus, the total market capitalization of the region relative to its GDP did not exceed 64% against an average of 72% in middle-income countries and a worldwide average of 88%. Similarly, the ratio of the value of stock transactions to GDP was as low as 31% in MENA compared to 68% and 106% for the average middle-income countries and the whole planet. Actually, development of MENA markets remain constrained by the domination of commercial banks, a common characteristic of the countries of the region.

An improvement of the performance of financial system in the region is crucially

needed in order to enable financial development to be growth stimulator, which is essential in the region regarding its demographic trends and over-representation of young people in the labor force. Over the next few years there would be an estimated 4 million people entering the region's labor markets. Yet the MENA region has already one of the highest unemployment rates in the developing world; and MENA unemployed are predominantly young, relatively educated but not skilled workers, primarily located in urban areas. The share of youth (ages 15 to 24) in total unemployment at least doubles the total rate and they represent more than 40% of unemployed in Tunisia, Jordan, Egypt, Algeria and Iran. Unusually, education in this region is not a guarantee against unemployment. In fact, unemployment tends to increase with schooling, exceeding 15% for those with tertiary education in Egypt, Jordan and Tunisia. According to IMF notes on the region, MENA oil importer countries have the highest regional youth unemployment rate in the world, and many debaters regard it as a leading initiator of Arab revolts, so addressing high unemployment is a long-standing but increasingly urgent challenge for MENA countries. Thus, if developed financial markets can improve job market opportunities it can be used to enhance political stability.

The evolution of financial markets is relevant to a number of disciplines such as development economics, political science and demographics. Theoretical models generally suggest that equilibrium returns on financial assets will vary in response to changes in population age structure. Nevertheless, it is not easy to find robust evidence of such relationships in the time series data. Basically, baby boomer's aging can affect financial markets in their middle ages, when they increase their savings, and also when they are retired and their asset accumulation tends to decline.

Therefore, while development in the financial sector can encourage economic growth, one should not neglect the impact of demographics in the real economy. Life cycle models predict a positive relationship between stock market outflows and the fraction of old people (65 and above), and similarly a negative relationship

between the outflows and fractions of the middle-aged population (45 to 64). Bloom and Canning (2004) argue that since the early 1980s the dominant academic belief was that the population growth is rather neutral to economic growth. However, the emerging evidence indicates that since people's needs and contributions to the economy vary over their life cycle; population does matter to growth, with age structure playing a central role. Favero et al. (2011) and Favero et al. (2015), based on US data provide empirical evidence to put forward the importance of including the age structure of the population in the macro-finance models. Liao (2011) highlights the importance of demographic transition as a driver for growth and show that more than one third of the output growth in Taiwan during the past four decades can be attributed to demographic transition. Boucekkine et al. (2002), study the impact of an improvement in life expectancy on growth and conclude that although higher survival probabilities lead to better schooling and later retirement, it does not necessarily lead to higher economic growth. D'Albis (2007), determines the impact of a demographic change on per capita capital and finds that this relationship is rather non-monotonic, in contrary to the classical OLG models that find a strictly decreasing relationship between capital accumulation and age structure. Martins et al. (2005) study the impact of aging in OECD economies, and imply the change in age structure of the population affects supply side of the economy in capital markets, labor markets and also the productivity; they conclude that demographic structure has a real impact on GDP growth rates.

Theoretical papers dealing with financial markets and demography, investigate the effect of a demographic change on asset prices. A common framework is Overlapping Generations (OLG) with production and capital accumulation. Geanakoplos et al. (2004) show that demographic changes could impact asset prices; Abel (2003) shows that baby boom will eventually lead to a meltdown in stock prices as the current baby boom generation retires. The intuition behind the link between changing demographics and financial asset prices is the life cycle hypothesis, which suggests

young people (aged 20-39) are likely to be net borrowers. Thus financial asset prices would decline or be unaffected as the age group increases. The middle-aged (aged 40-64) are involved heavily in accumulation of net assets. This is because they are at the peak of their earnings potential, and likely to be saving for retirement. A relative increase in the size of this group would lead to a high demand for financial assets, e.g. stocks and bonds, resulting to an increase in financial asset prices. As the age group enters retirement (aged 65+), they start to de-cumulate their wealth. As a result, financial asset prices could come under downward pressure.

The outline of this thesis is as follows. The first chapter presents a general overview of the region, with a focus on economic, demographic and financial market outlook of the region. In the second chapter an overlapping generation model is presented, which, links economic growth, financial markets and demography. The model is simulated for three countries in the region with very different demographic trends and the results show that a more efficient financial sector leads to better economic performance and higher employment rates, furthermore, youth are the primary beneficiaries of the reform in the financial sector. The third chapter tests empirically the spillovers from the financial sector to the real sector and finds a negative impact of financial sector development on growth these results highlight the inefficiency of the financial sector in the region, as higher development of the financial sector fails to transmit the capital to its most productive use and contribute to growth. This study underlines the urgent need to reform the sector in ways not to just increase the size of the sector but also its efficiency. The financial sectors are developing and evolving all around the world, this development is accompanied with further deepening of the sector and financial innovation, which adds to the complexity of it, the once commonly used measures of financial development fall short to capture all these aspects, this stress the need to develop comprehensive indices that include different aspects of the financial sector. The fourth chapter is dedicated to the development of a financial index dedicated to the countries of the region that regroups different

aspects of financial development. The index is not only limited to size access and efficiency of the financial markets and institution, it also takes into account the macroeconomic environment of the country.

Chapitre 1

A Global overview of the MENA region

Résumé

Ce chapitre présente une vue d'ensemble de la région MENA, en mettant l'accent sur trois aspects principaux : économique, démographique et financier. Cette vue d'ensemble est essentielle pour comprendre le contexte de cette thèse, et pour mettre en lumière les défis actuels et futurs auxquels les pays de la région devront faire face.

Dans ce chapitre, nous identifions les caractéristiques spécifiques de la région MENA en examinant ses perspectives économiques, démographiques et l'évolution des marchés financiers. En général, l'activité économique est affaiblie par des conflits continus et la baisse significative du cours du pétrole initiée en 2014. La région est l'une des régions les plus jeunes de la planète, mais ce dividende démographique est aussi l'un des plus grands défis auquel la région devra faire face, car les taux de chômage des jeunes sont extrêmement élevés.

Les marchés financiers sont sous-développés et essentiellement dominés par les banques. L'évolution des marchés boursiers varie considérablement d'un pays à l'autre. Au cours des dernières années, nous observons un développement rapide

et hétérogène du système bancaire au sein des pays de la région. Entre-temps, la taille des autres investisseurs institutionnels, tels que les fonds de pension, des sociétés d'assurance etc, reste faible. La population de ces pays est jeune et relativement bien éduquée. Le taux de chômage élevé de la région touche principalement les jeunes et les femmes.

En conclusion, la principale source de financement de la région reste le secteur bancaire. En outre, la croissance observée sur les marchés financiers telle que la bourse est importante mais reste hétérogène.

1 Introduction

This chapter gives a general overview of the MENA region, with a focus on the economic, demographic and financial outlook of the different countries in the region. This overview is essential to comprehend the context of this thesis, more importantly, to highlight the key challenges MENA countries are currently facing and the ones they will face in the years to come.

In a first step, we need to define which countries are included in the MENA region, different authors may include or exclude specific countries in MENA. Some of these definitions of MENA are detailed in Appendix 1.A, all along different classifications within the region. In this chapter we majorly use the World Bank's definition of MENA, and only exclude two small countries, namely, Djibouti and Malta since the data is widely missing for them. Hence, in our definition of MENA we include : *Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, West Bank and Gaza, and Yemen.*

In this overview, firstly, we focus on the economic perspective of these countries ; specifically we study economic growth, inflation control and employment that are three major elements of economic policy. Boosting growth is one of the key policy

priorities in every county of the planet. In MENA, growth prospects severely challenged in oil-exporting countries with the abrupt and persistent fall in the oil prices since the mid-2014. For MENA oil importers, even though the low oil price is a blessing, deepening conflicts and security disruption are the main barriers against high durable growth.

Secondly, we highlight the current demographic tensions in the region, notably overrepresentation of the youth in the population, causing MENA to be one of the youngest regions in the world, with more than 28% of the population aging between 15 to 29 (see Roudi-Fahimi and Kent (2007), Devlin (2010) and Dhillon et al. (2009)). This implies an increasing number of job seekers entering the labor market, that will exert pressure on the region's labor markets for years to come. Some argue that the critically high unemployment rates specially among the youth is one of the triggers for the social tensions in the past couple of years known as the Arab spring.

Lastly, we overview the financial sector in the region following the framework introduced by Čihák et al. (2012), we divide the financial sector in financial markets and institution and study the size, access and efficiency within each aspect in past decades.

2 The economic perspective

The economic perspective of the region is largely dominated by geopolitical issues and oil price. Conflicts in Iraq, Libya, Syria, and Yemen are rising uncertainty and deteriorate confidence and present significant downside risks on the economic outlook of the region.

The drastic fall in oil prices in the second half of 2014, had a direct impact on the economic activity in the oil-exporting countries of the region, while on the other hand oil importers are benefiting from lower oil prices as well as economic reforms.

The IMF has announced a modest overall growth rate of 2.5 percent for the

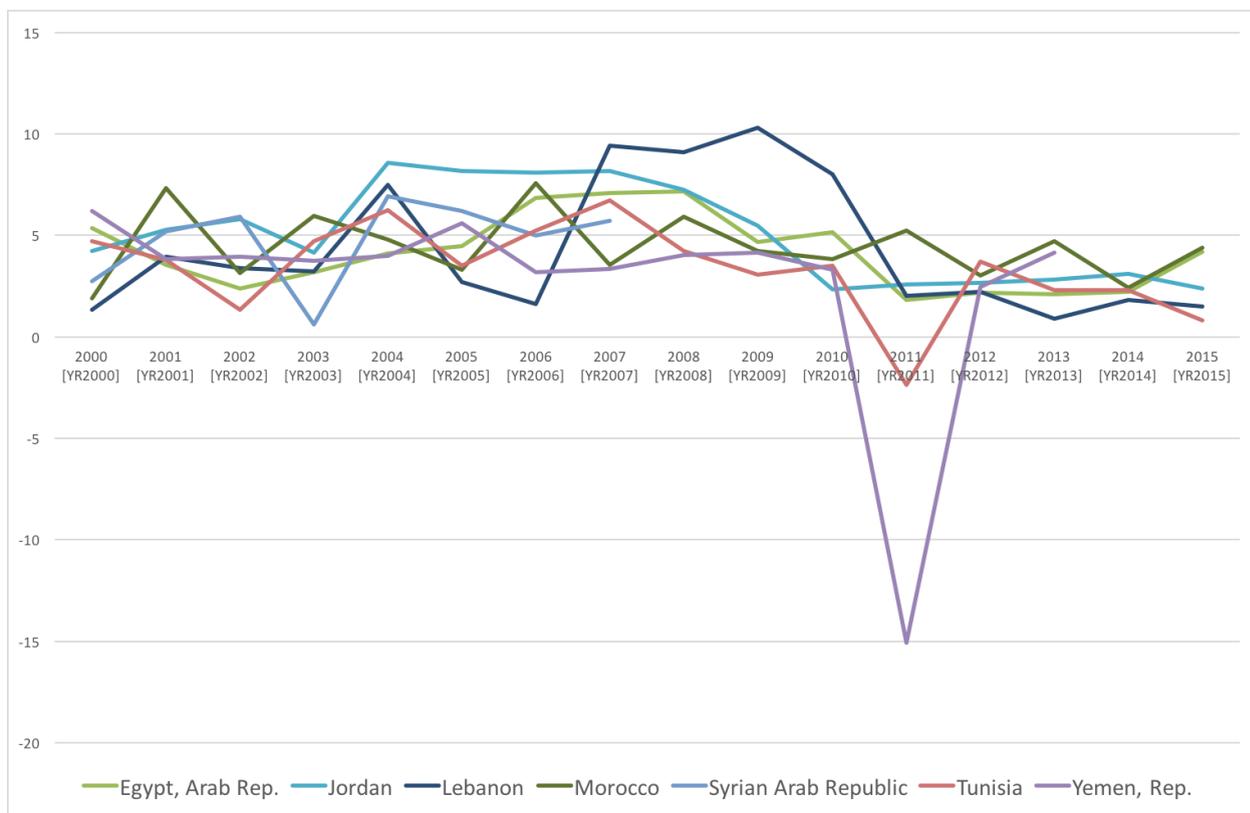
region in 2016, 0.5 percent point lower than its May 2015 projections (see Outlook (2015)).

2.1 Growth

Although most oil-importers in MENA progress towards political stability and enjoy lower oil prices accompanied with an improving economic perspective in the euro area that will encourage investment and exports ; but devastating conflicts in Iraq, Libya, and Syria are also intensifying security and social tensions in neighboring countries, especially Lebanon, worsening in security, social tensions and refugee spillovers have weakened the economic activity. Figure 1.1, demonstrates the modest growth rates for MENA oil importer countries since 2000. For all these countries, growth in 2015 is lower than its value before the 2008 global financial crisis, this is partially due to external risks that have risen since October 2015, and also to more volatile financial conditions, and low interest rates in US and euro area. The GDP per capita level varies largely among the countries in the region, some countries are considered as the “High-income” countries namely, Bahrain Israel, Kuwait, Oman, Qatar and Saudi Arabia while others enter the “Upper middle income” group ; Algeria, Iran, Iraq, Jordan, Lebanon and Libya, and the remaining are considered “Lower middle income”, who are Egypt, Morocco, Syria, Tunisia, West Bank and Gaza and Yemen. Figures 1.B.1 and 1.B.2 in Appendix 1.B , show the GDP level for MENA the oil-exporters and importers, there does not seem to be a catch-up among the MENA countries.

The situation for oil exporters is not any brighter, since mid-2014 the oil prices have dropped nearly 70 percent to about \$40 a barrel. Futures markets anticipate oil prices to recover only modestly to \$50 a barrel by the end of this decade, although much uncertainty surrounds this forecast, the early 2010s prices of \$100 per barrel seems long way off (See Outlook (2015) and Figure 1.2). This weak prospect for oil prices will lead to sluggish global growth, except for Iran, who is recovering from a

FIGURE 1.1 – GDP growth for non-oil exporting countries



Source : World Development Indicators

negative growth rate in the post sanction period by boosting its exports. As is shown in Figure 1.3, in 2015 the growth rates remained moderate and around 3 to 4%, only Kuwait is having a negative growth rate of -0.4%, which is due to an ongoing dispute with Saudi Arabia over shared resources and the fall in the oil production by 1.7 % in 2015 that accounts for two-thirds of the Kuwaiti GDP.

2.2 Inflation

Inflation in MENA countries has been fairly controlled. In 2015, the weighted average consumer price index of the region increased by 3.4% annually. Table 1.1 shows the evolution of the inflation rate in MENA countries since the 70s. Within the MENA region, oil-exporting countries, on average achieved lower inflation in the 1980s reflecting tighter monetary policies and the nominal anchor provided by

FIGURE 1.2 – Crude Oil Prices



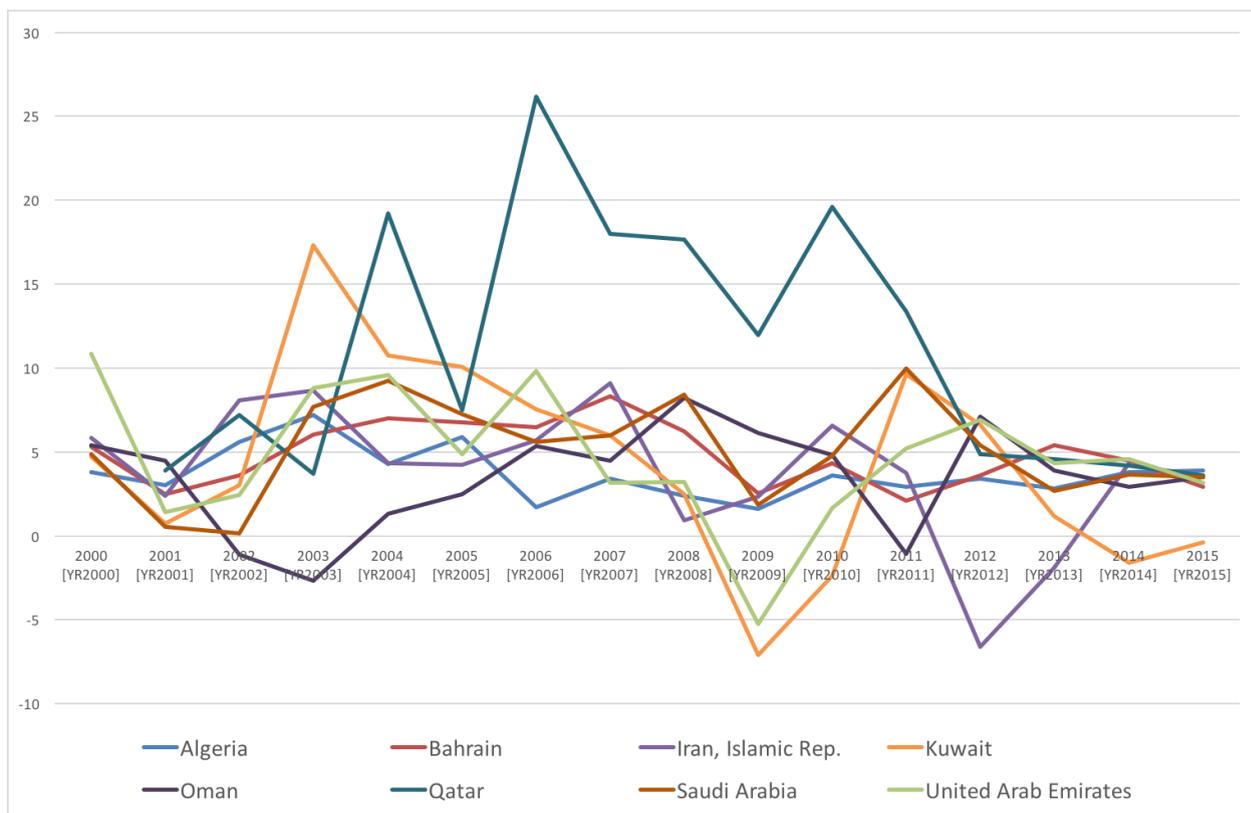
Source : <http://www.macrotrends.net/>

pegging most of these countries' currencies to the U.S. dollar. Nonetheless, since the beginning of the 1990s the inflation rate in oil-exporting countries as a group has been increasing, while this figure in non-oil exporting countries has been declining, ending up with a relatively better inflation performance in the latter group in 1990s.

At the individual country level, most of the MENA countries achieved single-digit inflation since the 1980s, and five countries, namely ; Bahrain, Kuwait, Oman, Qatar, and Saudi Arabia had better inflation performance than that of the average for industrial countries. Egypt significantly reduced inflation in the 1990s by strengthening fiscal and monetary policies. Contrary to Iran enduring the continues burden of inflation on its economy.

During the 2008 financial crisis, inflation rose in the region that got under control by 2009. The main drivers of the decline that began in mid-2014 are lower food and

FIGURE 1.3 – GDP growth for oil exporting countries



Source : World Development Indicators

energy prices, and also currency appreciation against China and Euro, the main import partners of MENA countries.

Inflation rates remain high in Egypt, Yemen and Syria due to deepening conflicts. The situation of Iran is quiet different though, Iran has long been suffering from high price levels and never achieved a one digit inflation rate, this figure took off drastically after 2010, with the implementation of international sanctions, according to official statistics, inflation reached its highest level of 39% in 2013, and is declining ever since with the sanction relief.

2.3 Employment

Labor market in the region is fairly heterogenous, Table 1.2, presents the evolution of the total unemployment rate for MENA countries.

TABLE 1.1 – Mean of the inflation rate per decade

Mean of the inflation rate	1970s	1980s	1990s	2000s	2010-2015
Algeria	8.22	9.03	18.55	3.21	4.71
Bahrain	12.56	2.25	0.79	1.57	2.02
Egypt	7.78	17.36	10.48	7.53	9.72
Iran	10.99	19.82	23.7	15.29	21.38
Jordan	10.81	7.02	5.07	3.86	3.42
Kuwait	8.64	3.58	3.13	3.4	3.58
Lebanon				1.18	1.63
Morocco	7.78	7.58	4.44	1.89	1.17
Oman				2.98	2.08
Qatar		3.81	2.87	5.7	1.57
Saudi Arabia	12.39	0.07	1.29	2.09	3.73
Syria	9.24	22.61	8.15	4.9	15.28
Tunisia			7.58	4.87	2.67

Inflation as measured by the consumer price index (data from WDI)

TABLE 1.2 – Unemployment rate evolution in MENA

Total Unemployment (% of total labor force)	1990s	2000s	2010-2014
Algeria	24.88	18.97	10.06
Bahrain	4.19	4.31	3.78
Egypt, Arab Rep.	9.5	9.84	12.01
Iran, Islamic Rep.	11.95	11.69	13.12
Jordan	15	14.10	12.26
Kuwait	0.8	1.39	3
Lebanon	8.03	8.06	6.23
Morocco	14.37	10.96	9.27
Oman	6.87	7.86	7.4
Qatar	0.41	0.82	0.42
Saudi Arabia	5.74	5.45	5.61
Syrian Arab Republic	8.31	9.76	10.67
Tunisia	15.72	13.92	14.37
United Arab Emirates	2.68	3.24	3.93
MENA	12.64	11.75	11.07

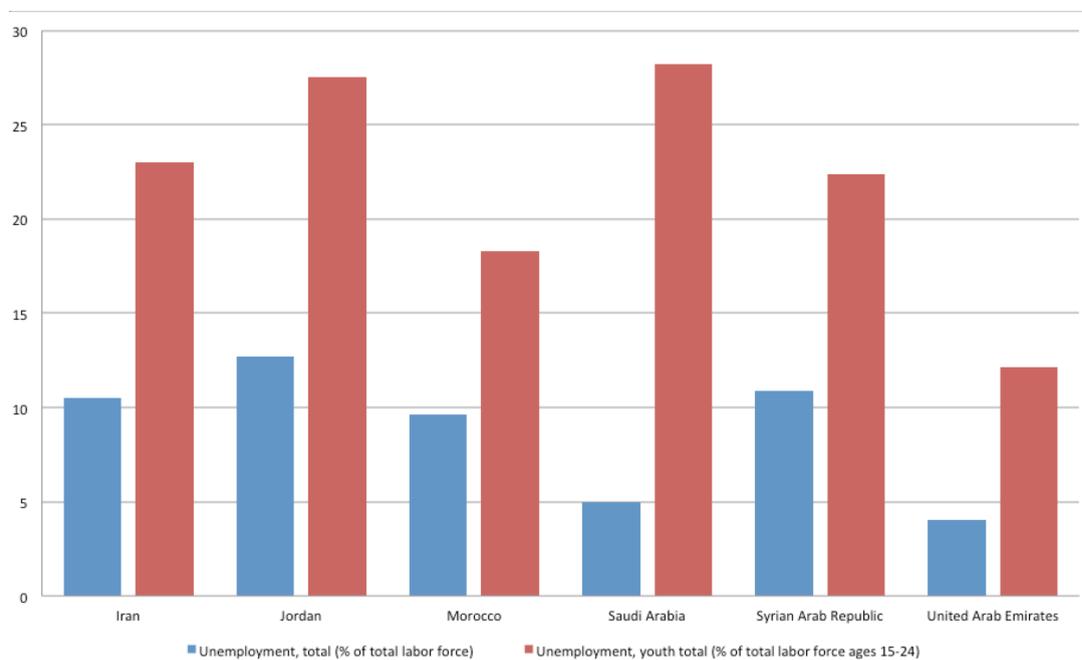
Source : International Labour Organization, Key Indicators of the Labour Market database.

2. THE ECONOMIC PERSPECTIVE

Unemployment in GCC countries¹ is fairly low, these countries are mainly importers of labor force and are rich in natural oil and gas resources. Contrary to the other countries of the region where the unemployment rates are rather high and somehow persistent.

In the region unemployment is a youth phenomenon, and even though the total unemployment rates are not critically high, this figure is nearly tripled for the youth, Figure 1.4 demonstrates this huge gap. Unfortunately youth face difficulties finding a job after entering the labor market and despite their educational achievements. Unemployment rates are naturally higher among the youth in every region of the world, since they have less experience and have been on the market for a shorter period of time, but the gap is not as profound nowhere else on the planet. Hence, creating jobs for the youth is one of the main challenges in the region (see Figure 1.5).

FIGURE 1.4 – Unemployment rates in MENA in 2014 : youth vs. total

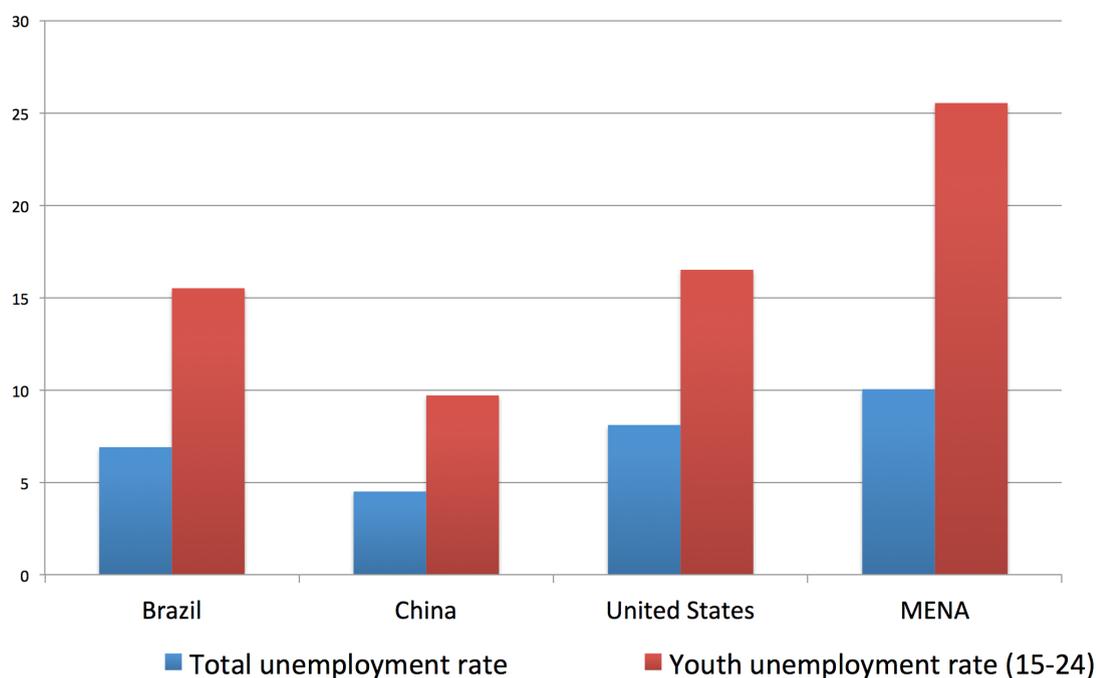


Source of the data : WDI

Youth unemployment refers to the share of the labor force ages 15-24 without work but available for and seeking employment.

1. Gulf Cooperation Council (GCC) is a political and economic alliance of six Middle Eastern countries, namely, Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman.

FIGURE 1.5 – Unemployment rates in different regions of the world

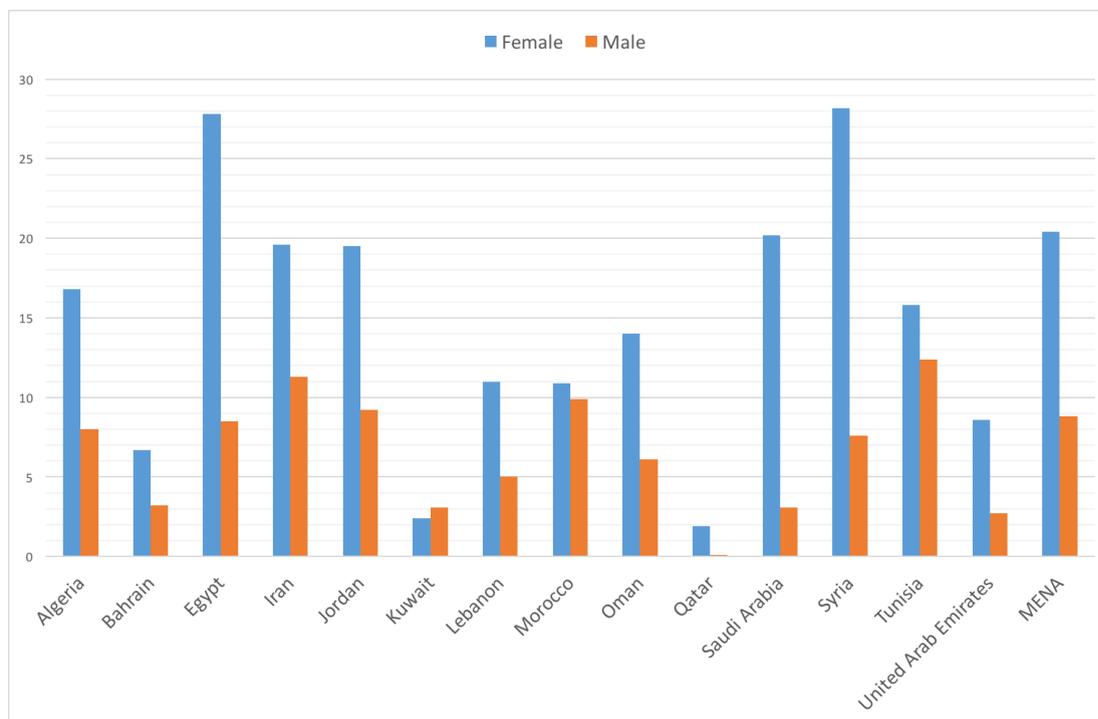


Source of the data : WDI

Dhillon et al. (2009) highlights the problems associated with the youth critically high levels of unemployment, and argue that even in the period of from 2002 to 2008 when the region faced high economic growth, the quality of education was not satisfactory and young population in the region had hard time to find decent jobs. MENA countries are currently having record number of graduates that are job seekers, and this pressure on the labor market are going to persist under the present unfavorable economic situation highlighted by global economic downturn leading to fall in oil prices, exports, remittances and foreign investments.

From a gender point of view, unemployment rates among women are nearly twice as high as those for men, due to growing labor participation rates among women, with a high absorption of female labor force in the public sector. Figure 1.6 highlights this gap.

FIGURE 1.6 – Unemployment rates in 2014 : female vs. male



Source of the data : WDI

3 Conflicts in the region

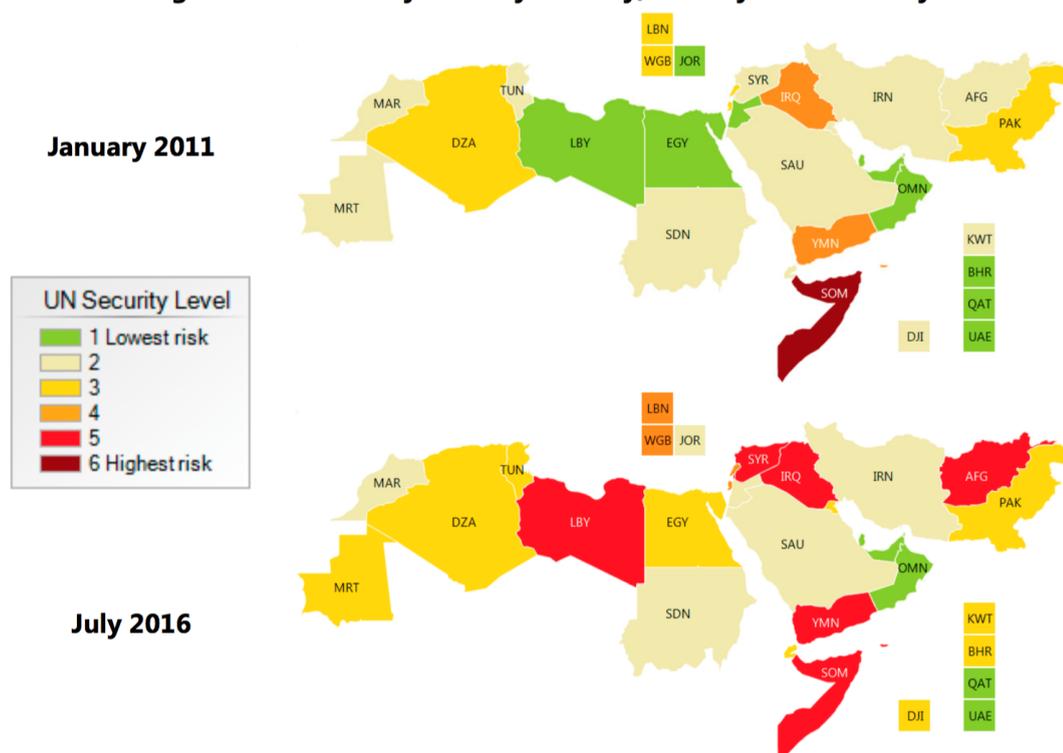
Since about the middle of the last century, the MENA region has experienced more serious and more frequent conflicts than any other region of the world. Figure 1.7 represents this worsening situation.

Conflicts in MENA countries such as Iraq, Libya, Syria, and Yemen have led to massive loss of life, human rights violation and destruction. From an economic perspective these conflicts have caused deep recessions, inflated inflation, worsened budgetary and financial conditions, and damaged institutions. These conflicts have fundamentally changed the physical, economic and social landscape of the region, which looked much more hopeful at the beginning of the Arab Spring just over six years ago. The harmful effects of the conflicts influence the neighboring countries such as other MENA countries and even Europe.

Rother et al. (2016) perform a quantitative analysis for a panel of 179 countries with annual data for the period 1970-2014 and show the impact of conflicts on

FIGURE 1.7 – Outspreading conflicts in the region

Figure 1. UN Security Level by Country, January 2011 and July 2016



Source: IMF Security Services.

Note: Country borders do not necessarily reflect the IMF's official position.

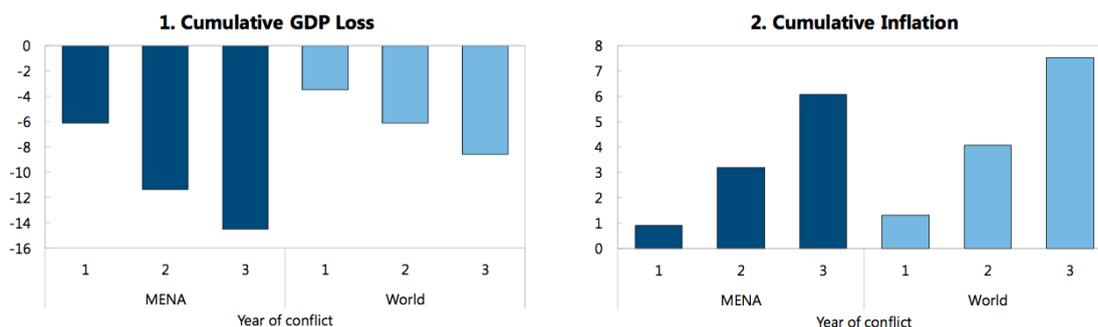
Source : Rother et al. (2016)

growth and inflation are large, on average for MENA Countries during years of conflict face a reduction in GDP growth of 1.5 percentage points ; GDP decrease by 4 percentage points in the first year and inflation increases by 2.3 percentage (Figure 1.8). Moreover, their results show the negative effects increase with the duration of the Conflict

The economic consequences of the conflicts has been disastrous in the domestic level. In 2015, after four years of fighting, the GDP in Syria, was less than half its pre-conflict level in 2010. In 2015 alone, Yemen lost an estimated 25-35 percent of its GDP, while in Libya, where dependence on oil made GDP growth extremely volatile GDP fell 24 percent in 2014 as violence increased. West Bank and Gaza offer a longer-term perspective of what can happen to growth in a fragile situation. The World Bank noted that the economy of the West Bank and the Gaza Strip has

FIGURE 1.8 – Economic impact of conflict

Figure 3. Cumulative Changes in GDP and Inflation by Years of Conflict
(Percentage points of GDP loss and inflation due to conflict)



Sources: Center for Systemic Peace; IMF World Economic Outlook; IMF staff estimates.

Note: Staff estimates of GDP loss and inflation changes due to conflict account for country fixed effects and conflict intensity. The sample period is 1970–2014.

Source : Rother et al. (2016)

virtually stagnated over the past 20 years, during which period almost 250 percent of average growth has been recorded in other MENA countries WB (2015). The strength of these GDP contractions in conflicts is remarkable, as the literature is more nuanced. Studies tend to suggest that the impact of conflicts usually depends heavily on the type, intensity, duration and geographical extent of violence Leeson (2007).

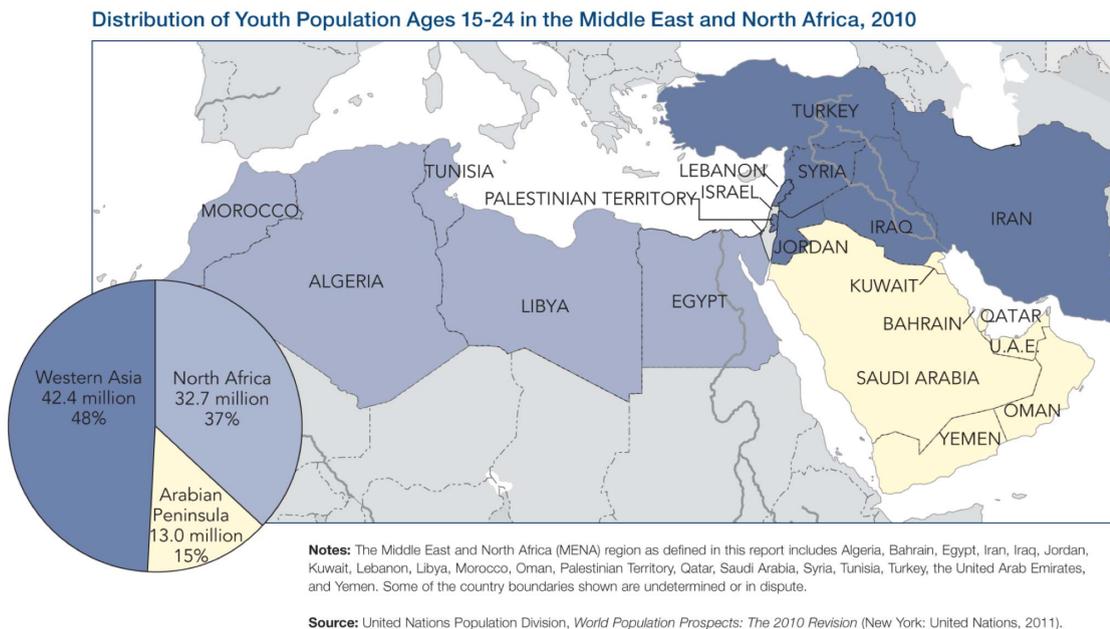
In addition, these conflicts have induced high inflation and burden on exchange rates. In Iraq and Afghanistan, inflation reached more than 30 percent in the mid-2000s and more than 15 percent in Yemen and Libya in 2011, after the supply of critical goods and services collapsed. In Syria, between March 2011 and May 2015, consumer prices raised more than 300 percent. Such inflationary dynamics is usually accompanied by strong devaluation pressure on local currencies. For example, the Syrian Pound has lost 90% percent of its value compared to its pre-war value against the US dollar.

4 The demographic perspective

The MENA region has a vibrant and growing population relative to other developing regions. From 1950 to 2000, the regions population increased by nearly four times, from an estimated 100 million in 1950 to 380 million in 2000 Devlin (2010). This was faster than any other developing region and mostly due to rapid decline in mortality and slow decline in fertility rates.

Many, refer to MENA as the youngest region on the planet, with 90 million individuals being between 15 and 24, or one fifth of its total population in 2010. (see Figure 1.9 and Roudi (2011)). The median age in MENA is 22 years compared to a World average of 28.

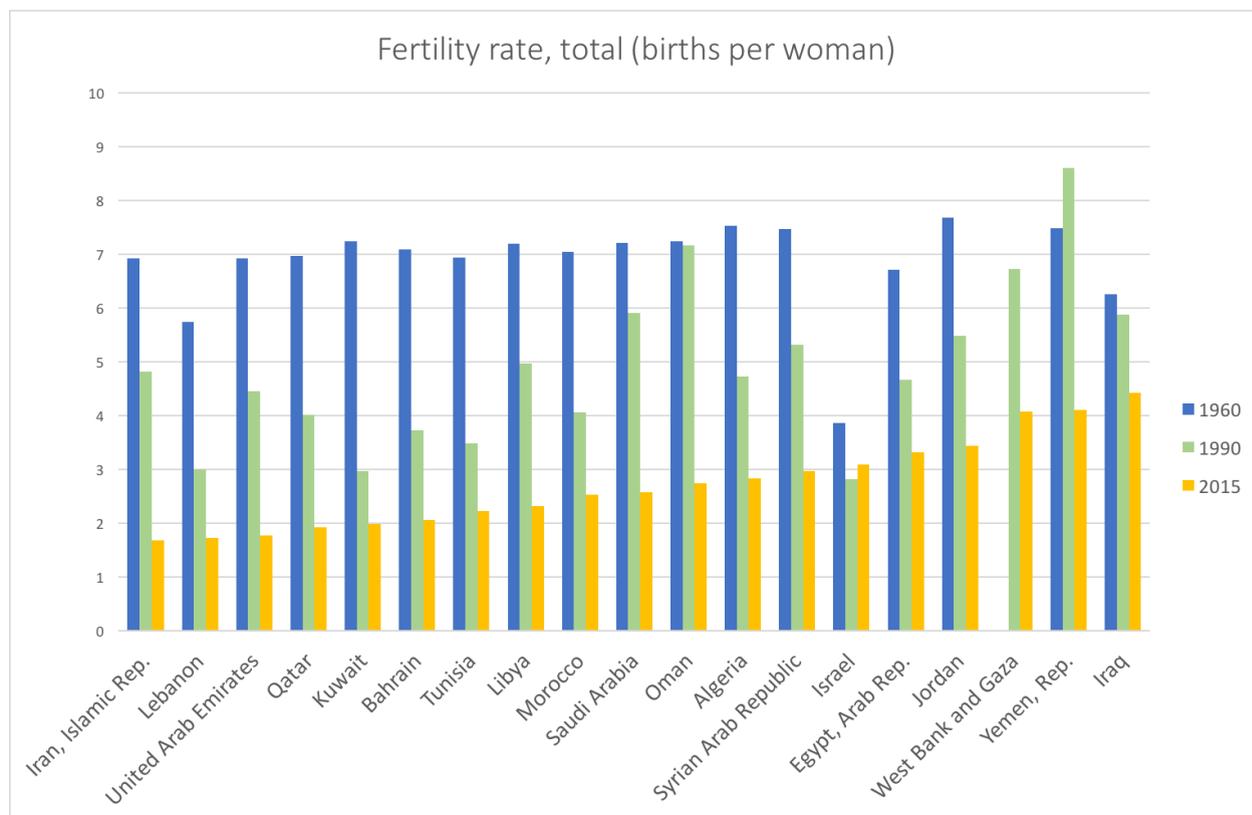
FIGURE 1.9 – Youth population in MENA



Source : Roudi (2011)

Figure 1.10 represents these declines in fertility rates, Iran has the lowest fertility in the region in 2015. According to Assaad and Roudi-Fahimi (2007), the rapidly declining death rates and slowly declining fertility rates lead MENA's population size quadrupled in the last half of the 20th century. Despite recent fertility declines, MENA's population is projected to surpass 700 million by 2050. One consequence

FIGURE 1.10 – Fertility and mortality rates in MENA region



Source of the data : WDI

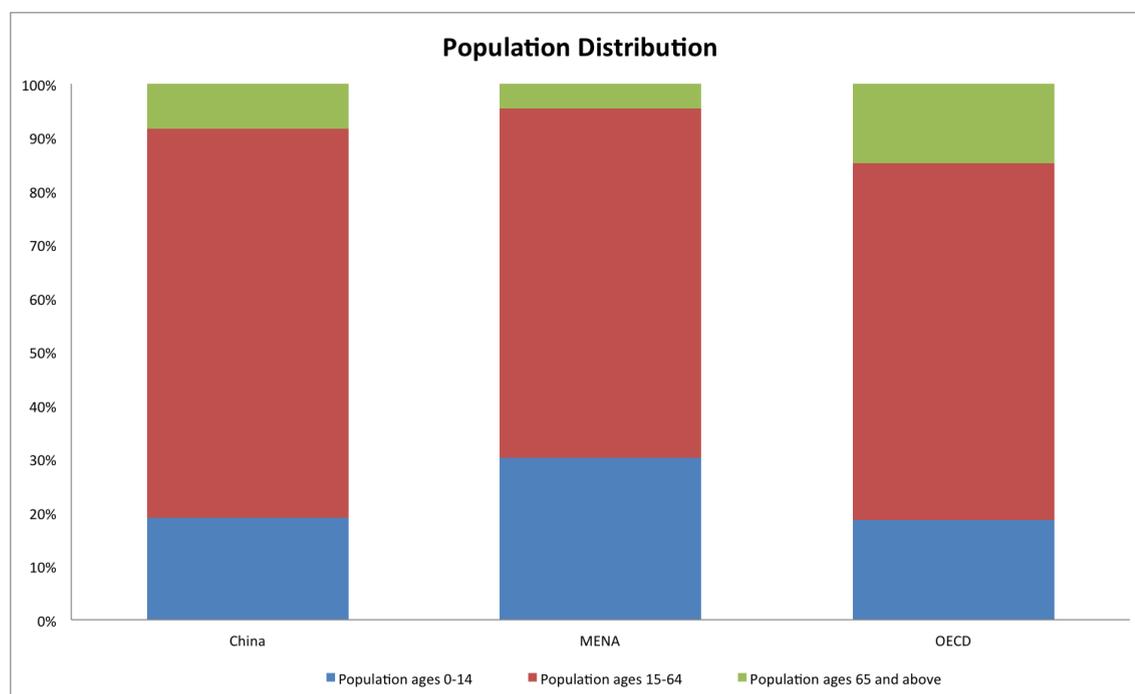
of the region recent demographic trends is an increasingly notable youth bulge. This young population provides momentum for continued population growth in the region, despite declining fertility.

Mainly, we can highlight two distinctive characteristics in population trends of the region, first, relatively high proportion of population under 15, and second, the small proportion of retired (population of age 64 and above). These two factors, lead to low old age-dependency ratio² both, in present and also in upcoming years. For the countries of the region, the next few decades could be the best opportunity to boost their economy before the inevitable aging. (See Figure 1.11)

In the following part we distinguish demographic evolutions in each country of the region, as it is shown in Figure 1.12, the ratio of under 15 to total population

2. Old age dependency ratio, is the ratio of older dependents (people older than 64) to the working-age population—those ages 15-64

FIGURE 1.11 – Population distribution in 2011 for selected regions



Source of the data : WDI

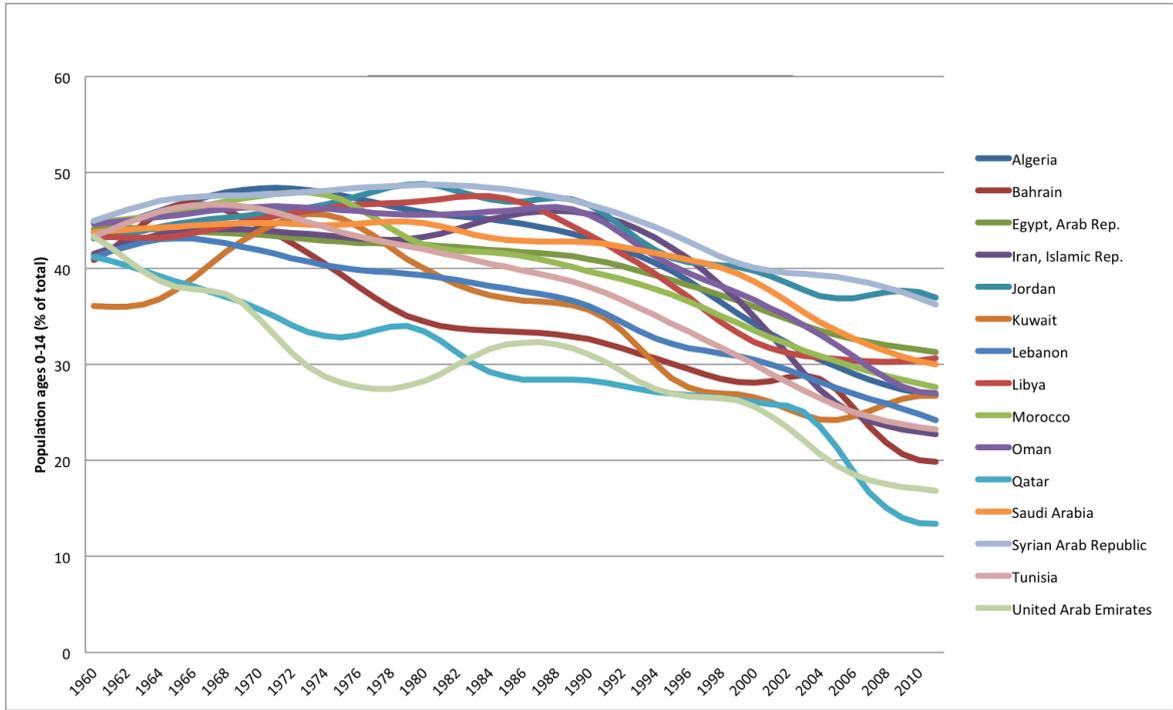
is relatively high, for example in 2011, it is 30.2% in average for MENA region compared to 18.5% for OECD countries. However, this difference is not compensated in a lower share of labor force in total population. As it is shown in Figure 1.13, in 2011, the share of population of age 15 to 64 in total population is around 65% in average for MENA countries which is comparable to 66.53% for OECD countries. Therefore a high ratio of children in the total population lead to a relatively low ratio of retired and elderly. The trend of this ratio is shown in Figure 1.14, which shows, in 2011 the population of age 65 and above represent 4.6% of total population, in average of MENA countries which is relatively low compared to 14.9% in the case of OECD countries.

This positive demographic horizon is an open widow towards better economic performance in the upcoming years.

It is also useful, to take a look at the population pyramids reported in Appendix 1.B, Figures 1.B.3 and 1.B.4, that highlights the diversification in the population structure in the countries of the region. The striking asymmetry between in the

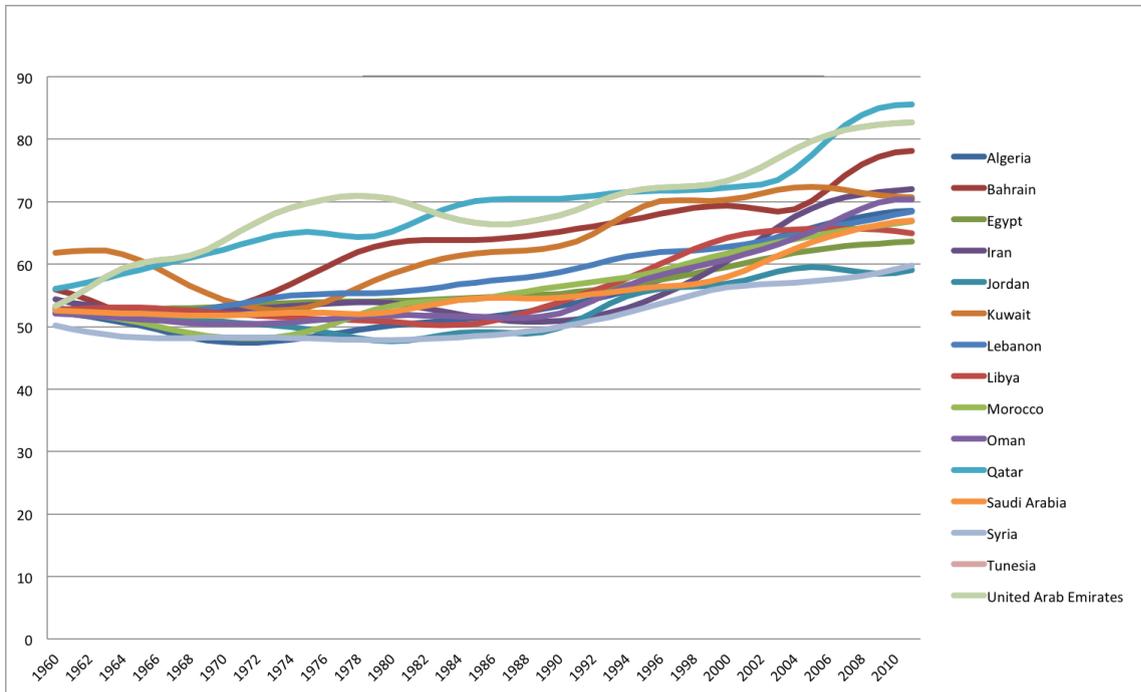
4. THE DEMOGRAPHIC PERSPECTIVE

FIGURE 1.12 – Population under 15 in MENA region (in % of total population)



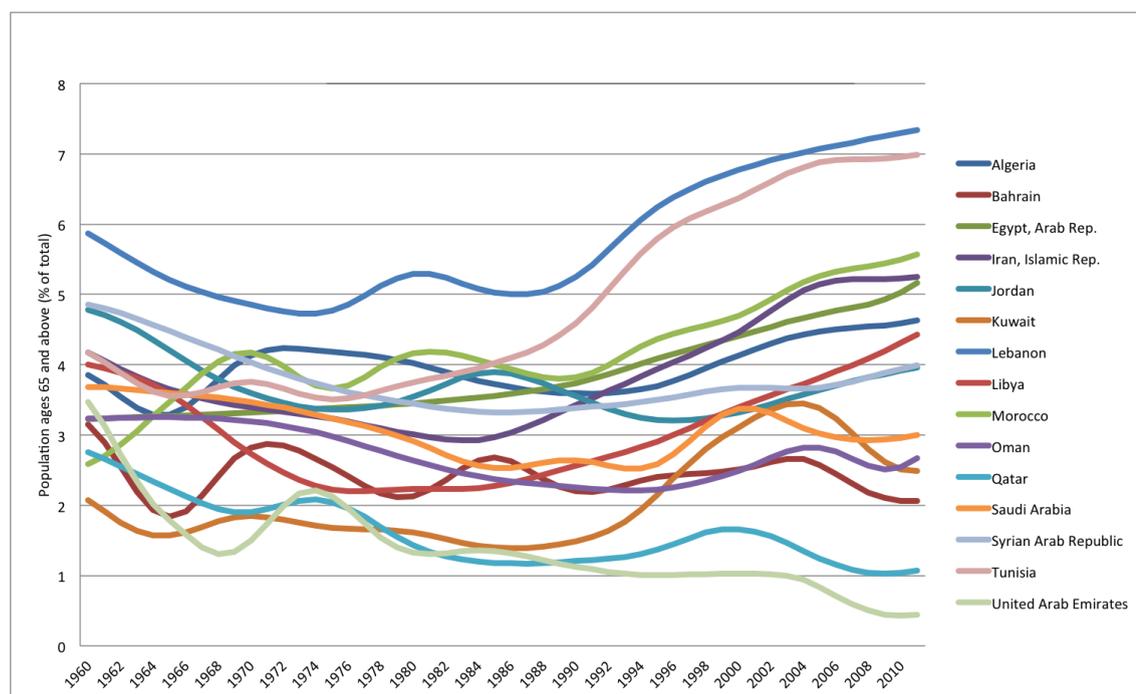
Source : WDI

FIGURE 1.13 – Labor force in MENA region (in % of total population)



Source : WDI

FIGURE 1.14 – Population above 65 years old in MENA region (in % of total population)



Source : WDI

female and male population in Qatar, United Arab Emirates, Bahrain, Kuwait and Saudi Arabia is due to massive entrance of male labor to these naturally rich oil-exporter countries (this significant immigration is one of the main reasons that these countries are not selected for calibration in the second Chapter.)

5 The financial sector perspective

Some studies have already pictured the banking and financial sector of the region so far, using conventional indicators of financial development in the case of MENA region (see Creane et al. (2004)), they unanimously highlight the need to reinforce the institutional environment. Here we use the Global Financial Development Database (GFDD) to picture the financial sector in the region, we follow Čihák et al. (2012) and divide the financial sector in markets and institutions and study the size, access and efficiency for both of these aspects.

Although financial development, varies largely between one country to another, in average they are relatively underdeveloped compared to other regions of the world. Moreover, in the region we have a dominance of the government in the banking sector, identified as big central banks and high concentration in the banking sector, or dominance of a few state owned companies in the markets.

Another specificity of the financial sector in the region, is that it is mostly bank-based. In order to determine the structure of the financial sector (whether it is more bank-based or market-based), we look at the ratios of *bank deposit over GDP* and *stock market capitalization over GDP*. As it is illustrated in Table 1.3 As shown in this table, the financial structure is mostly bank-based in the region except for most of small oil-exporting countries, who have high immigrated labor force such as Jordan, Kuwait and Qatar. One striking number in this table is the high Lebanese bank deposits, according to International Monetary Fund (2017) the massive deposits in Lebanon is due to foreign deposit inflows from the large Lebanese diaspora attracted by high interest rates and exchange rate stability.

5.1 Financial institutions

5.1.1 Size

The financial institutions within a country is majorly composed of central bank, commercial banks and other financial institutions (such as insurance companies, pension funds and mortgage loan companies). Figure 1.15, studies the composition of the financial sector and compares it with different country-groups sorted by their income level. Although, the overall size of the financial sector in MENA is close to the one by upper middle income countries, the configuration of the sector is closer to lower middle income and low income countries. The relative *size of central banks* is strikingly high in the region, this size is the smallest for high income countries (around 2% of GDP) and only a little higher for upper middle, lower middle and

TABLE 1.3 – Structure of the financial sector (bank-based vs. market-based) in 2010

Country	Bank deposit/GDP	Stock market capitalization/GDP
Algeria	42.4356	.
Bahrain	86.32599	81.66583
Egypt	65.37225	39.68219
Iran	22.75681	.
Jordan	91.20363	118.3631
Kuwait	68.27551	86.15101
Lebanon	212.9586	33.27213
Libya	.	.
Morocco	85.04035	71.84473
Oman	33.35133	32.36188
Qatar	50.37303	82.8403
Saudi Arabia	28.52543	74.63817
Syria	50.78195	.
Tunisia	50.45038	21.67736
UAE	66.33266	26.37886
Average	68.15597	60.80687

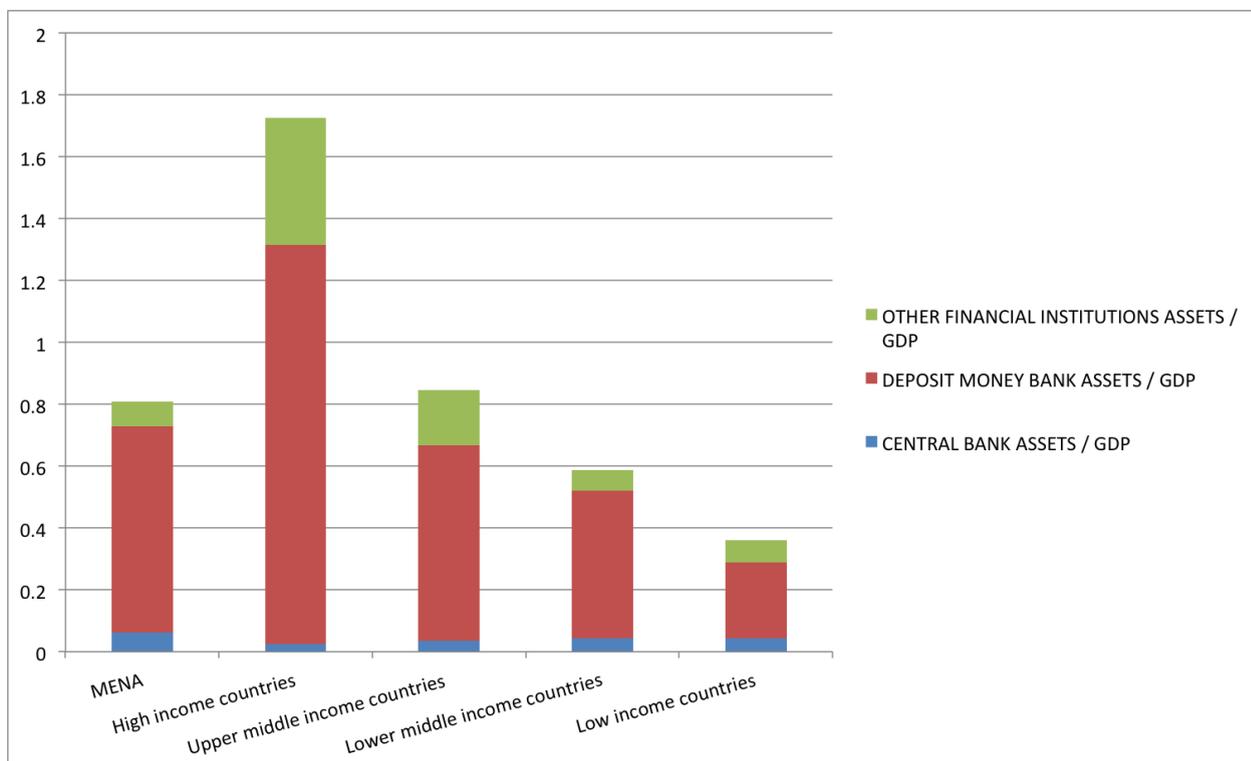
Source of data : Financial Development and Structure Dataset.

low income countries (respectively 3, 4 and 4%), it is the highest for MENA region (6% of GDP). Which demonstrates the strong presence of the governments in the financial sector. Moreover, proportion of *other financial institutions' assets in GDP* is quit small in the region ; this ratio is 7.8% for MENA compared to 41% for high income, 18% for upper middle income, 6.5% for lower middle income and 7% for low income countries.

In the remainder of this section we use commonly used financial indicators to obtain an overview of the current status of the financial sector, as well as the trends in the past few decades. For the size of the financial institutions, we use the following three indicators :

- *Central bank assets to GDP* (represents the size of the central banks Figure 1.16)
- *Deposit money banks assets to GDP* (represents the size of commercial banks Figure 1.18)

FIGURE 1.15 – Financial institutions composition (2009)

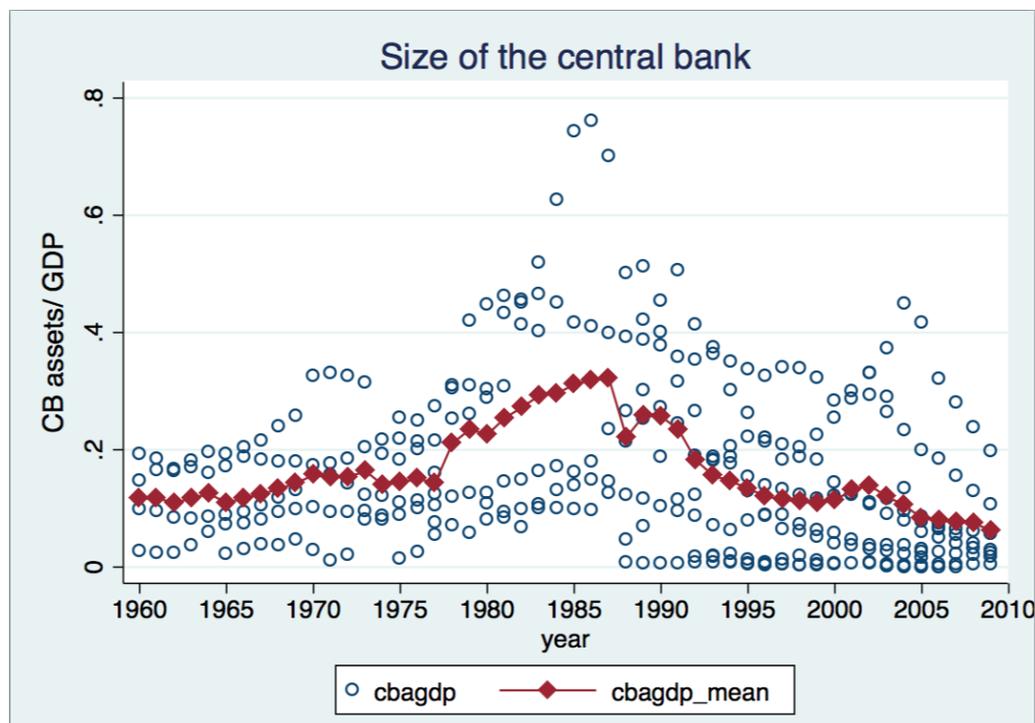


Source of the data : Financial Development and Structure Dataset

— *Other financial institutions assets to GDP* (Figure 1.19)

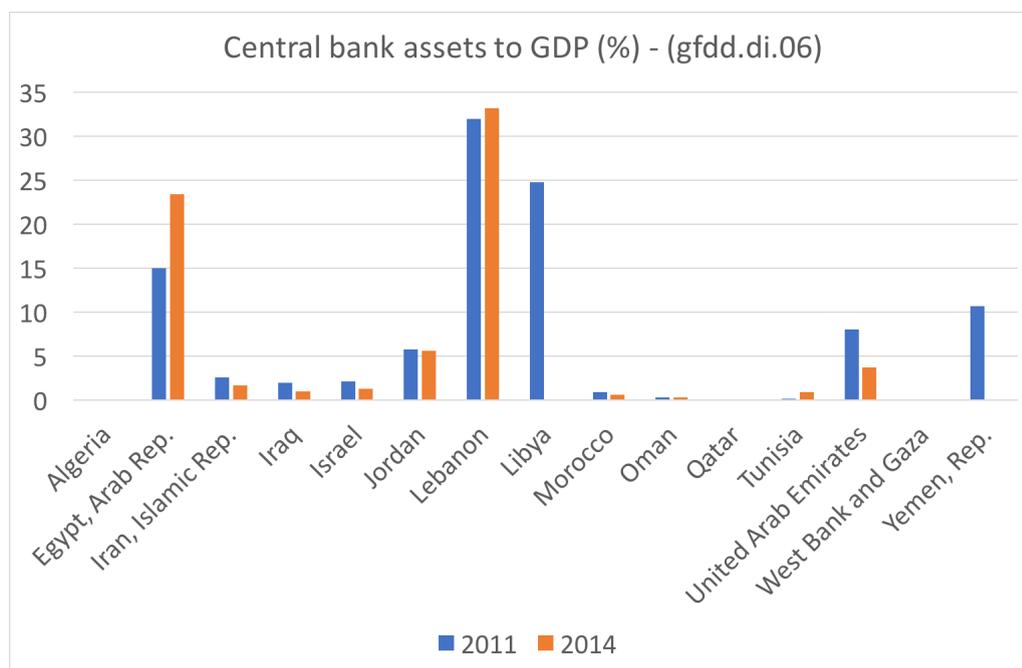
We can observe since the mid-80s, the *size of the central banks* (Figure 1.16) in the region has a tendency to decrease while the share of deposit money bank assets has increased. Figure 1.17 shows this significant decrease since the ratio is under 10% for most of the countries in the region, moreover it shows the heterogeneity among the countries, in countries such as Algeria, Qatar and West Bank and Gaza the ratio of central bank assets has dropped to close to zero (respectively 0.04, 0.01 and 0.06 in 2014) while in Lebanon this figure is above 30%. It is worth noting, that the *size of other financial institutions*, represented in Figure 1.19 are decreasing which is the contrary of what has happened in other regions of the world. We should highlight that this ratio for high income countries is around 35% and the current ratio of 1% in the region is considered very low. Which brings the accent to urgent need to develop a secure environment for non-bank financial institutions.

FIGURE 1.16 – Central bank assets to GDP



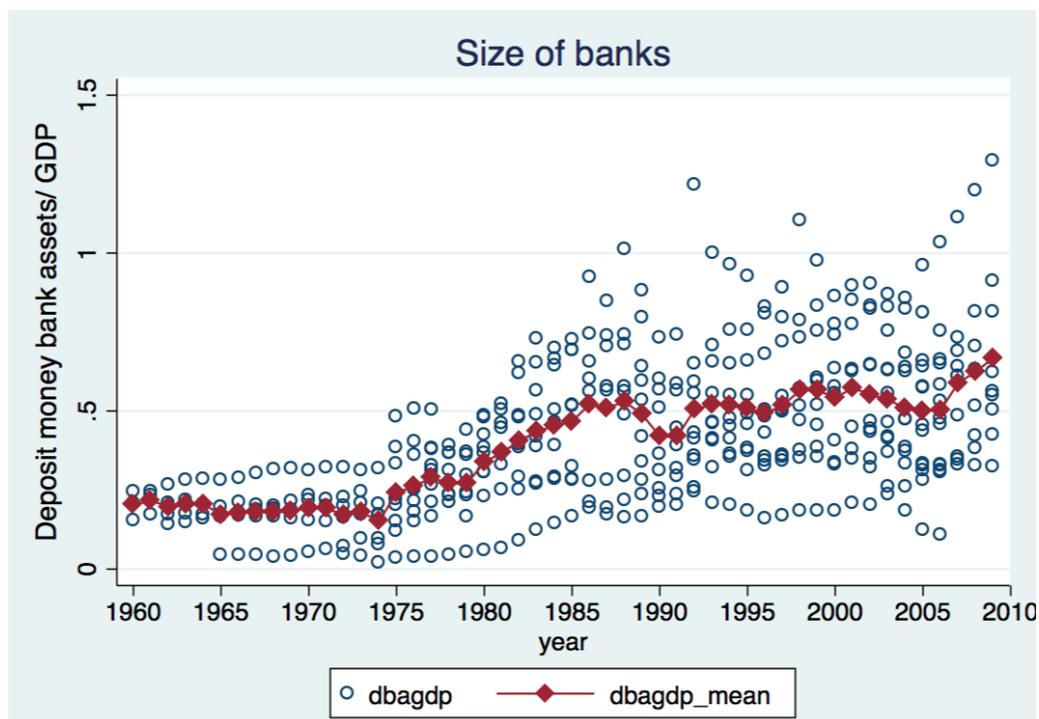
Source of the data : Financial Development and Structure Dataset

FIGURE 1.17 – Central bank assets to GDP (2011 vs. 2014)



Source of the data : GFDD

FIGURE 1.18 – Size of banks



Source of the data : *Financial Development and Structure Dataset*

*Liquid liabilities*³ is another typical measure of financial depth and thus of the overall size of the financial sector, without distinguishing among the three financial sectors or the use of liabilities. Figure 1.20 shows the *ratio of liquid liabilities to GDP*, this figure once more highlights the heterogeneity of the financial depth and the distinction of Lebanon.

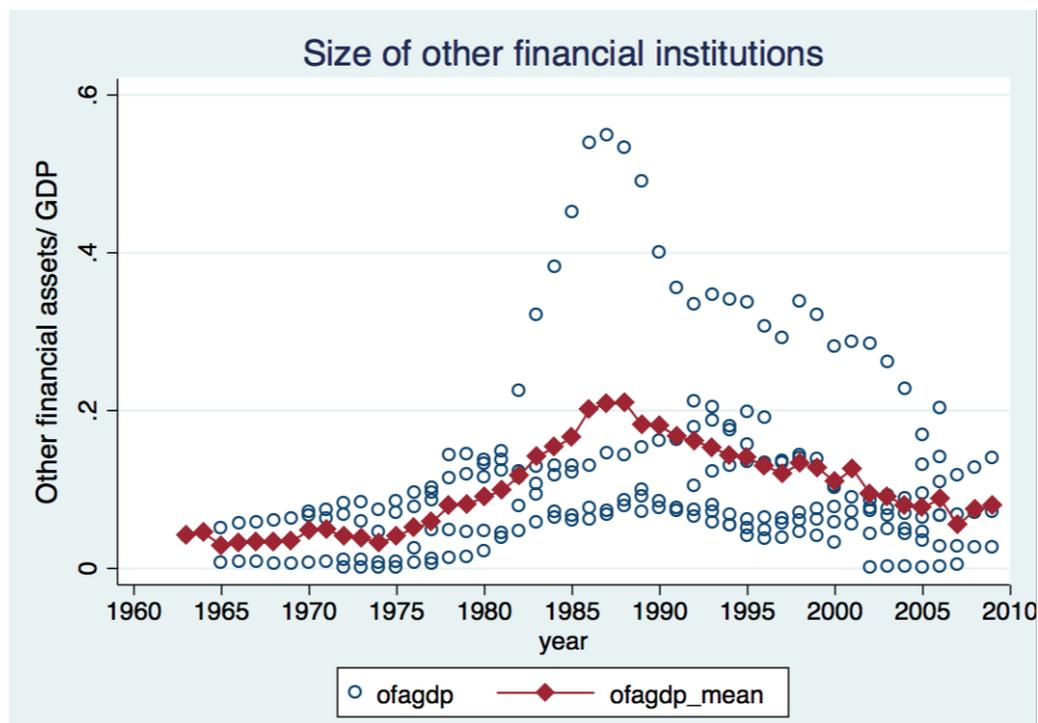
5.1.2 Access

We use the following indicators to study the access to the financial institutions :

- *Bank accounts per 1000 adults* (Figure 1.21).
- *Account at a formal financial institution Age 15+* (Figure 1.22).
- *Bank branches per 100000 adults* (Figure 1.23).

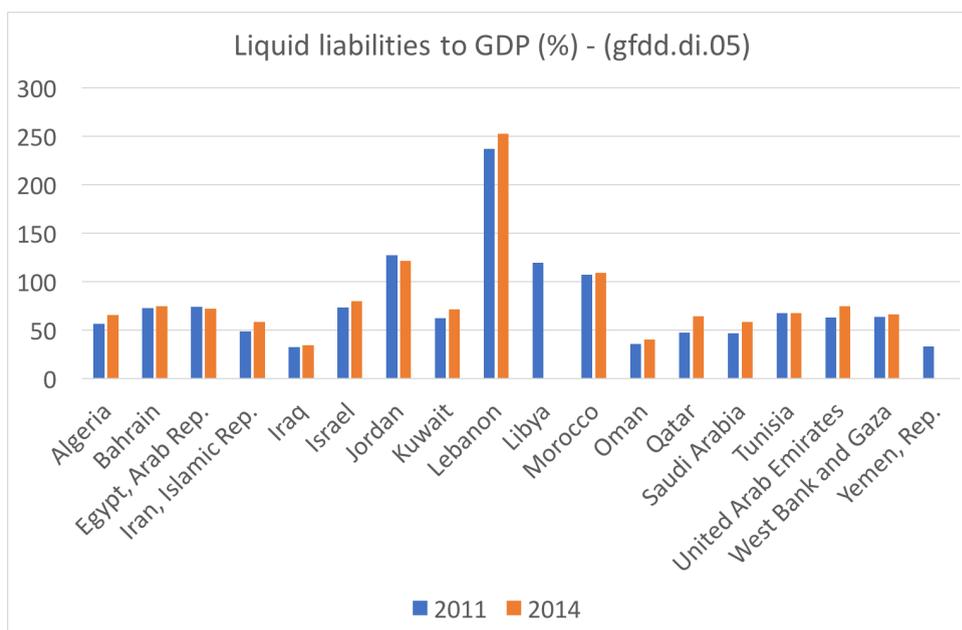
3. Which equals currency plus demand and interest-bearing liabilities of banks and other financial intermediaries.

FIGURE 1.19 – Size of other financial institutions



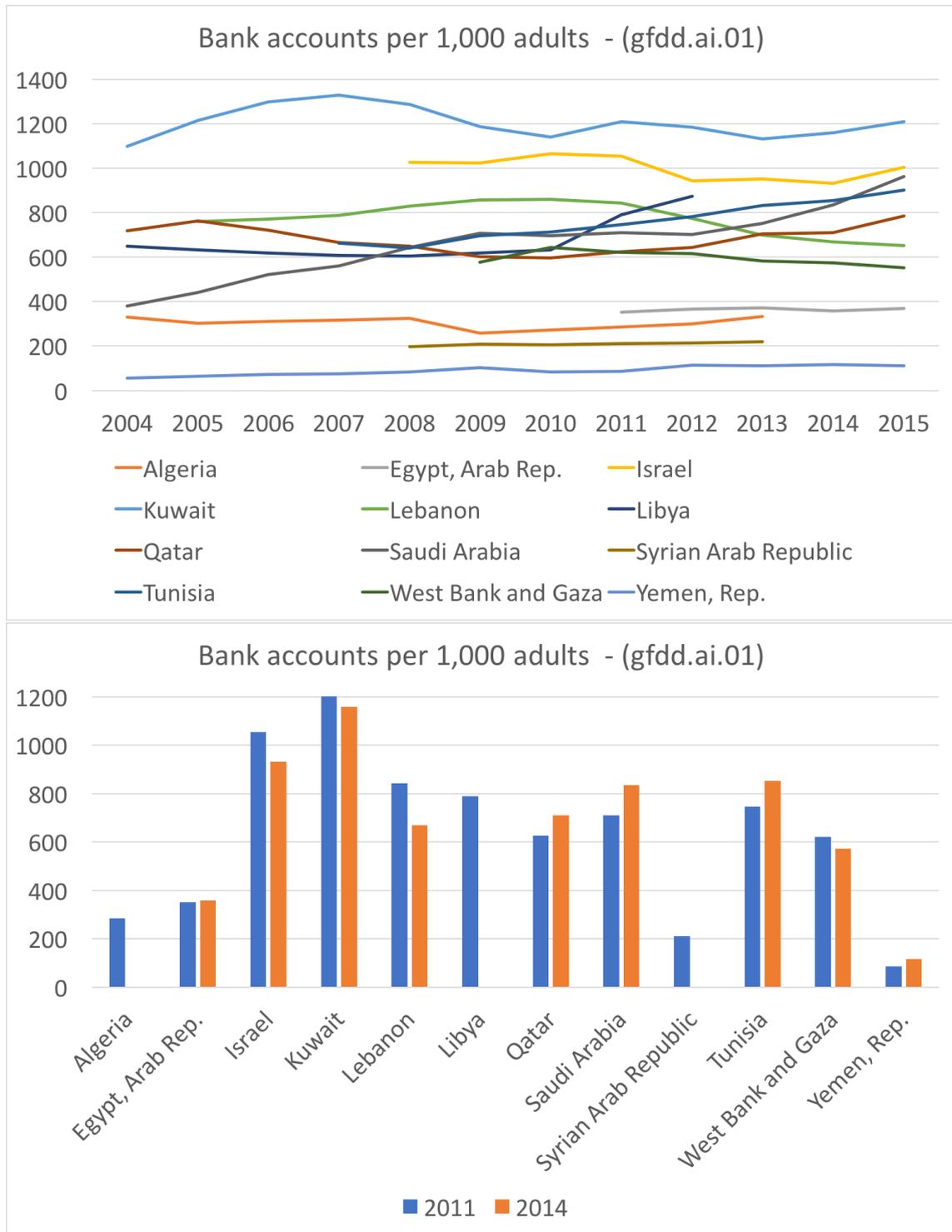
Source of the data : Financial Development and Structure Dataset

FIGURE 1.20 – Overall size of the financial sector (Liquid liabilities to GDP)



Source of the data : GFDD

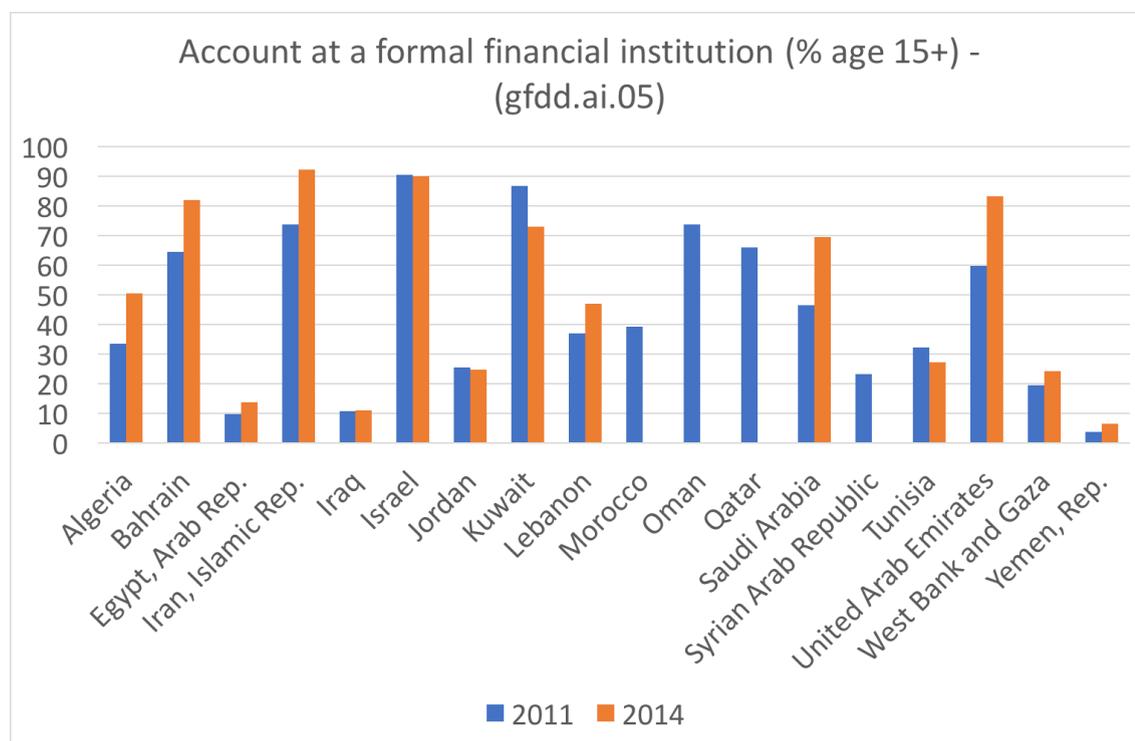
FIGURE 1.21 – Bank accounts per 1000 adults



Source of the data : GFDD (2017)

The most commonly used variable to represent access to financial institutions or financial inclusion is the number of bank accounts per 1,000 adults. MENA countries

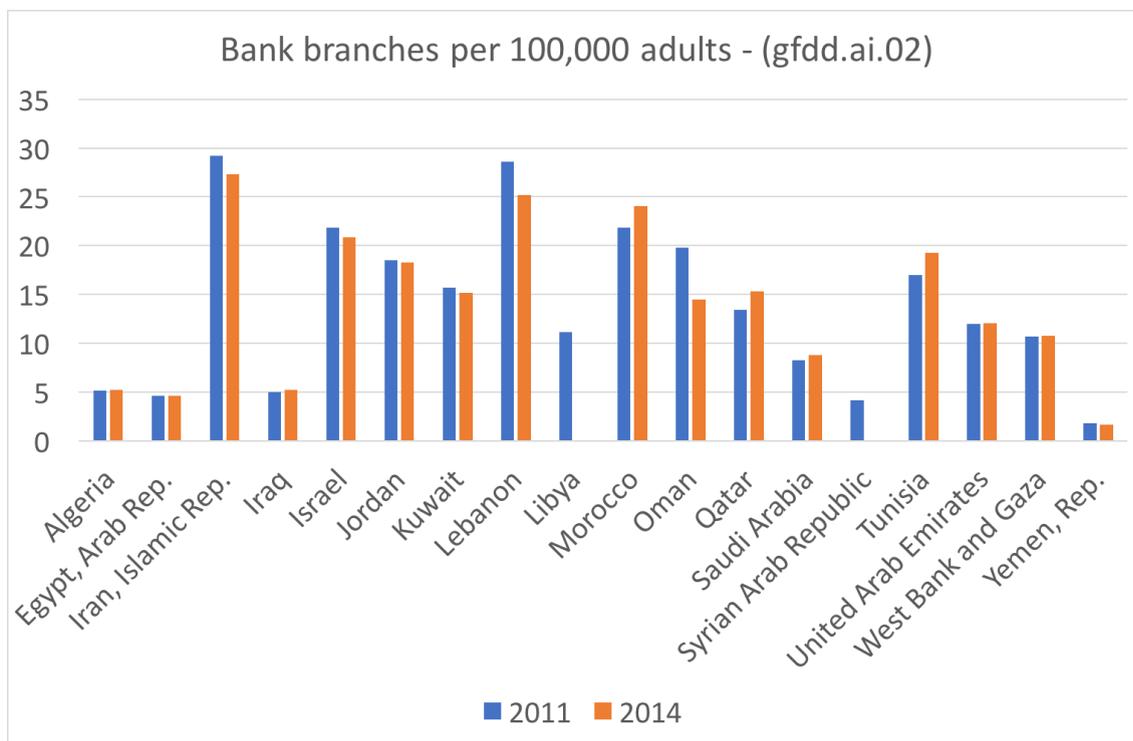
FIGURE 1.22 – Account at a formal financial institution age 15+



Source of the data : GFDD (2017)

Bank accounts per 1000 adults was 385.9 on average in 2010, compared to other countries with different income levels : the high income countries have an average of 2004.3, while Upper middle income countries have an average of 921.1, lower middle income countries an average of 570.1 and low income countries an average of 147.9. We can therefore say that MENA countries are behind on this criteria and are between lower middle income and low income countries, even the best performing country Kuwait with an average of 1200 is significantly lower than the one of high income countries. The same holds for other indicators such as *Account at a formal financial institution Age 15+*, the Figure 1.22 shows that out of 18 countries for which we have World Bank data, 10 have a percentage of account holder below 50%. The last parameter *Bank branches per 100000 adults* (Figure 1.23) has to be interpreted with caution as banks move more and more towards branchless and mobile banking, but it shows us the high disparity in the region, with countries such as Algeria, Egypt, Iraq, Syria and Yemen, that have 5 or less bank branches per 100,000 adults

FIGURE 1.23 – Bank branches per 100000 adults



Source of the data : GFDD (2017)

and thus a big proportion of their population is excluded from the financial sector specifically in poor rural areas, while on the other hand, some countries have 4 times more banks (up to 29 per 100,000) such as Iran, Israel, Lebanon and Morocco.

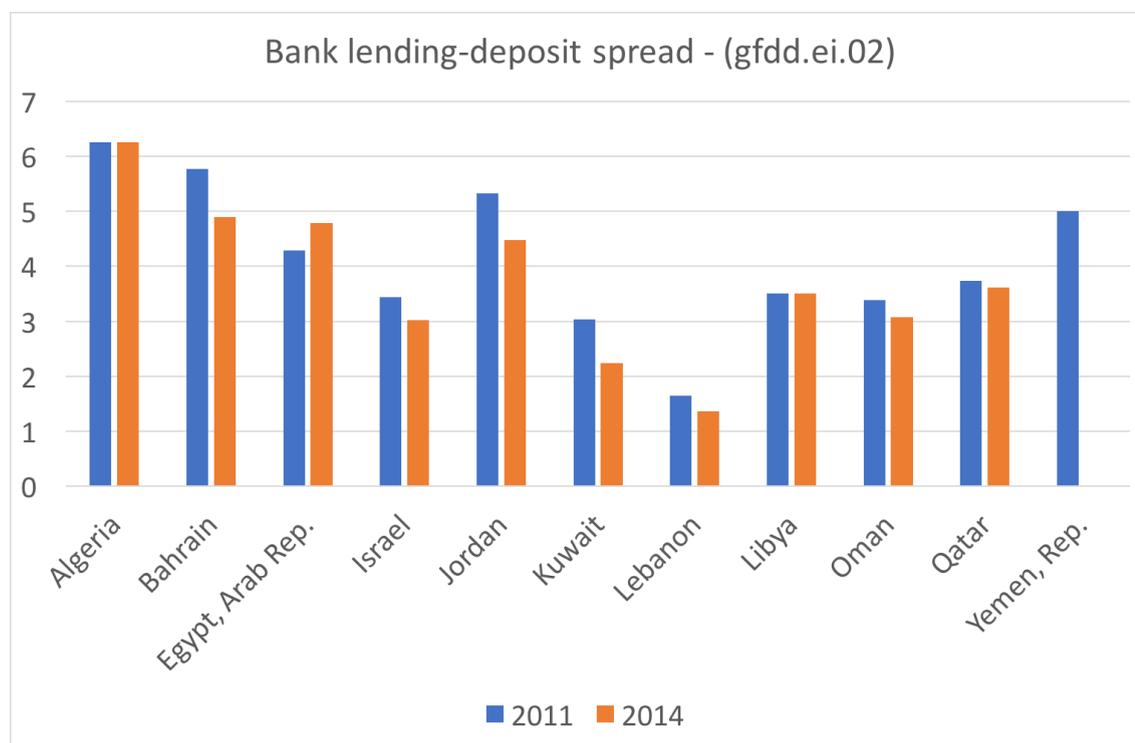
5.1.3 Efficiency

We have different measures of the efficiency of the banking sector :

- *Lending deposits spread*, (Figures 1.24).
- *Net interest margin* (Figures 1.25).
- *Overhead costs*, (Figures 1.26).
- *Concentration* : (Figure 1.27).

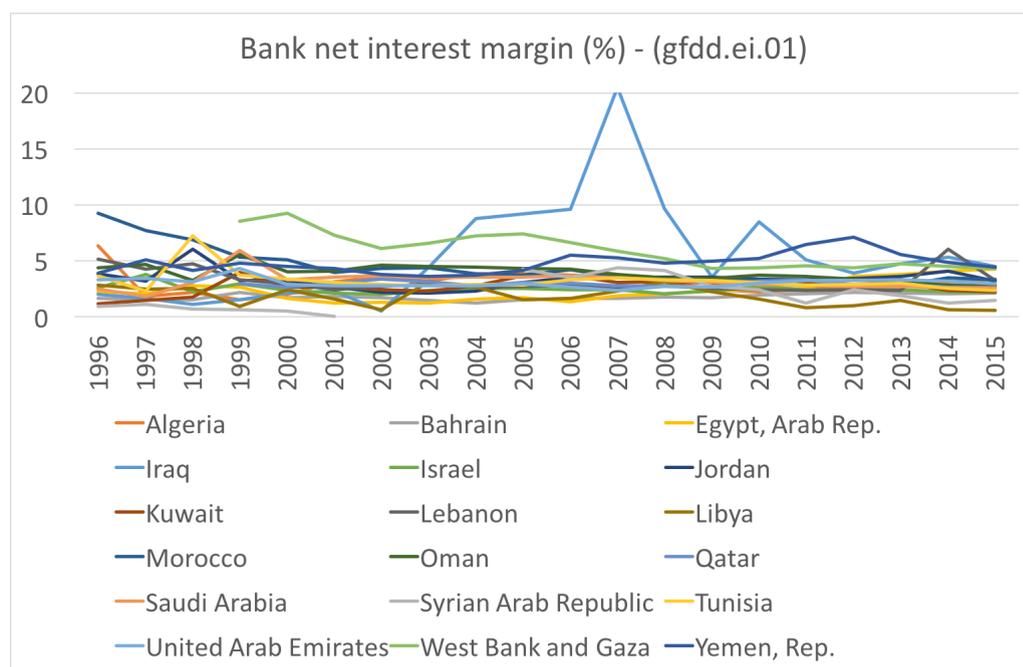
Efficiency is measured by the cost of intermediating credit. Therefore the transaction cost should be lower in more efficient markets, we use *Lending deposits spread*, (Figures 1.24), *Net interest margin* (Figures 1.25) and *Overhead costs* (Figures 1.26)

FIGURE 1.24 – Bank lending deposit spread



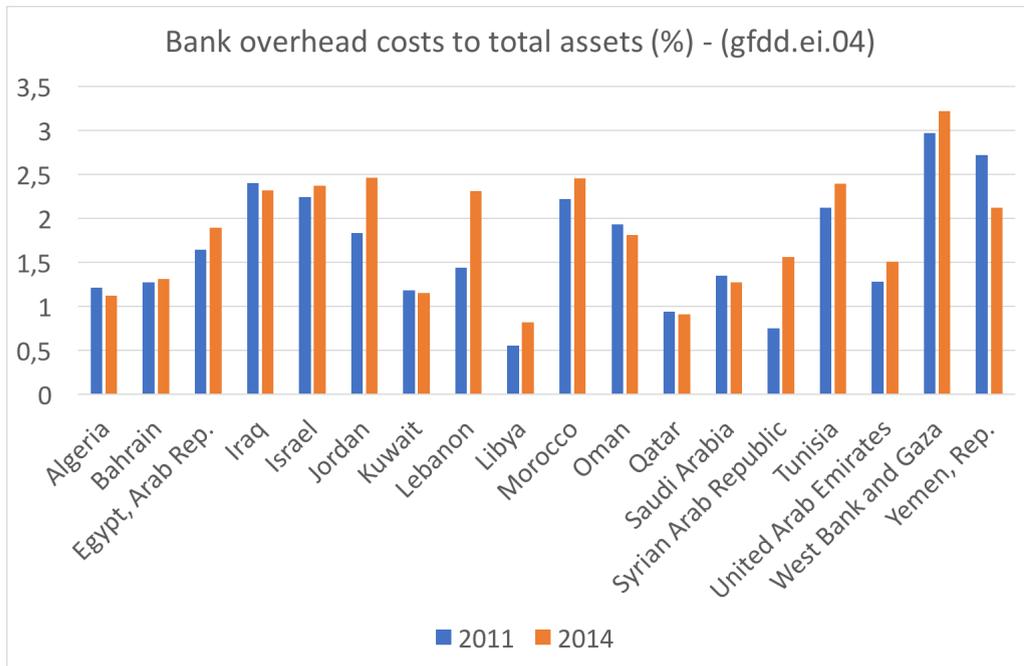
Source of the data : GFDD (2017)

FIGURE 1.25 – Bank net interest margin



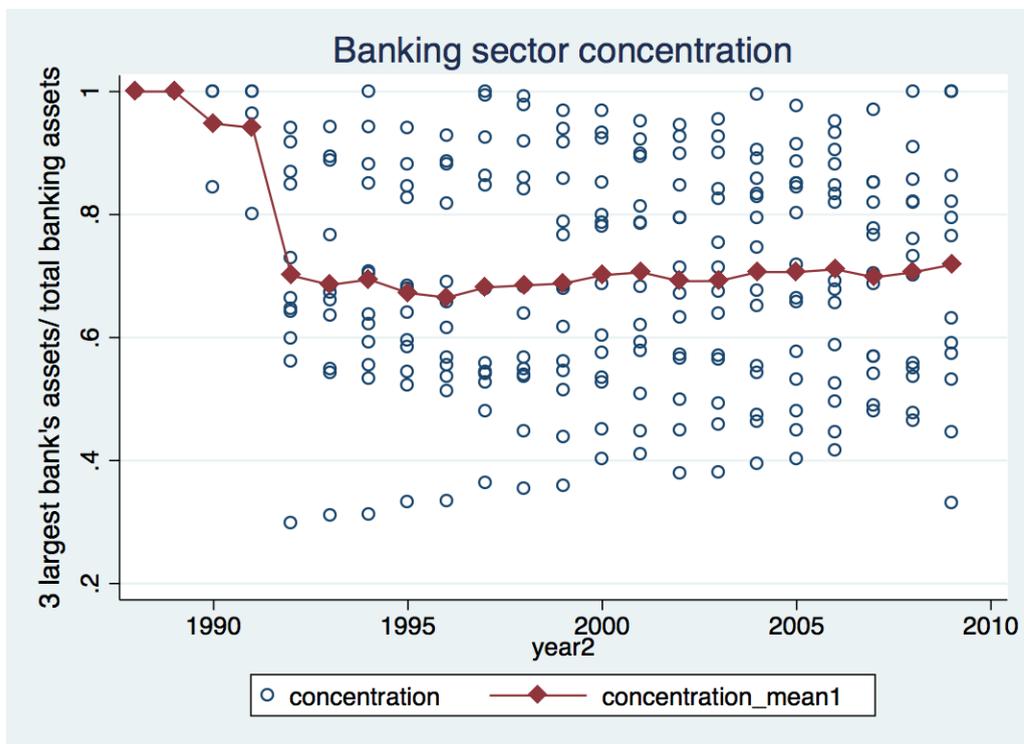
Source of the data : GFDD (2017)

FIGURE 1.26 – Bank overhead costs to total assets



Source of the data : GFDD (2017)

FIGURE 1.27 – The ratio of the three largest banks’s assets to total banking sector’s assets



Source of the data : Financial Development and Structure Dataset

parameters as a proxy for the efficiency. The lower these indicators are, the more efficient is the banking sector.

The MENA countries have a *Lending deposits spread* of 4,6 in 2010, compared to other countries with different income levels : the high income countries have an spread of 3.8, while upper middle income countries have a spread of 6.7, lower middle income countries a spread of 8.8 and low income countries a spread of 13.7. We can therefore say that MENA countries perform relatively well on this indicator, Figure 1.24 display that the spread goes from 6 in Algeria to 1.5 in Lebanon. This is confirmed by the *Overhead costs* displayed on Figures 1.26 which have an average of 1.75 in 2015. However the *Net interest margin* illustrated on Figures 1.25 show the disparity among countries and the strong influence of geopolitical instability illustrated by the sharp rise of Iraq *Net interest margin* between 2003 and 2008.

The last indicator of Efficiency is *concentration*, a highly concentrated financial sector does not reflect an efficient, competitive market, consequently the higher this indicator is, the less efficient is the banking sector. Figure 1.27 shows that banks are fairly concentrated in many countries of the region.

5.2 Financial Markets

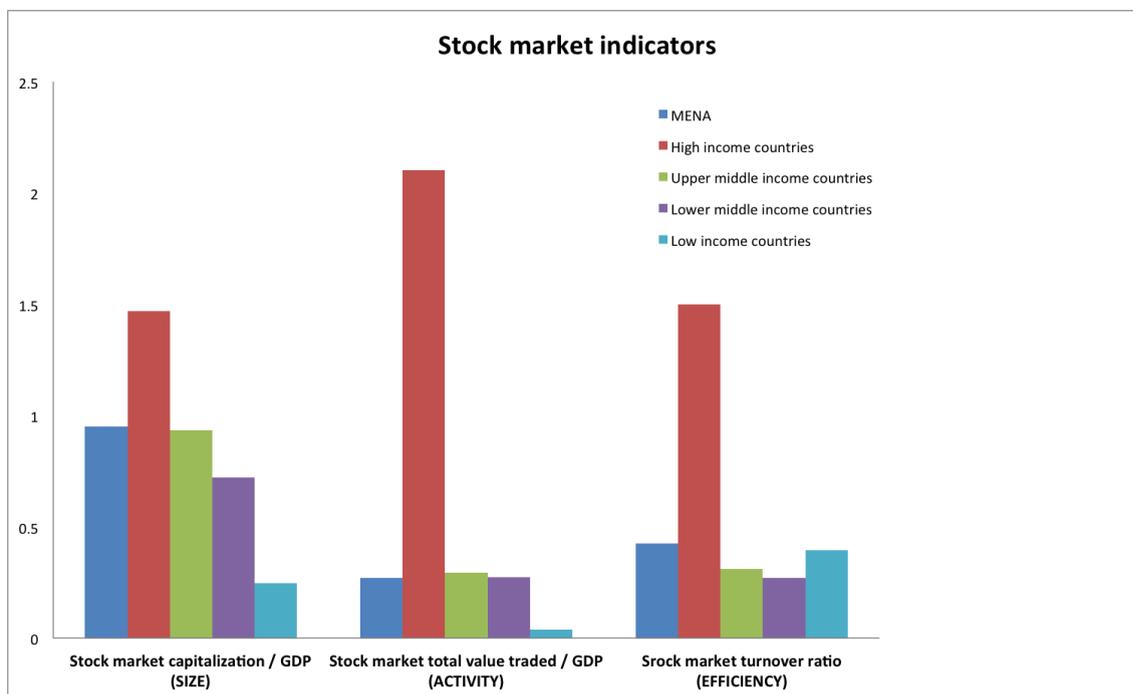
5.2.1 Size

We have used the following indicators of Financial markets size :

- *Stock market capitalization to GDP* (Figures 1.29 and 1.30)
- *Stock market total value traded to GDP* (Figures 1.32 and 1.31)

During the recent years we witnessed a vast growth of the stock market among developing economies. Although it has increased volatility in the economy, they are mainly regarded as an engine of growth. One can expect stock markets to facilitate access to liquidity and provide risk diversification services. Still, the fact that there is faster growth after the development of the stock markets, is suggestive of causality

FIGURE 1.28 – Stock market comparison



Source of the data : Financial Development and Structure Dataset

but is not conclusive.

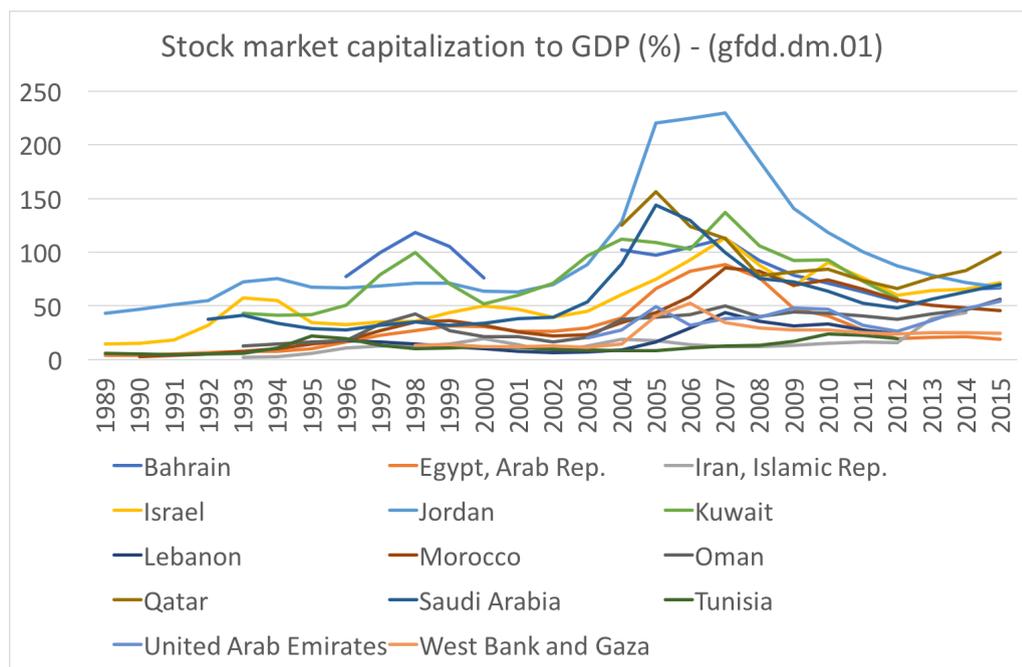
Figure 1.28 studies the conventional stock market indicators for MENA and for different groups of countries according to their income level. Blue bars represent MENA. In this Figure we have *stock market capitalization divided by GDP*⁴ as a measure of size, *total value traded in the stock market divided by GDP*⁵ as a measure of activity and therefore size. This figure shows that the stock markets in MENA are on average as developed as Upper middle income economies.

As an indicator of the size of the stock market we use the *stock market capitalization to GDP ratio* (presented in both Figures 1.29 and 1.30). Table 1.4 sheds light on the differences of stock market development among these countries. Stock markets are most developed in Jordan, GCC countries have relatively developed markets, Morocco stands right after GCC countries, while the markets are rather under developed in the rest of MENA countries.

4. This share equals the value of listed shares divided by GDP.

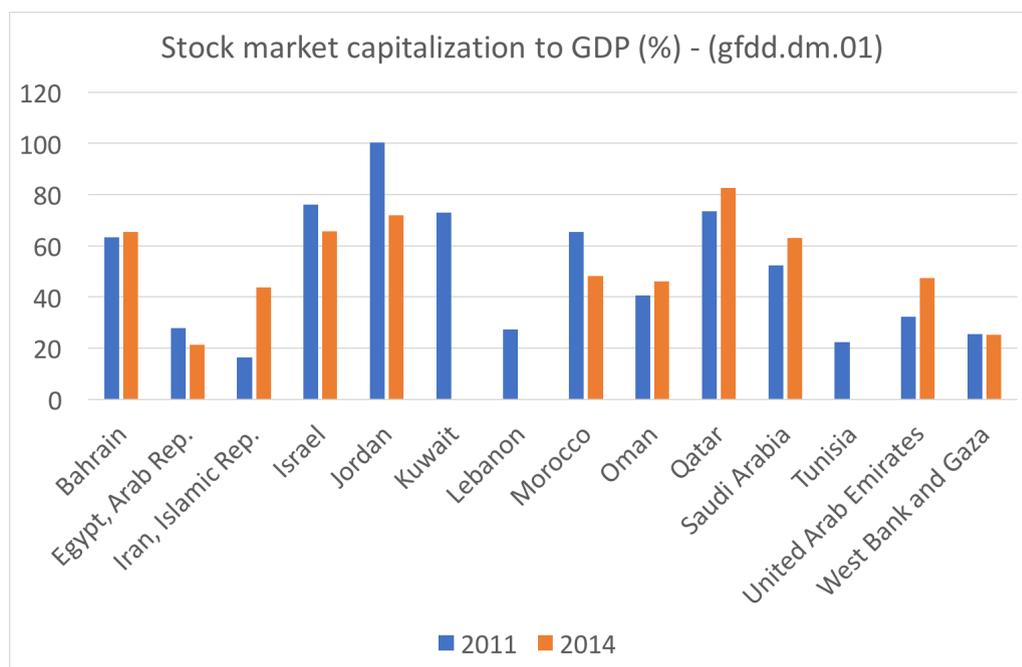
5. This share equals total shares traded on the stock market exchange divided by GDP.

FIGURE 1.29 – Stock market capitalization to GDP



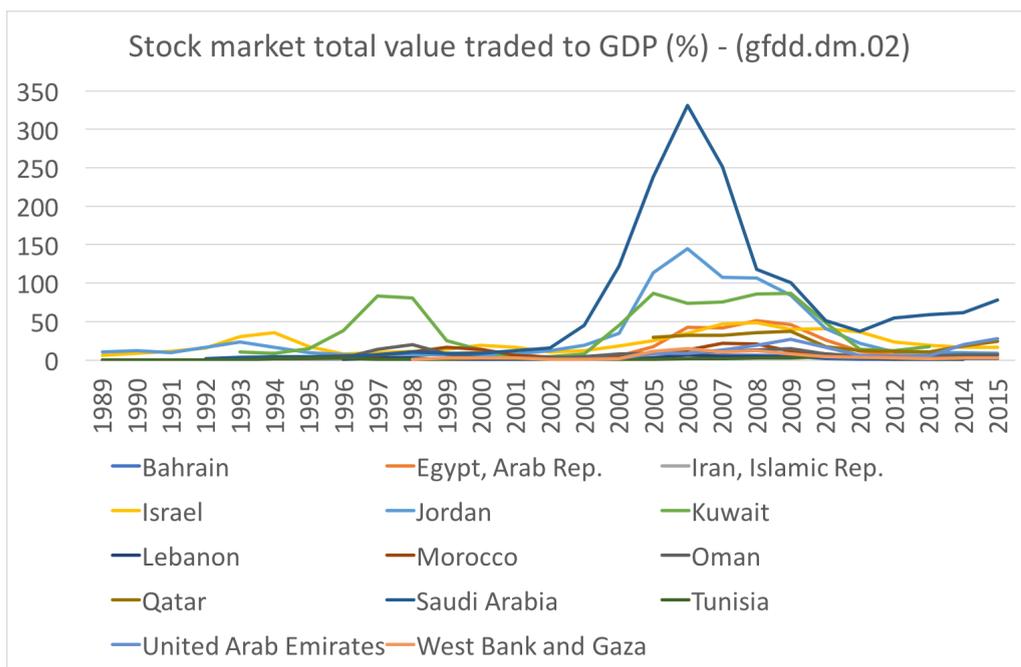
Source of the data : GFDD (2017)

FIGURE 1.30 – Stock market capitalization to GDP



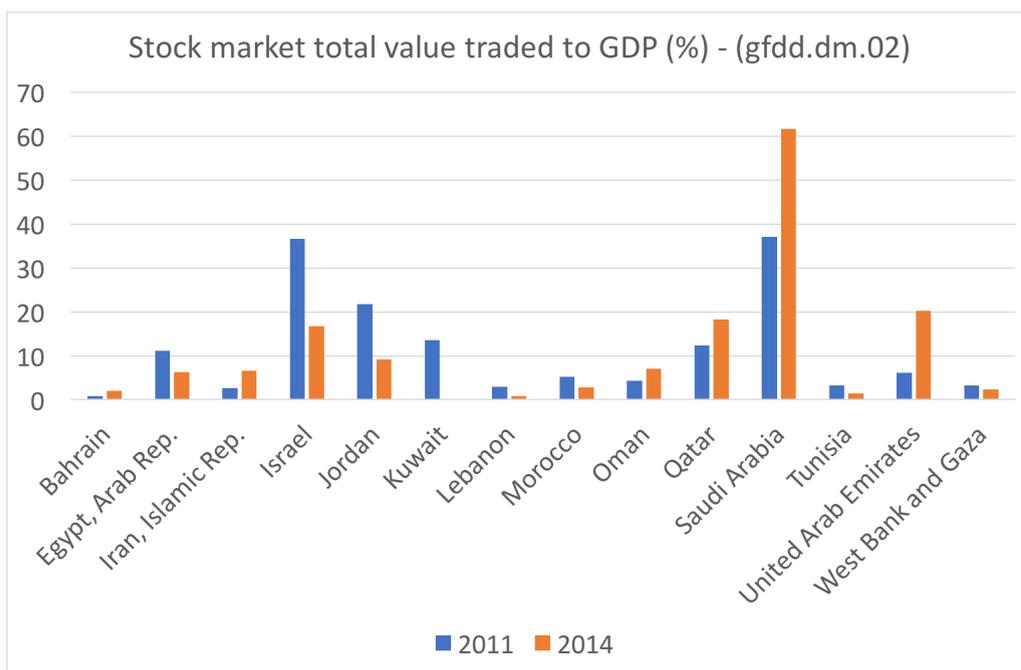
Source of the data : GFDD (2017)

FIGURE 1.31 – Stock market total value traded to GDP



Source of the data : GFDD (2017)

FIGURE 1.32 – Stock market total value traded to GDP



Source of the data : GFDD (2017)

To measure the activity of the stock markets we use *stock market total value traded to GDP* (Figures 1.32 and 1.31). Once again we can see that the stock market activity varies largely among the countries in our sample. Saudi Arabia and United Arab Emirates have boosted their market size from 2011 to 2014, while in other countries such as Israel the market size has shrank.

To sum up, the main source of the finance in this region is still the banking sector. Additionally the growth observed in the stock market, is also important in this region. Some countries have a very well-developed stock markets while the others are left behind. Even though the stock markets continue to grow fast in some countries of the region (such as Saudi Arabia and United Arab Emirates), those markets are not sufficiently stable yet.

TABLE 1.4 – Stock market indicators in 2009

Country	Market capitalisation	Total value traded	Turnover ratio
Algeria	.	.	.
Bahrain	98.39815	9.885142	4.507703
Egypt	47.2063	33.2102	59.19915
Iran	15.31671	4.434252	30.71475
Jordan	140.8483	86.96673	40.67102
Kuwait	92.09233	86.90569	71.69886
Lebanon	32.02083	2.481738	9.393332
Libya	.	.	.
Morocco	69.56054	27.88584	46.51857
Oman	34.0451	15.05418	36.54903
Qatar	82.14737	36.15233	31.82209
Saudi Arabia	74.8166	114.9861	119.5678
Syria	.	.	.
Tunisia	17.01047	3.002655	16.94946
UAE	27.46328	38.81536	88.51279
Average	60.9105	38.31502	46.34205

Source : *Financial Development and Structure Dataset*

5.2.2 Access

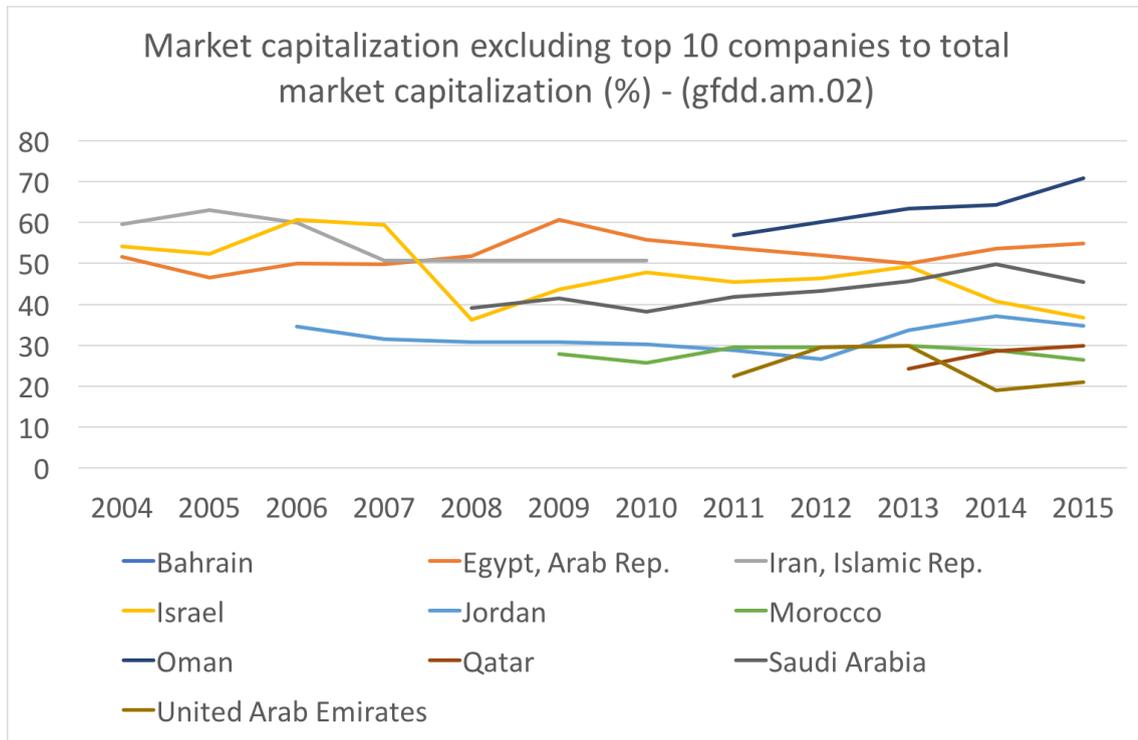
We have used the following indicators of Financial markets access :

- *Market capitalization excluding top 10 companies to total market capitalization* (Figure 1.33 and Figure 1.34).
- *Value traded excluding top 10 traded companies to total value traded* (Figure 1.35 and Figure 1.36).

Access to financial markets is a difficult variable to measure, we use market concentration as a proxy to measure it, as a higher degree of concentration represent a high barrier for newer or smaller company to enter the market. To measure Market concentration we look at *Market capitalization excluding top 10 companies to total market capitalization* (Figure 1.33 and Figure 1.34) and *Value traded excluding top 10 traded companies to total value traded* (Figure 1.35 and Figure 1.36), both variables exclude the top 10 companies, and show the part of the market which is not concentrated, therefore higher values show a less concentrated and more open market.

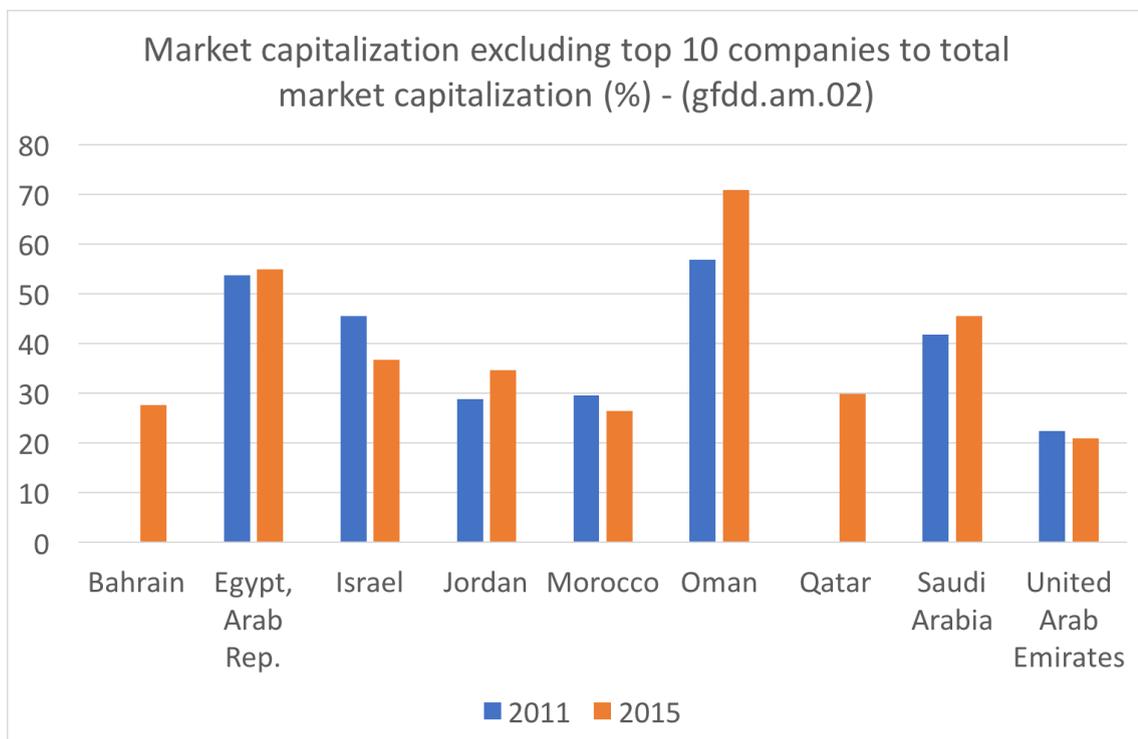
Although Saudi Arabia and UAE represent the biggest market in the region (highest market capitalisation), the majority of their market is dominated by only a few actors and the access to the markets is therefore harder for smaller companies. On the 9 countries for which we have the parameter *Market capitalization excluding top 10 companies to total market capitalization* and represented on Figure 1.34, 5 have values around or below 30%. The *Value traded excluding top 10 traded companies to total value traded* parameter display the same trend, as we can see on the Figure 1.36, out of 8 represented countries, only Saudi Arabia has a *Value traded excluding top 10 traded companies to total value traded*, of over 50%. This shows that the sector is generally highly concentrated with a few big companies (usually owned by politically well connected families) and limited access for the new actors.

FIGURE 1.33 – Market capitalization excluding top 10



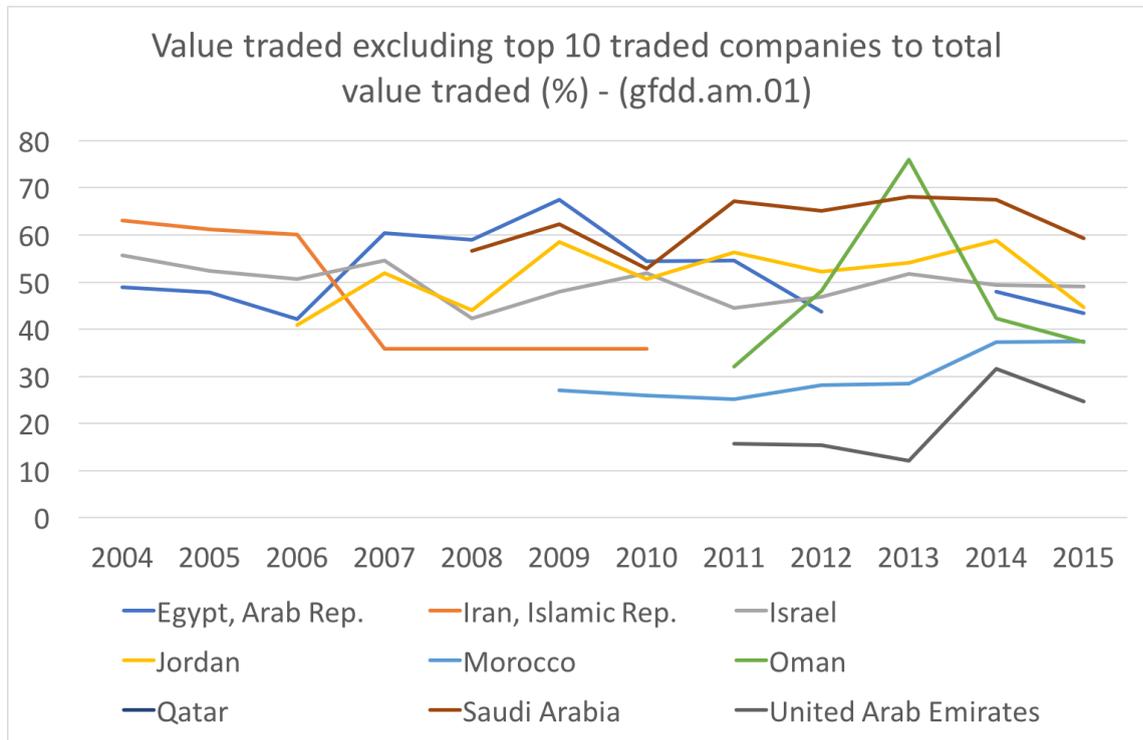
Source of the data : GFDD (2017)

FIGURE 1.34 – Market capitalization excluding top 10



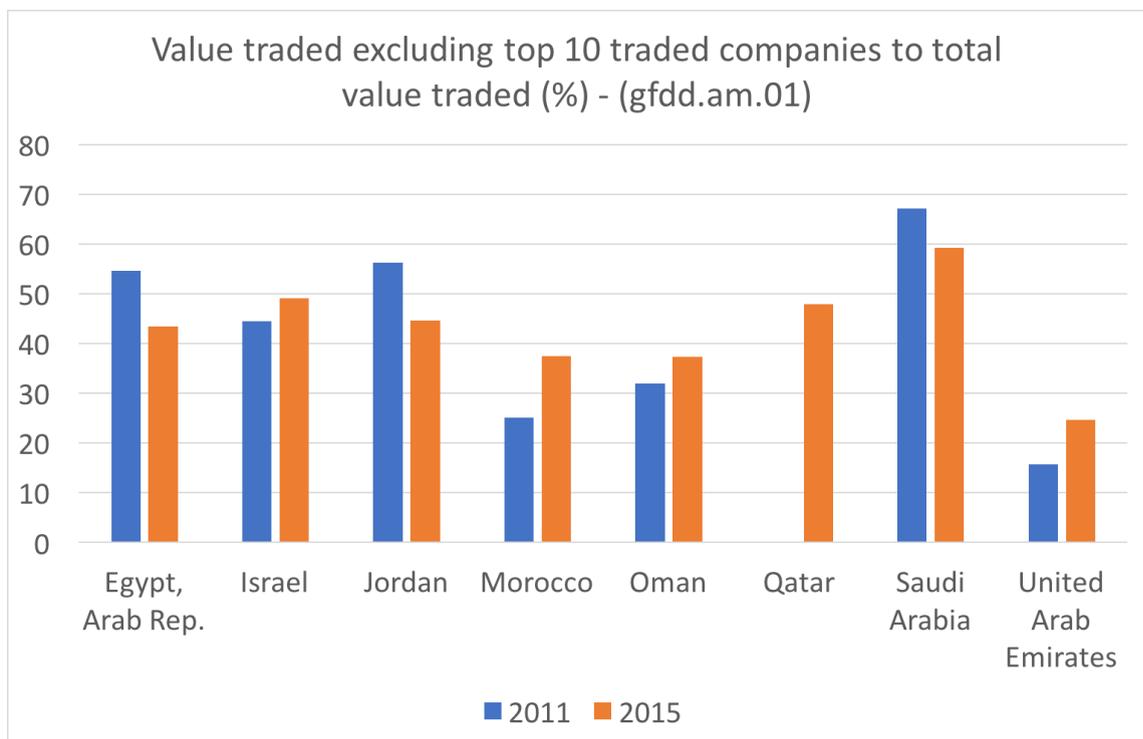
Source of the data : GFDD (2017)

FIGURE 1.35 – Value traded excluding top 10



Source of the data : GFDD (2017)

FIGURE 1.36 – Value traded excluding top 10

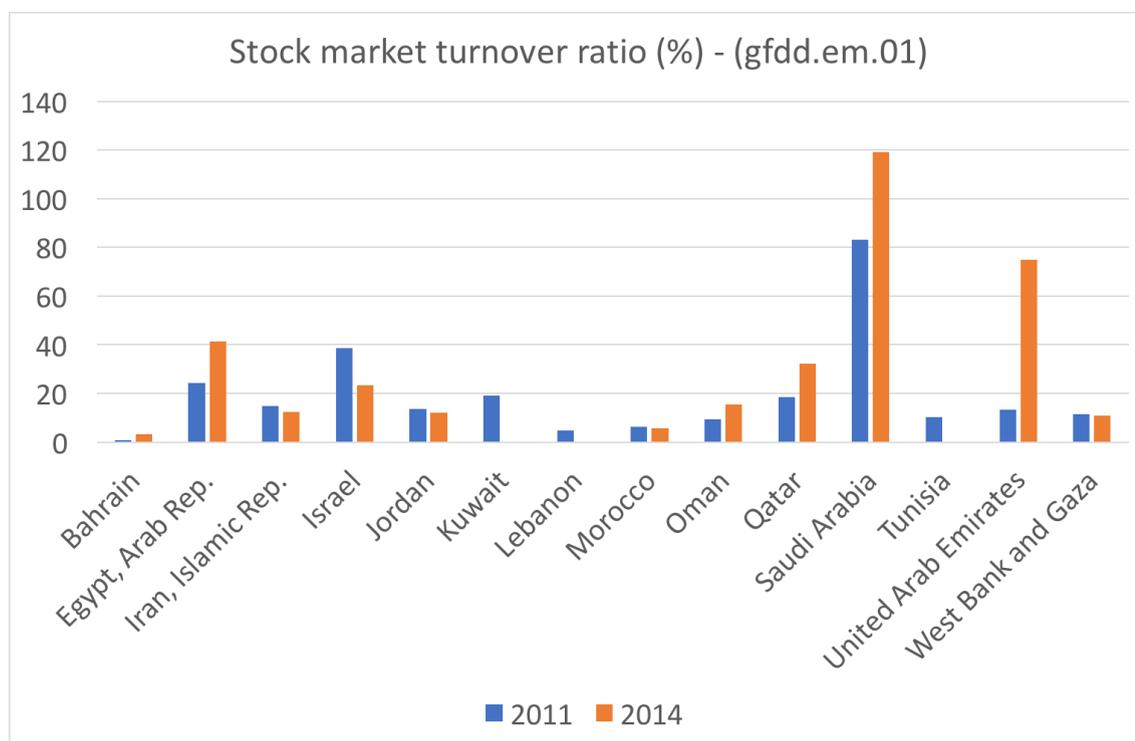


Source of the data : GFDD (2017)

5.2.3 Efficiency

To measure the efficiency of financial markets, we use the *stock market turnover ratio*⁶ as a higher turnover demonstrates more liquidity and therefore a more efficient financial market.

FIGURE 1.37 – Stock market turnover ratio



Source of the data : GFDD (2017)

Figure 1.37 shows MENA countries *turnover ratio* with an average of 44.6 in 2010, compared to other countries with different income levels : the high income countries have an average of 84.4, while Upper middle income countries have an average of 35.2, lower middle income countries an average of 35.0 and low income countries an average of 56.6. We can therefore say that MENA countries are closer to upper middle income countries with the markets still in the process of development.

Saudi Arabia and United Arab Emirates distinguish in terms of high turnover ratios, this is due to recent development of Stock markets in these countries and the

6. Turnover ratio is defined as the ratio of the value of total shares traded to market capitalization.

liquidity injections in the sector. which shows high heterogeneity of the stock market development in the region and the current will to deepen it.

6 Conclusion

In this chapter we identify basic characteristics of MENA region by looking at its economic perspective, demographic perspective and financial markets' evolution.

Globally, the economic activity is weakened by continuous conflicts and persistent low oil prices. MENA is one of the youngest regions on the planet, but this demographic gift is also the biggest challenge the region should face, since the youth unemployment rates are critically high. Creating jobs, raising the living standards and providing people with decent health and education are the top priorities in the political agenda of the young and vibrant countries in the region.

Financial markets are under developed and basically bank-based. Stock market development vary drastically within the countries of the region. During the recent years we observe a fast and heterogenous development of the banking system among the MENA countries. Meanwhile, the size of the other financial institutions such as pension funds, mortgage institutions ; remains small. Population in these countries are young and relatively well educated. High unemployment rates in the region critically touches the youth and women.

To conclude, the main source of the finance in this region is still the banking sector. Additionally the growth observed in the stock market, is also important in this region. Some countries have a very well-developed stock markets while the others are left behind. Even though the stock markets continue to grow fast in some countries in region (such as Saudi Arabia and United Arab Emirates), those markets are not sufficiently stable yet.

Appendix

1.A What are MENA countries and their classifications

The definition of MENA countries may differ from one institutions to another. Globally, the following 21 countries are typically included in MENA : Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, West Bank and Gaza, and Yemen. This classification corresponds to the World Bank's definition of MENA, however Unicef excludes Israel from these countries while referring to MENA. IMF reports are mostly based on MENAP region, where Afganistan and Pakistan are also included. Rarely, Ethiopia and Sudan are included by some other authors. In this thesis, the MENA countries in each chapter changes slightly according to the availability of the data and the problematic of the chapter and is clearly specified at the beginning of the chapter. But globally we only exclude Djibouti and Malta from the World Bank's MENA list.

There are different classifications associated with the MENA countries :

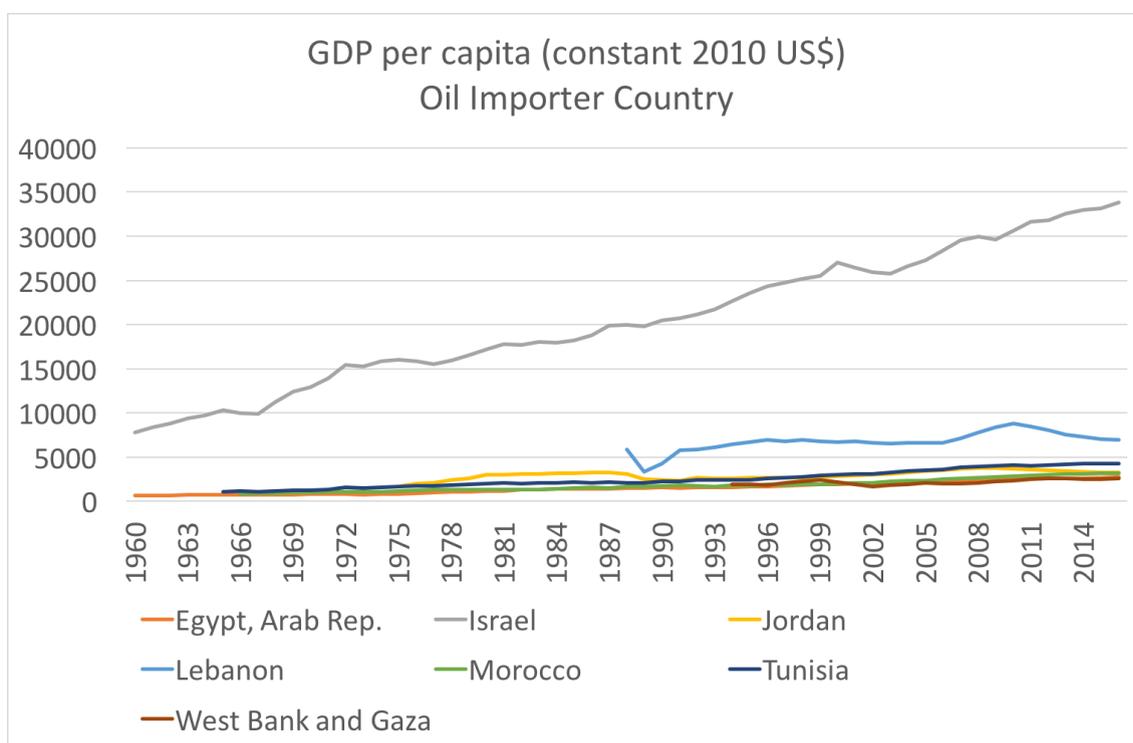
- **MENA oil-exporters** : Algeria, Bahrain, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, the United Arab Emirates, and Yemen.
- **MENA oil-importers** : Djibouti, Egypt, Jordan, Lebanon, Morocco, Syria, and Tunisia.

1.B. COMPLEMENTARY FIGURES

- **The GCC (Gulf Cooperation Council)** : Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
- **The Maghreb** : Algeria, Libya, Mauritania, Morocco, and Tunisia.
- **The Mashreq** : Egypt, Jordan, Lebanon, and Syria.
- **The ACTs (Arab countries in transition)** : Egypt, Jordan, Libya, Morocco, Tunisia, and Yemen.
- **The Arab World** : Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen.

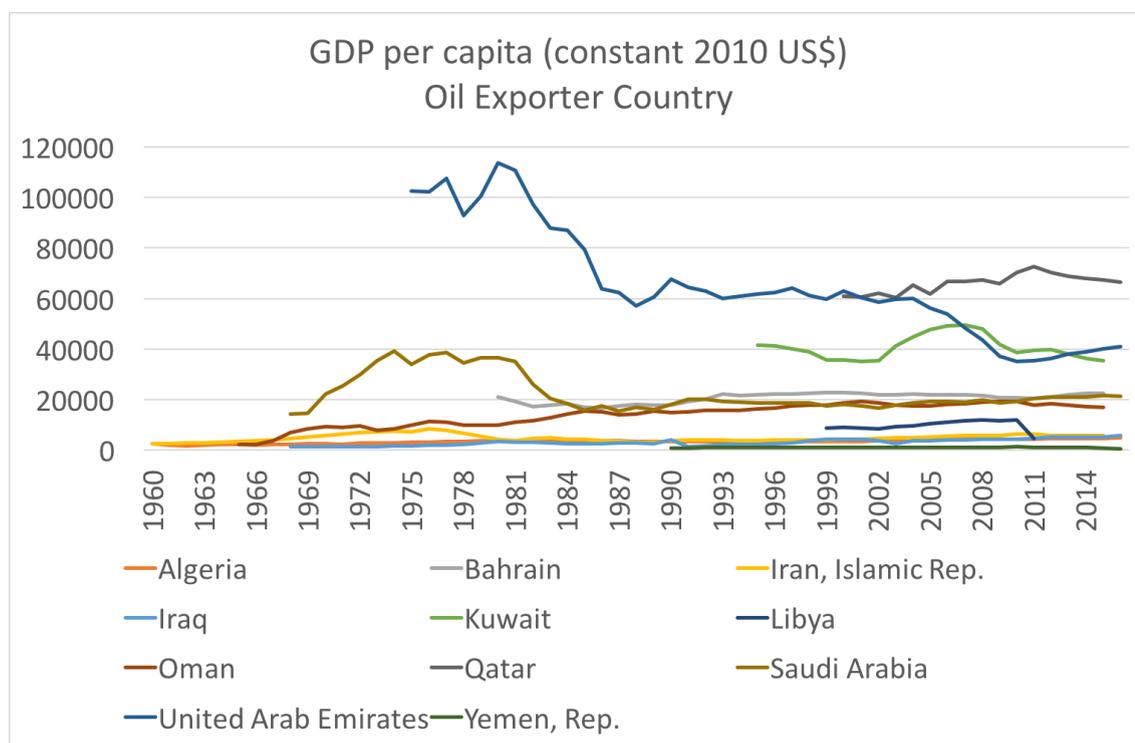
1.B Complementary Figures

FIGURE 1.B.1 – GDP per capita - MENA oil-importers



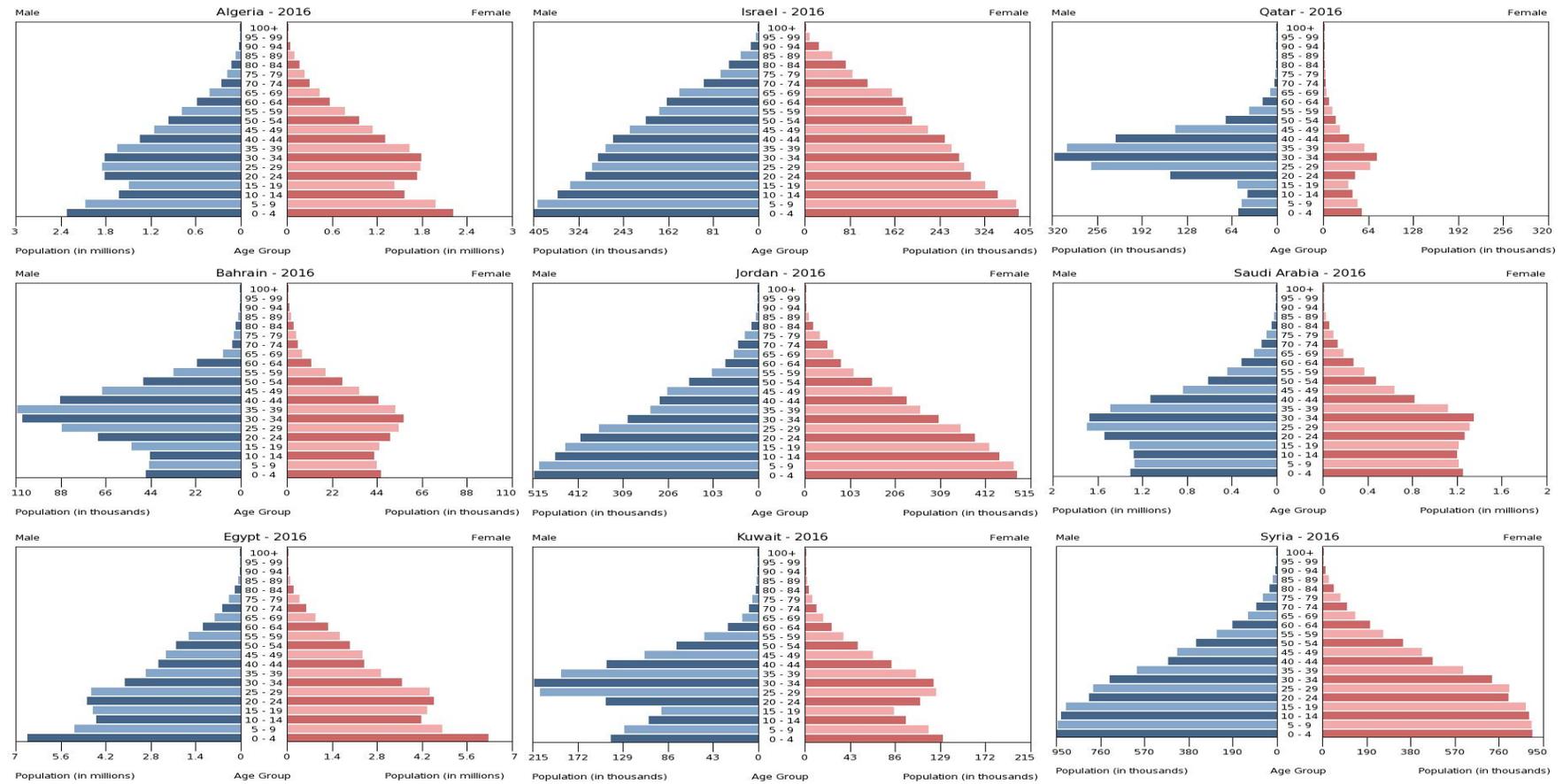
Source : WDI

FIGURE 1.B.2 – GDP per capita - MENA oil-exporters



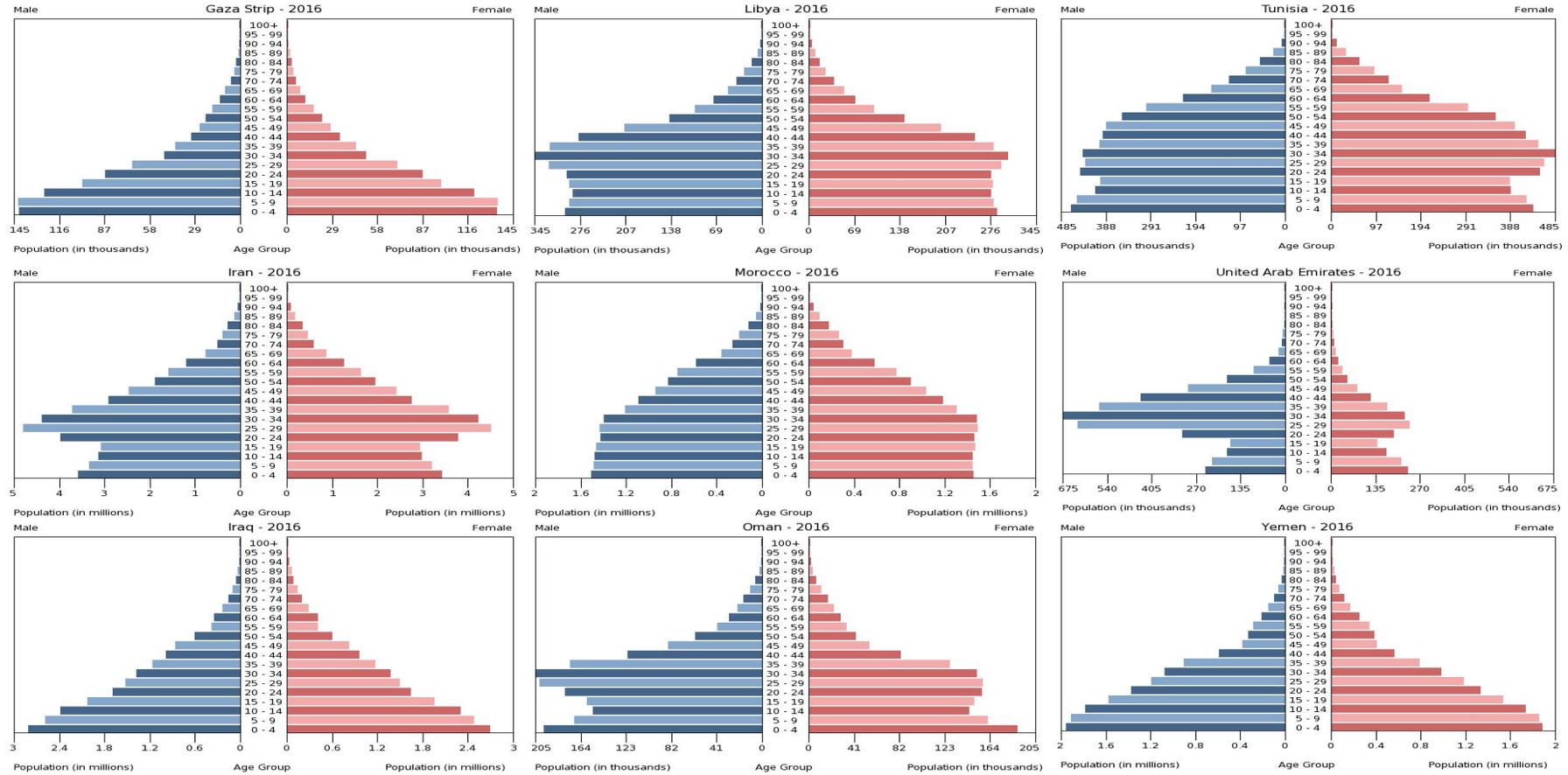
Source : WDI

FIGURE 1.B.3 – Population pyramid in MENA countries in 2016 (page1/2)



Source : The World Factbook <https://www.cia.gov/library/publications/the-world-factbook>

FIGURE 1.B.4 – Population pyramid in MENA countries in 2016 (page2/2)



Source : The World Factbook <https://www.cia.gov/library/publications/the-world-factbook>

Chapitre 2

Demographic transition, financial markets and growth : Analysis of selected MENA countries

Résumé

Alors que la région MENA connaît une transition démographique rapide et imminente, faire face à des taux de chômage élevés pour les jeunes instruits reste l'un des plus grands défis à relever dans de nombreux pays de la région.

Dans ce chapitre, nous évaluons l'impact économique d'une transition démographique dans certains pays de la région, notamment l'Iran, le Maroc et l'Égypte. Nous utilisons un modèle d'équilibre général à générations imbriquées et introduisons un coût de mobilisation du capital qui représente l'efficacité des marchés financiers, puis en utilisant les prévisions de Nations Unies, nous simulons les tendances démographiques actuelles dans chaque pays jusqu'en 2100.

Nos résultats, dans un premier temps, suggèrent que l'évolution démographique sera un moteur important de la croissance et de la réduction du chômage au cours des prochaines décennies. Dans un deuxième temps, nous réévaluons l'impact de dif-

férents scénarios d'amélioration de l'efficience des marchés financiers (nous utilisons le coût de mobilisation du capital pour le modéliser) et montrons qu'un secteur financier plus efficient conduit à une meilleure performance économique. L'impact du gain d'efficience du secteur financier peut conduire à une réduction du chômage, jusqu'à 8 pp pour le groupe d'âge le plus jeune. Nous montrons également que les jeunes sont les premiers bénéficiaires de la transition démographique et du gain d'efficacité dans le secteur financier.

1 Introduction

The demographic transition is among the most important challenges facing the global economy in the 21st century. These demographic changes are particularly challenging in the Middle East and North Africa (MENA), where the demographic transition started relatively late, compared to Latin America and Southeast Asia, but is happening at a considerably fast rate. (see Aoudia (2008)).

Our goal is twofold, firstly to evaluate the effect of a demographic shift on the economy, and secondly to estimate the impact of the financial market efficiency improvement in the process. The financial markets' performance is linked to demographic transition and contribute significantly to youth employment in the region.

The annual population growth rate in MENA declined sharply since the beginning of the 1990's, from an average of 3.5% in 1990 to 1.8% in 2015. We focus on Iran, Morocco and Egypt, three countries in the region who face the demographic change at quite different speeds. The decline in the fertility rate in Iran is one of the fastest in the world, it took only a decade for the fertility rate to drop from more than 6 births per woman to fewer than 3, which is even faster than China's over 6 to under 3 fertility transition. In Morocco, this transition took 22 years, while in

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Egypt, however, the fall in fertility rates started earlier and the number of births per woman dropped under 6 by 1970, it still has not reached less than 3 children, 47 years later, with the current rate being 3.3 children per woman. Hence, Iran, Morocco and Egypt are chosen to represent fast, medium and slow demographic transition.

The labor force in the region has grown at the fastest annual rate in the world (2.7% in the past 10 years), at the same time this demographic gift comes more as a demographic challenge since youth unemployment in the region is also among the highest. In 2015, youth unemployment reached 30% in Iran and Morocco and higher than 40% in Egypt.¹

Changes in the age structure of the population have become a worldwide phenomenon in both developing and advanced economies, with potential implications on economic growth. Mason (2005) indicates that the demographic change has a direct, favorable effect on per capita income, through two demographic dividends, the first dividend arises from changes in age structure of the population that influence the share of the population concentrated in the working ages, given fixed output per worker, participation and unemployment rates, this will lead to an increase in output per capita. The second dividend arises to the extent that anticipated changes in the share of the population concentrated in the retirement ages induce individuals, firms, and governments to accumulate capital. In short, in order to provide old-age consumption, society increases the savings rate. Therefore, the demographic change not only matters for the stock of the human capital, but also for the one of physical capital, and since financial markets play a crucial role to allocate capital and channel the available funds in the economy to their most productive use, it is hence fundamental to take into account the role of the financial markets in the growth process associated with demographic change.

In this paper, not only we evaluate the economic effect of the demographic shift,

1. Unemployment rates for ages between 12 and 24, given by national statistics.

but we also introduce a measure of financial market efficiency into the model. The main purpose of this work is to identify factors that can promote youth employment and specifically to estimate whether financial markets can stimulate youth employment and to what extent.

The model is calibrated for Iran, Morocco and Egypt. Nevertheless, our results are likely to apply more generally to almost every country in the region. In all of these countries, although persistent youth unemployment rate is one of the main challenges, the demographic transition is not yet complete. Hence, we expect a massive entrance of the youth in the labor market followed by a fall in the upcoming decades, although the fall is happening at different rates, it will severely impact the economy.

We use an overlapping generation framework with a search and matching structure in the labor force. One original feature of the model is that we add a cost of capital allocation as a proxy for the efficiency of the financial sector. This cost represents the fees charged by the financial sector in the process of financial intermediation. Although the sector is not very well developed in the countries of this study, it has been subject to many reforms and growing rapidly during the past decade.

The impact of demographic evolution on economic performance has long been a subject of debate in the literature. Bloom and Canning (2004) argue that since the early 1980s the dominant academic belief was that the population growth is rather neutral to economic growth. However, the emerging evidence indicates that since people's needs and contributions to the economy vary over their life cycle; population does matter to growth, with age structure playing a central role. Favero et al. (2011) and Favero et al. (2015), based on US data provide empirical evidence to put forward the importance of including the age structure of the population in the macro-finance models. Liao (2011) highlights the importance of demographic transition as a driver for growth and show that more than one third of the output growth in Taiwan during the past four decades can be attributed to demographic

transition. Boucekine et al. (2002), study the impact of an improvement in life expectancy on growth and conclude that although higher survival probabilities lead to better schooling and later retirement, it does not necessarily lead to higher economic growth. D'Albis (2007), determines the impact of a demographic change on per capita capital and finds that this relationship is rather non-monotonic, in contrary to the classical OLG models that find a strictly decreasing relationship between capital accumulation and age structure. Martins et al. (2005) study the impact of aging in OECD economies, and imply the change in age structure of the population affects supply side of the economy in capital markets, labor markets and also the productivity; they conclude that demographic structure has a real impact on GDP growth rates. Moreover, they highlight the importance of the structure of financial markets in the process.

One of the main contributions of this paper is that we take into account the evolution of both physical and human capital, contrary to the existing literature that only focus on one of these aspects. Secondly, this paper uses real data on population structure, which not only includes information regarding fertility rates, but also information about mortality rates that may have a different effect on GDP per capita. While other papers mainly focus on the evolution of the fertility or population growth rates, others such as Lagerlöf (2006) introduce endogenous fertility. The focus of this paper on Iran, Morocco and Egypt is another novelty, to our knowledge there is no similar model calibrated for MENA countries.

Theoretical papers dealing with financial markets and demography, investigate the effect of a demographic change on asset prices. A common framework is Overlapping Generations (OLG) with production and capital accumulation, the introduction of adjustment cost allows capital to be priced endogenously. Geanakoplos et al. (2004) show that demographic changes could impact asset prices; Abel (2003) shows that baby boom will eventually lead to a meltdown in stock prices as the current baby boom generation retires. The intuition behind the link between changing

demographics and financial asset prices is the life cycle hypothesis, which suggests young people (aged 20-39) are likely to be net borrowers. The middle-aged (aged 40-64) are involved heavily in accumulation of net assets. This is because they are at the peak of their earnings potential, and likely to be saving for retirement. A relative increase in the size of this group would lead to a high demand for financial assets, e.g. stocks and bonds, resulting in an increase in financial asset prices.

The Finance-Growth nexus has been largely studied in recent decades. However, there are few research dedicated to development of financial markets in MENA region. Among studies discussing the different channels through which finance can promote economic growth, Levine (2005) and Panizza (2013) give a comprehensive survey of this literature, that goes back to the early works of Bagehot (1873) and Schumpeter (1911), and growing ever since. Saint-Paul (1992), develops a theoretical framework to analyze the interaction between financial markets and technological choice, his results justify the government will to encourage the development of the financial sector to move from a “low equilibrium” characterized by an underdeveloped financial sector and low division of labor towards a “high equilibrium” with strong financial markets and extensive division of labor. The main channels of positive spillover from financial sector to the economy is through better risk diversification, that allows agent to invest in riskier, more productive projects, that increase growth.

The classical empirical studies, by Goldsmith (1969), McKinnon (1973) and Shaw (1973), highlight the positive correlation between financial development and economic growth. Meanwhile, studies that focus on the region provide conflicting results. Naceur and Ghazouani (2007) underline the relationship between financial development and economic growth for 11 MENA region countries, using a dynamic panel model with GMM² estimators and their empirical results reinforce the idea of no significant relationship between banking and stock market development, and growth. They conclude, this lack of relationship must be linked to underdeveloped financial

2. Generalized method of moments

systems in the MENA region that hamper economic growth, and that these countries should improve the functioning of their financial system in order to prevent their economies from the negative impact of a shaky financial market. Ben Naceur et al. (2008), also focus on MENA region, specifically, the impact of the stock markets on growth; they find a negative impact of the stock markets in the short run that turns positive in the long run. Among the papers studying developed economies, Greenwood et al. (2013) use a costly state verification model, and stress the importance of financial intermediation for economic development and conclude that 29 percent of U.S. growth can be attributed to technological improvements in financial intermediation. To our knowledge there is no study in the literature on the impact of financial development on economic growth that controls for demographic changes.

The paper is organized as follows. The model is introduced in the second section, third section details our calibration strategy. Results are presented in the fourth section and the last session concludes.

2 Theoretical Framework

We develop a general equilibrium OLG model inspired by de la Croix et al. (2013), except that we do not take into account the retirement period and introduce the financial sector efficiency to the real sector, with search and matching structure in the labour market. The originality of the model is that following Pagano (1993) we introduce an investment cost as a proxy for financial markets' efficiency. For the sake of simplicity we do not introduce retirement in the model, although this will be a shortcoming in the case of studying an aging population.³

3. The pension schemes are not very well developed in the region and many elderly stay in the labor market or depend on their children.

2.1 Demography

Our focus is on the individual's behavior when they are active in labor market, more specifically, agents of ages 15 to 64. Each period of time in the model stands for 10 years, individuals are assumed to enter their economically relevant life at ages 15-24 ($a = 0$) and leave it at 55-64 ($a = 4$).

$Z_{a,t}$ represents the population of age a in period t . The size of the initial cohort (population at age $a = 0$) is known, i.e. $Z_{0,t}$ is known, let $\beta_{a,t}$ the conditional survival probability of reaching age a in period t , if the agent has survived until age $a - 1$ in period $t - 1$. The total population of age a in period t is given by⁴ :

$$Z_{a,t} = \beta_{a,t} Z_{a-1,t-1} \quad \forall t \geq 1 \quad (2.1)$$

We suppose that the participation rate is exogenous and normalized to 1. and since the individuals stay in the labor force until their last period, the working age population is given by Z_t :

$$Z_t = \sum_{a=0}^4 Z_{a,t}$$

Agents of working age are either employed ($N_{a,t}$) or unemployed ($U_{a,t}$) with $n_{a,t}$ and $u_{a,t}$ representing the employment and unemployment rates :

$$Z_{a,t} = N_{a,t} + U_{a,t} = (n_{a,t} + u_{a,t}) Z_{a,t} \quad (2.2)$$

The labor market has a Diamond-Mortensen-Pissarides (DMP) search and matching structure, in which firms post vacancies as a cost and jobs are distributed through a basic search and matching model and wages are determined in each period by a Nash bargaining solution.⁵ We assume that there is a constant return to

4. Considering migration is beyond the scope of this paper.

5. The classical contributions are given in Diamond (1981), Pissarides (1985) and Mortensen and Pissarides (1994).

scale matching function :

$$M_t = M(V_t, \Omega_t) = \bar{m}V_t^{1-\gamma}\Omega_t^\gamma \quad (2.3)$$

With M_t denoting the number of possible matches between job seekers and the vacancies, V_t the number of vacancies available and $\Omega_{a,t}$ is the number of job seekers of age a in period t . At age 0 every agent, entering the market is a job seeker, $\Omega_{0,t} = Z_{0,t}$

for ages above 0 the number of job seekers is given by the unemployed in the previous period plus those how have lost their jobs in the past period (with χ being the job destruction rate) :

$$\Omega_{a,t} = (u_{a-1,t-1} + \chi n_{a-1,t-1})Z_{a,t} \quad (2.4)$$

$$= (1 + (\chi - 1)n_{a-1,t-1})Z_{a,t} \quad \text{for } a = \{1, 2, 3, 4\} \quad (2.5)$$

The total number of job seekers in each period, Ω_t , is given by the sum of job seekers in all ages :

$$\Omega_t = \sum_{a=0}^4 \Omega_{a,t} = Z_{0,t} + \sum_{a=1}^4 (1 + (\chi - 1)n_{a-1,t-1})Z_{a,t} \quad (2.6)$$

The probability of finding a job denoted by p_t , and the probability for a vacancy to be filled, q_t are given by :

$$p_t = \frac{M_t}{\Omega_t} \quad \text{and} \quad q_t = \frac{M_t}{V_t} \quad (2.7)$$

The employment rate for workers in age group a is equal to non-destroyed jobs from the last period, plus new hires of this period :

$$n_{a,t} = (1 - \chi)n_{a-1,t-1} + p_t \frac{\Omega_{a,t}}{Z_{a,t}} \quad \text{for } 1 \leq a \leq 4 \quad (2.8)$$

and

$$n_{0,t} = p_t \quad (2.9)$$

By replacing $\Omega_{a,t} = (1 - (1 - \chi)n_{a-1,t-1})Z_{a,t}$ we obtain the law of motion for employment :

$$n_{a,t} = (1 - \chi)n_{a-1,t-1}(1 - p_t) + p_t \quad \text{for } 1 \leq a \leq 4 \quad (2.10)$$

2.2 Households

We have a representative agent for each age category with perfect foresight, who does not leave intended bequest. All agents in the economy are price takers. The objective function of the households depends on their consumption and employment status, it is given by :

$$W_t^H = \max \sum_{a=0}^4 \left(\frac{1}{1 + \theta} \right)^a \beta_{a,t+a} \left(u(c_{a,t+a}) - d_n n_{a,t+a} \right) \quad (2.11)$$

Where $\theta > 0$ is the time preference and d_n is the constant disutility per unit of work and is supposed to be constant. We assume that there is no government in this model. This hypothesis is convenient, since the tax rates are relatively low in the countries of this study, and in general the government in these countries does not play an active role in providing citizens with good and widespread social security and pension schemes, therefore, we assume that the government's debt policy cannot be used as a vehicle for redistributing wealth among generations.

The household budget constraint at time $t + a$ is given by :

$$(w_{a,t+a}n_{a,t+a}) + \frac{\beta_{a-1,t+a-1}}{\beta_{a,t+a}}(1 + r_{t+a})s_{a-1,t+a-1} = c_{a,t+a} + s_{a,t+a} \quad (2.12)$$

With $s_{a,t}$ be the financial wealth accumulation at time t in per capita terms or

simply the savings rate. The financial wealth is whether held in shares or physical capital. Following Yaari (1965), we suppose that there is perfect insurance against individual lifetime uncertainty, therefore the total return to savings is equal to gross risk-free interest rate divided by survival probability from period $t + a - 1$ to the next period.

Thus, the Euler equation for the Households writes :

$$u'(c_{a,t+a}) = \frac{u'(c_{a+1,t+a+1})}{1 + \theta} (1 + r_{t+a+1}) \quad (2.13)$$

For later use we need to calculate the value of additional jobs for the household :

$$\frac{\partial W_t^H}{\partial N_{a,t}} = \frac{Z_{0,t}}{Z_{a,t}} \sum_{j=0}^{4-a} \left(\frac{1}{1 + \theta}\right)^{a+j} (\beta_{a+j,t+j}) (u'(c_{a+j,t+j}) w_{a+j,t+j} - d_n) \frac{\partial n_{a+j,t+j}}{\partial n_{a,t}} \quad (2.14)$$

with

$$\frac{\partial n_{a+j,t+j}}{\partial n_{a,t}} = (1 - \chi) (1 - p_{t+1} \frac{\beta_{a,t}}{\beta_{a+1,t+1}}) \left(\frac{\partial n_{a+j-1,t+j-1}}{\partial n_{a,t}}\right) \quad (2.15)$$

2.3 Firms

In this model we have a single production sector which is assumed to behave competitively. Production is constant return to scale, with two factors of production, namely, capital and labor. Labor is measured in efficiency units, h_t , and efficiency can vary across ages due to experience and also across generations due to education difference. The total labor input is defined as :

$$H_t = \sum_{a=0}^4 h_{a,t} N_{a,t} \quad (2.16)$$

Production function of the representative firm is assumed to be a constant return to scale Cobb-Douglas.

$$Y_t = A_t F(K_t, H_t) \quad (2.17)$$

Where Y_t is the output produced in period t and A_t is the total factor productivity and K_t is the capital stock.

Firms rent capital at cost ν_t , which is an increasing function of the interest rate, depreciation rate of capital and the financial cost of capital, which we will define in the following section. In our model we focus on one of the main functions of the financial sector which is, mobilize savings.

With ζ being the cost of posting a vacancy. The firm will maximize the following Bellman equation :

$$W_t^F = \max_{K_t, V_t} \left\{ F(K_t, H_t) - \nu_t K_t - \sum_{a=0}^4 w_{a,t} N_{a,t} - \zeta V_t + R_{t+1}^{-1} W_{t+1}^F \right\} \quad (2.18)$$

Subject to :

$$N_{a,t} = Z_{a,t} n_{a,t} \quad (2.19)$$

$$n_{a,t} = (1 - \chi) n_{a-1,t-1} + p_t \frac{\Omega_{a,t}}{Z_{a,t}} \quad \text{with} \quad n_{0,t-a} = p_{t-a} \quad (2.20)$$

$$p_t = q_t \frac{V_t}{\Omega_t} \quad (2.21)$$

Hence, we obtain the first order conditions as follows :

$$\nu_t = F_{K_t} \quad (2.22)$$

$$\zeta = q_t \sum_{a=0}^4 \frac{\Omega_{a,t}}{\Omega_t} \frac{\partial W_t^F}{\partial N_{a,t}} \quad (2.23)$$

Note that ζ is the marginal cost of hiring and $\frac{\partial W_t^F}{\partial N_{a,t}}$ is the value at time t of an additional worker of age ζ and is given by :

$$\frac{\partial W_t^F}{\partial N_{a,t}} = \frac{1}{Z_{a,t}} \frac{\partial W_t^F}{\partial n_{a,t}} \quad (2.24)$$

$$= \sum_{j=0}^{4-a} \frac{\beta_{a+j,t+j}}{\beta_{a,t}} \frac{(1-\chi)^j}{1+r_{t+j}} (h_{a+j,t+j} F_{H_{t+j}} - w_{a+j,t+j}) \quad (2.25)$$

This condition shows that, in the equilibrium the marginal cost of hiring should be equal to marginal value of employment to the firm.

2.4 Wages

Wages are negotiated in every period and are determined by a standard Nash bargaining rule :

$$\max_{w_{a,t}} \left(\frac{\partial W_t^F}{\partial N_{a,t}} \right)^{1-\eta} \left(\frac{1}{u'_{c_{a,t}}} \frac{\partial W_t^H}{\partial N_{a,t}} \right)^\eta$$

The First order optimality condition is given by :

$$(1-\eta) \frac{1}{u'_{c_{a,t}}} \frac{\partial W_t^H}{\partial N_{a,t}} = \eta \frac{\partial W_t^F}{\partial N_{a,t}} \quad (2.26)$$

2.5 Cost of investment for the representative firm

In a closed economy with no government, and perfect financial markets, capital market equilibrium requires that aggregate gross saving, $S_t = \sum_a s_{a,t} Z_{a,t}$, equals gross investment, I_t . Here, following Pagano (1993), we assume that a proportion $1-\varphi$ of the aggregate flow of saving is ‘lost’ in the process of financial intermediation :⁶

$$\varphi S_t = I_t \quad (2.27)$$

6. This specification for the cost of capital is equivalent to the one by Abel (2003), if we only assume that the capital adjustment technology in the next period takes a linear form instead of a log-linear one, this setting help us to keep a linear relationship between net investment, gross savings and the depreciation rate.

In the process of transforming saving into investment, financial intermediaries absorb resources, so that a unit saved by the households generates less than one unit worth of investment, this represents the fraction φ in Equation (2.27). The remaining fraction $1 - \varphi$ goes to banks as the spread between lending and borrowing rates, and to securities brokers and dealers as commissions, fees, etc. This absorption of resources by the financial sector is primarily a reward for services supplied, but it may also reflect the X-inefficiency of the intermediaries and their market power. Moreover, the activity of the financial sector is often burdened by taxation (in the form of high reserve requirements, transaction taxes, etc.) and by restrictive regulations, translating into higher unit margins. If financial development reduces this leakage of resources, there will be a rise in φ .

Thus, we model the efficiency of the financial sector as a change in financial transaction cost. Households save the amount S_t and receive in the next period $(1 + r_{t+1})S_t$. Firms, on the other hand, only receive a fraction of these savings due to the presence of transaction costs, $\varphi_t S_t$, with $0 < \varphi \leq 1$, and $(1 - \varphi)$ what will remain from the initial savings after the production process, is the depreciated investment which would be equal to $(1 - \delta)\varphi_t S_t$, hence, the total cost of capital for the firm in the period $t + 1$, writes :

$$\nu_{t+1}\varphi S_t = (1 + r_{t+1})S_t - (1 - \delta)\varphi S_t \quad (2.28)$$

$$\nu_{t+1} = \frac{1 + r_{t+1}}{\varphi} - (1 - \delta) \quad (2.29)$$

$$r_t = \varphi(1 - \delta + \nu_t) - 1 \quad (2.30)$$

Equation (2.30) shows that an increase in the financial sector efficiency, translated as an increase in φ , will lead to, ceteris paribus, an increase in the interest rates. We need to distinguish this definition of cost of capital from the literature on ad-

justment cost for investment, since the nature of these two are completely different and the cost of capital that we defined is due to financial markets transaction costs and independent of the production process or the nature of the investment.

We can define $R_t(\varphi, r_t) \equiv \frac{1+r_t-\varphi}{\varphi}$ to finally obtain the cost of capital, similar to the canonical model :

$$\nu_t = R_t(\varphi, r_t) + \delta \quad (2.31)$$

We can interpret $R_t(\varphi, r_t)$ as the interest firms pay for their capital which is not the same interest that households receive r_t due to financial market fees ($R_t(\varphi, r_t) > r_t$). This distinction between interest paid by firms and the interest received by the households helps to see the link between our settings and the canonical model.

2.6 Equilibrium

All agents in this economy are price-takers and all markets are competitive. There are 3 markets in our economy : market for capital, labor and a physical good which is either consumed or invested to build future capital. We write the equilibrium conditions for each market in our economy :

- **Labor market** : the equilibrium is given by the wages and Nash bargaining solution in equation (2.26).
- **Good market** : we have the good market equilibrium as :

$$\sum_a c_{a,t} Z_{a,t} + I_t = Y_t \quad (2.32)$$

- **Capital markets** : The stock of the capital next period is constructed by investment in the current period plus the depreciated capital of the previous period.

$$K_{t+1} = I_t + (1 - \delta)K_t \quad (2.33)$$

3 Calibration

The focus of this paper is on selected MENA countries, namely, Iran, Morocco and Egypt. This selection is due to different demographic characteristics, notably the speed of decline in the fertility rate. The parameters of the model are set to reflect the best the economic situation, labor market tensions and the demographic shifts in these countries.

3.1 Parameters

The main parameters remain the same across the selected countries, the major difference is in demographics which is detailed in the following section. There are four different categories of parameters in the model :

General technological and preference parameters ; these parameters are mostly uncontroversial and are set to values consistent with previous contributions or microeconomic evidence. A constant return to scale Cobb-Douglas production function, with elasticity of output with respect to capital set at $\alpha = 0.33$. Total factor of productivity is set to produce the same gap in GDP per capita among the countries as we observe in the data.⁷ Other technological and preference parameters are reported in Table 2.1.

TABLE 2.1 – General technological and preference parameters

Symbol	Definition	Value	Source
α	Elasticity of output with respect to capital	0.33	de la Croix et al. (2013)
θ	Time preference	0.01	Hagedorn and Manovskii (2008)
δ	Depreciation rate of capital	5% annually	de la Croix et al. (2013)
d^n	Disutility of working	0.25	de la Croix et al. (2013)

The second category of parameters, is the age dependent productivity of agents. Skirbekk (2004) gives a survey of the literature regarding the productivity of the labor force for different age groups. Most studies show a considerable decline in productivity after the age 50, as a result of the decline in cognitive and mental

7. TFP is set to 21, 18.9 and 19.5 in Iran, Morocco and Egypt respectively.

3. CALIBRATION

abilities, which is considered a universal phenomenon.⁸ Our main assumption here is that the age-productivity profile remains the same among the countries of our study and as suggested by empirical findings increases until the age of 50 and then decreases very slowly, as reported in Table 2.2.⁹

TABLE 2.2 – Age specific human capital

Symbol	Definition	Value
h_0	Human capital for agents of ages within 15-24	1.3647
h_1	Human capital for agents of ages within 25-34	2.3647
h_2	Human capital for agents of ages within 35-44	4.3647
h_3	Human capital for agents of ages within 45-54	6.8647
h_4	Human capital for agents of ages within 55-64	6.3647

The third category gathers labor market parameters. These parameters are associated with a frictional labor market. The matching process is a constant return to scale Cobb-Douglas function, the elasticity of matches with respect to vacancies, γ , and the workers' bargaining power, η , are set at 0.5. The matching efficiency parameter, \bar{m} , and vacancy cost, ζ , are set to target the final steady state of finding job and posting a vacancy at 90%, since the unemployment is around 10% in the countries in our sample¹⁰ According to national statistics. The job destruction rate is calculated based on the KILM data set by ILO. In Key Indicators of the Labour Market (KILM) dataset, we have the job destruction rate for Morocco, for Iran and Egypt its value is supposed to be similar, it is estimated by quarterly unemployment inflows and is around 0.004 for the countries in MENA region. Table 2.3, brings together all these parameters.

The fourth category of parameters are specific to the financial market develop-

8. Age-productivity profile is estimated almost always by wage differentials, which is quiet debatable as the rewards to the seniors maybe due to loyalty or past achievements rather than current productivity, on the other hand, older workers importance to the companies is difficult to measure since it can be due to wider networks, knowing better how to deal with problems with lower frequencies, etc. Hence, although wage differentials are not the ideal measures for productivity, they are considered one of the best so far.

9. In order to verify that our results are not simply a response to the calibration of the human capital we perform a robustness check in Appendix 2.C, where, we set the human capital constant among different age groups.

10. 10.2% for Morocco, 13% for Egypt and 12.8% for Iran in 2014.

TABLE 2.3 – Frictional labor market parameters and financial market efficiency

Symbol	Definition	Value	Source
γ	Elasticity of matches with respect to vacancies	0.5	de la Croix et al. (2013)
\bar{m}	Matching efficiency parameter	0.9	Authors by targeting p and q
η	Bargaining power of workers	0.5	de la Croix et al. (2013)
χ	Job destruction rate (quarterly)	0.004	ILO, KILM 9 dataset
ζ	Cost of posting a vacancy	43.5	Authors by targeting p and q

ment. According to Lesmond et al. (1999), estimated transaction costs vary from 10% for small firms to 1% for large firms in developed economies. Naturally this figure is much higher in MENA region with less developed financial sector. We assume that the cost of allocating capital is 20%, when the financial markets are relatively inefficient. This cost can be reduced in the case of financial market efficiency improvement, meaning that the variable $\varphi = 0.8$ when financial markets are inefficient and it can reach $\varphi = 1$ where financial markets so efficient that the cost of capital allocations falls close to 0. We also perform a robustness check with the transaction cost of 10%, and end up with similar results that are reported in Appendix 2.B.

3.2 The Demographic Shift

According to Equation (2.1) the parameters that define the population dynamics in the model are $Z_{0,t}$ and $\beta_{a,t}$, which are the size of the initial cohort and the probability of reaching age a in period t if the agent has already survived to age $a - 1$ in period $t - 1$, respectively. These parameters are set to replicate the World Population Prospects data set by UN.¹¹ The use of real data on population allows us to incorporate information about mortality rates by age in our analysis, which is one the distinctive features of this paper since most of the literature simulate demographic shocks solely by considering the evolution of the fertility rates. and are reported in Appendix 2.A. The dynamics of population evolution per age group and total population for each country is represented in Figure 2.1.

11. United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects : The 2015 Revision, custom data acquired via website.

The growth rate of population, Figure 2.2, is a decreasing function, although for Iran and Morocco we observe a slight take off in the final periods of the simulation.

We consider the period where the share of the youngest age group surpasses the share of the oldest age group in the working age population as a turning point in the demographic shift of each country. Thus, according to Figure 2.3 the turning point for Iran, Morocco and Egypt are 2040, 2070 and 2100 respectively. This also reflects the speed of the demographic shift and the aging process in the labor force which is the fastest for Iran and the slowest for Egypt.

3.3 Financial efficiency shock

In order to study the impact of financial efficiency improvement¹² On the economic variables, we consider different scenarios for the financial sector efficiency improvement. In the “Baseline scenario” the cost for allocating capital remains unchanged and the evolution of variables are solely a response to the change in the demographic structure, which replicates the population given in the data; the “High scenario”, in addition to the demographic change, consists of a 50% decline in the cost of capital allocation in every period or every decade; and the “Low scenario”, is a very gradual improvement in the sector corresponding to 5% decline in the cost for mobilizing capital. In both of these scenarios the decrease in the capital’s cost start in 2000, Table 2.4 gives the value of φ under each scenario.

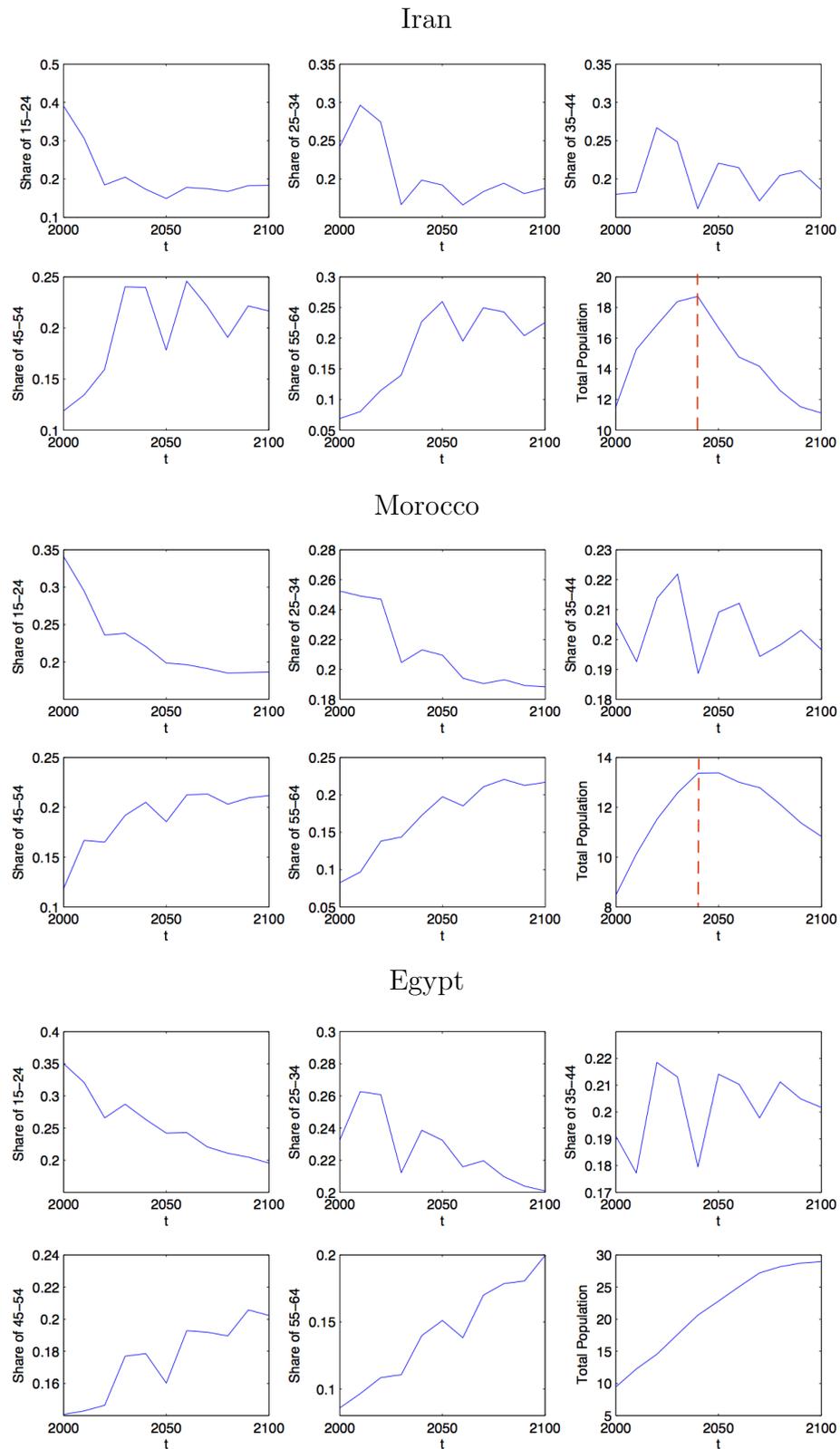
TABLE 2.4 – The value of $(1 - \varphi)$ or the cost of capital accumulation under different scenarios

Period	1	2	3	4	5	6	7	8	9	10
Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
High	0.2	0.1	0.05	0.025	0.0125	0.0062	0.0031	0.00156	0.00078	0.00039
Low	0.2	0.19	0.18	0.17	0.16	0.15	0.147	0.139	0.132	0.126

12. The main focus of this paper on the efficiency of the financial sector and not its size. Some recent studies such as Arcand et al. (2015) show that if the financial sector grows too large it would harm the real economy. Our main assumption here is that the financial sector gets more efficient in time but identifying the reforms in the sector that go hand in hand with capital allocation efficiency is beyond the scope of this paper.

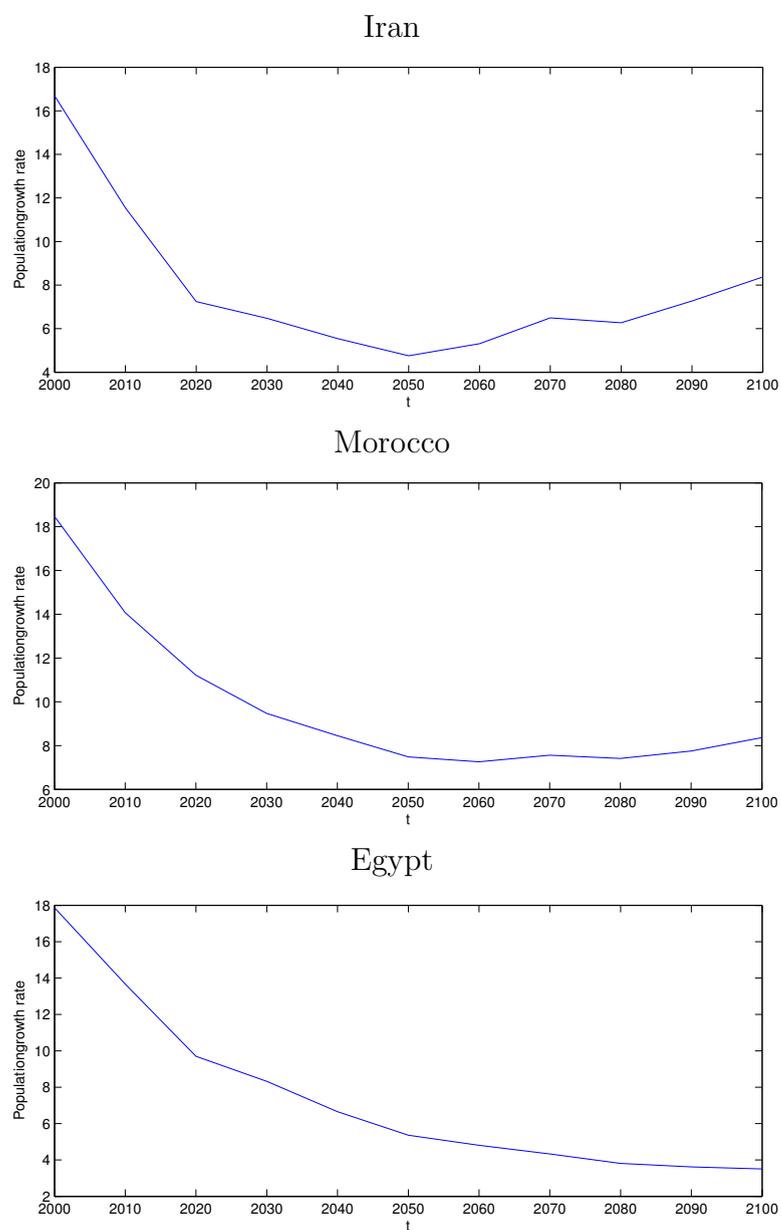
In other words, our the “Baseline scenario” takes into account only the demographic changes, while “High scenario” studies the impact of a continuous huge and significant reform in the financial sector on these demographic changes and “Low scenario” focuses on small but continuous reforms in the financial sector.

FIGURE 2.1 – Population dynamics by age and total



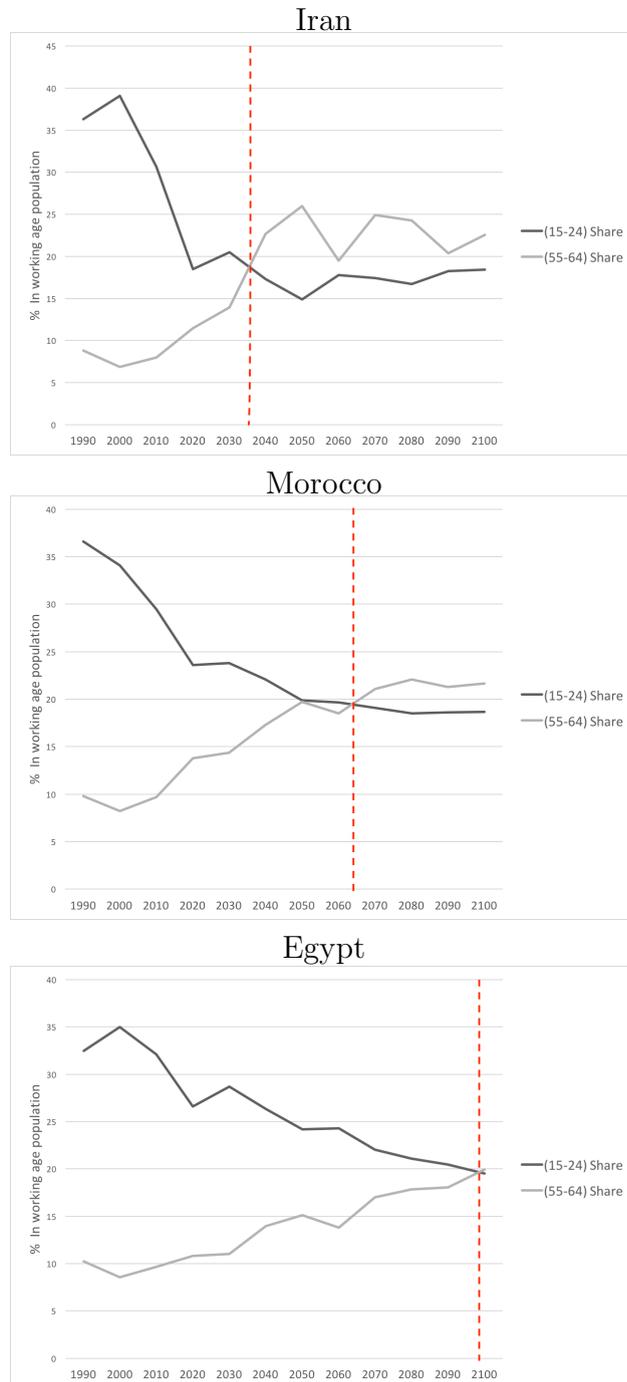
Note : Population of each age group is represented as its share in total active population
(Authors' calculations based on UN data set)

FIGURE 2.2 – Active population growth rate



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FIGURE 2.3 – The evolution of the share of the youngest and oldest age group in the labor force



4 Results

In this section we represent the simulation results. We quantify the impact of a demographic shift on the principal macroeconomic variables such as GDP and employment rate, and compare the dynamics of each indicator under different scenarios for financial efficiency improvement.

Growth

The impact of the demographic change on GDP evolution is reported in Figure 2.1, as expected the GDP level in the economy follows closely the working age population (Figure 2.1), the more human capital is abundant, the higher GDP level rises. For Iran, both the peak in the working age population and the peak in GDP level is in 2040, which is 173.8% higher than the GDP level in 2000. For Egypt both the working age population and GDP level rise until the last period. As for Morocco, the peak in the labor force occurs in between 2040 and 2050 followed by a smooth decline, while the GDP rises to its highest levels from 2050 to 2070.¹³ This peak also corresponds to the turning point in the aging process of the labor force in each country. Furthermore, the comparison among different scenarios, shows that more efficient financial sector leads to higher output level.

In order to quantify the effect of the labor force aging on growth, and to exclude the effect of the population size, it is more useful to look at the GDP per capita evolution (see Figure 2.2). GDP per capita rise as the population ages, it tends to stabilize at the turning point of the demographic shift, i.e. for Iran in 2040 and for Morocco in 2070, at the same time for Egypt it continues to rise until the last period. Our findings are in line with D'Albis (2007) and Boucekkine et al. (2002), who find a non-monotonic impact of the demographic evolution on the economy. The main

13. The main reason is that, in the model productivity of agents rise with age, therefore the labor becomes more productive as the country is aging. In Morocco the decline in the labor force happens at a slow pace from 2040 to 2070. Therefore the gain in productivity due to aging dominates the effect of the increase in the labor force.

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difference of our work is that unlike D’Albis (2007) who only takes into account the evolution of the physical capital and Boucekkine et al. (2002) who focus only on the human capital, we consider the evolution of both physical and human capital. Secondly, those papers study the impact of an increase in population’s growth rate (as a response to fertility shocks), while our paper uses real data on population structure, which also includes information about mortality rates that may have a different effect on GDP per capita.

One can also note that the rise in GDP per capita is higher under the High scenario, showing the positive impact of the financial sector efficiency improvement on GDP per capita. Table 2.1 reports the percentage rise in GDP per capita in the last period of the simulations, compared to its initial level in 2000. Morocco benefits the most from a gain in the efficiency of the financial sector and ends up with 26.37 percentage point higher GDP per capita under the High scenario. We expect this gain in GDP per capita lead to a significant fall in unemployment rates.

TABLE 2.1 – GDP per capita in 2100

	Baseline	High Scenario	Low Scenario	P.P. difference between High and the baseline	P.P. difference between Low and the baseline
Iran	69.63	92.65	76.93	23.02	7.3
Morocco	61.84	88.21	72.66	26.37	10.82
Egypt	43.78	68.73	53.38	24.95	9.6

Note : The numbers are represented as the percentage difference from the initial value of GDP per capita in 2000. For instance, under the baseline scenario, the GDP per capita in Iran in 2100 is 69.63 % higher than its value in 2000.

The rise in GDP per capita, with no surprise, is associated with higher productivity of the labor force, (see Figure 2.3). The productivity is calculated as output per worker, as the population aging and we end up with proportionately more experienced workers affiliated with higher productivity. This is an interesting feature of the model that takes into account the evolution of the human capital associated with aging.

Employment

The OLG framework makes it possible to distinguish between different age groups, the unemployment rates vary significantly among ages, with the youth having the highest unemployment rate of about 40% while the unemployment rate for the oldest agents is a quarter of it. These figures are in line with the data from the labor market in the region and highlights the fact that most of the tension in the labor market is on youth (Figure 2.4). Accordingly, the impact of the shock is much stronger on younger individuals and the variations of unemployment rates are more significant for the youngest age group. The unemployment rates among individuals of age 45 and above are quite similar.

The demographic evolution can affect unemployment via two direct channels. Firstly, through an increase in population and the labor force that may lead to higher unemployment by the supply-demand mechanism. Secondly, through the change in the age structure of the population; as the population ages, the unemployment rate falls. The main reason is that the unemployment rate is higher among the youth, because individuals are more experienced at older ages, hence more productive and subject to higher human capital; besides, they were present in labor market for a longer time, hence they have higher probability to be employed. Furthermore, there is an indirect channel in play, which is through capital accumulation, as the population aging, the aggregate savings increases since older age groups tend to save more, which leads to higher investment and job creation, hence, low unemployment rates. Figure 2.5 shows that these channels dominate, and the demographic evolution has a powerful negative impact on unemployment rates. The demographic transition alone is responsible for 16 , 14.2 and 10.3 percentage point decrease in the total unemployment rate in Iran, Morocco and Egypt, respectively.

Financial market efficiency improvement leads to greater stock of capital and consequently higher productivity of capital, thus, lower unemployment rates; and

since the impact of the shock is clearly stronger under the high scenario, the unemployment rates are the lowest in this scenario. Younger age groups benefit more from the efficiency gain in the financial sector ; while the gain can be as high as 8.3 pp. for the youngest cohort, it is no higher than 2.5 pp. for the oldest one. Table 2.2 reports the unemployment rates in the last period of the simulation under the Baseline and High scenario for all age groups, as well as, the total unemployment rate. As the size of the youngest cohort is shrinking, the fall in the unemployment rate is the greatest for the younger cohorts.

One can also note that the drop in the unemployment rate is sharper for Iran, who faces more abrupt fall in the fertility rates (higher demographic dividend), than Morocco, where the fertility rates decline at a smoother pace. The fall in unemployment rates is the lowest for Egypt, where fertility rates are rather stable and the demographic dividend is the lowest.

Another interesting observation in this figure is that the age structure of the population affects the unemployment rate beyond a simple supply-demand mechanism. The unemployment rates tend to stabilize at the same year of turning point in the demographic shift of every country (2040, 2070 and 2100 for Iran Morocco and Egypt respectively) .

Savings

Savings is one of the most studied macroeconomic aggregates which has important implications on growth and consumption levels and its evolution is a determining factor for the dynamics of the OLG models. In fact, the importance of household's decision on savings in the model is twofold, it is an essential factor for wealth determination in the budget constraint, it also shapes the dynamics of the capital accumulation in the economy.

Naturally, the total savings (Figure 2.6, which determines the aggregate capital as well), follows the demography, as the population grows the aggregate savings is

TABLE 2.2 – Unemployment rates in 2100

	Baseline (2000)	Baseline (2100)	High (2100)	Difference Baseline-High (2100)	Difference Baseline (2100-2000)
Iran					
15-24	40.5	22.3	15.7	6.6	18.2
25-34	19.3	8	4.7	3.3	11.3
35-44	12.6	5.2	3.2	2	7.4
45-54	10.5	4.8	3.1	1.7	5.7
55-64	9.9	4.7	3	1.7	5.2
Total	24.7	8.7	5.7	3	16
Morocco					
15-24	46.3	33.6	28.2	5.4	12.7
25-34	25.7	14.7	11	3.7	11
35-44	17.5	9.6	7.2	2.4	7.9
45-54	14	8.3	6.3	2	5.7
55-64	12.9	7.9	6.2	1.7	5
Total	28.6	14.4	11.4	3	14.2
Egypt					
15-24	42.7	34.6	26.3	8.3	8.1
25-34	21.8	15.2	10.1	5.1	6.6
35-44	14.7	10	6.7	3.3	4.7
45-54	12.1	8.6	5.9	2.7	3.5
55-64	11.2	8.2	5.7	2.5	3
Total	25.5	15.2	10.9	4.3	10.3

Note : Unemployment rates in the percentage in the Baseline and High scenario and their difference in percentage points. The last column represents the gain in employment rates as a response to demographic transition solely.

increasing. Agents have perfect foresight and anticipate one period earlier, therefore the maximum savings occurs one period prior to the GDP maximization.

The dynamics of the unemployment and saving level are closely interrelated, higher levels of aggregate savings lead to abundance of physical capital, which in every neoclassical setting causes a fall in unemployment rate.

Figure 2.7 demonstrates the savings evolution per capita for different age groups.¹⁴ The savings are increasing during the agents lifecycle, here, since we do not have

14. In this model, like any other overlapping generation settings the savings are 0 for the oldest age group.

retirement in the model, we do not obtain a fall in the savings at the end of the life-cycle. Hence our results are consistent with the existing literature regarding the life-cycle model of savings. The demographic transition to an older labor force, globally makes the saving per capita is increasing for the youngest age group and decreasing for the oldest one.

Wages

As one may expect wages are the lowest for the youngest age group and increase through the agent's life cycle as he becomes more experienced in the labor market, followed by a small downturn in the last period of the life cycle (Figure 2.8), this fall is due to the decline in the human capital for the last age group. Wages are almost five times higher for the oldest age groups than the youngest one.¹⁵ The disparity in wages is not solely a response to the difference in the human capital for different age groups, it is also because the youth appears in the labor market fewer times, thus have less probability to get employed. With higher unemployment rates among youth, the value of an extra hour of work is higher for them and according Equation (2.26), they end up negotiating lower wages.

The shift in the demographic structure of the countries generate a global increase in wages for all age groups, which is basically a response to the increase in GDP per capita. Wages are also influenced by TFP level. The TFP is the highest for Iran, accordingly, wages are globally higher.

Interest rate

According to Carvalho et al. (2016) the demographic transition is one key element that explains the prolonged decline of global real interest rates. The increase in life expectancy puts downward pressure on the real interest rates since agents build up their savings in anticipation of a longer life. Figure 2.9, shows the evolution of the

15. Although we could not find any data regarding the wage gaps among different age groups for the countries of this study, the gap produced by the model seems not far from the reality.

interest rate in the model, that majorly declines for all countries, only for Iran we have an initial increase which is followed by a decrease after 2020.

Although the real interest rate movements are determined by the country's monetary policy, and are subject to a lot of fluctuations, the endogenous interest rates caused by the model are more or less consistent with the reality. The interest rate in Morocco in 2000 was 14.15%, and in 2001, 12.51%; while in Egypt it was 7.8% and 11.21%, respectively. In Iran, while the nominal interest rates were higher than 11% in the beginning of the 2000s, and as high as 17% in 2014, the real interest rate is very low and even negative because of the very high inflation rate.

An improvement in financial market efficiency leads to higher interest rate, but the difference between scenarios declines significantly over the long run.

4. RESULTS

FIGURE 2.1 – GDP level evolution (percentage deviation from the initial steady state)

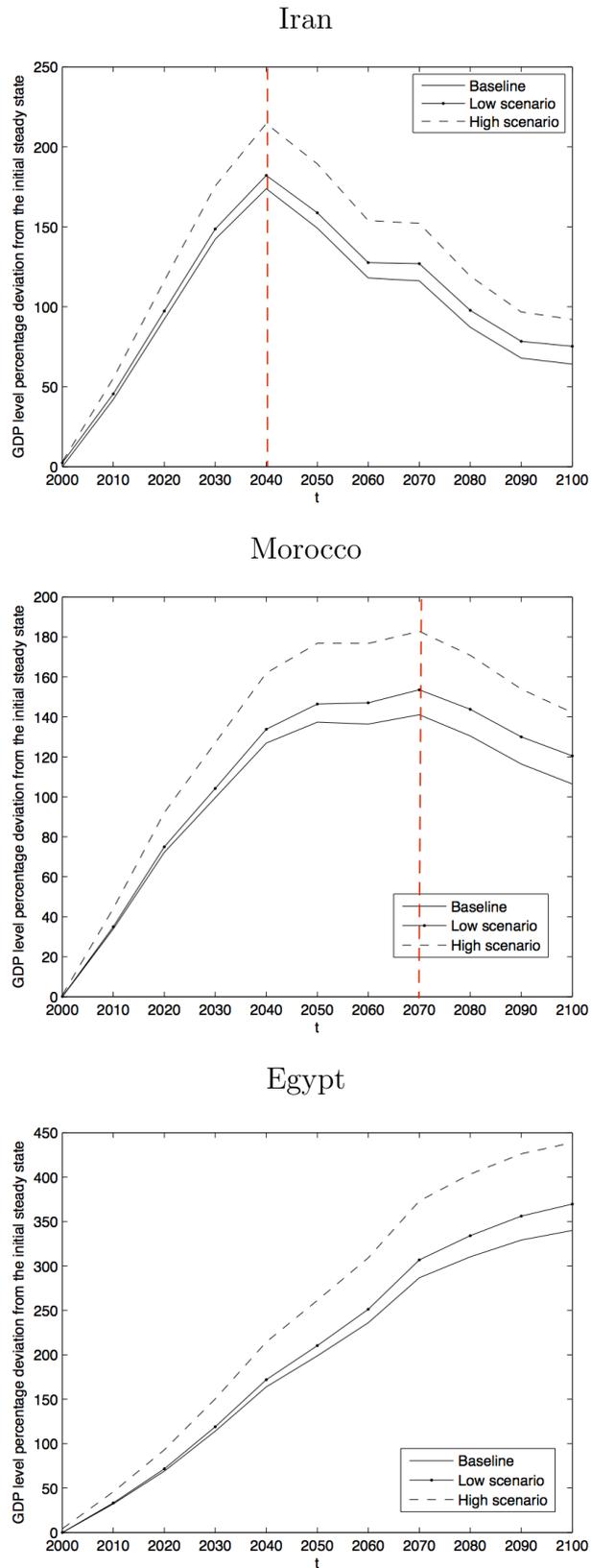


FIGURE 2.2 – GDP per capita evolution (percentage deviation from the initial steady state)

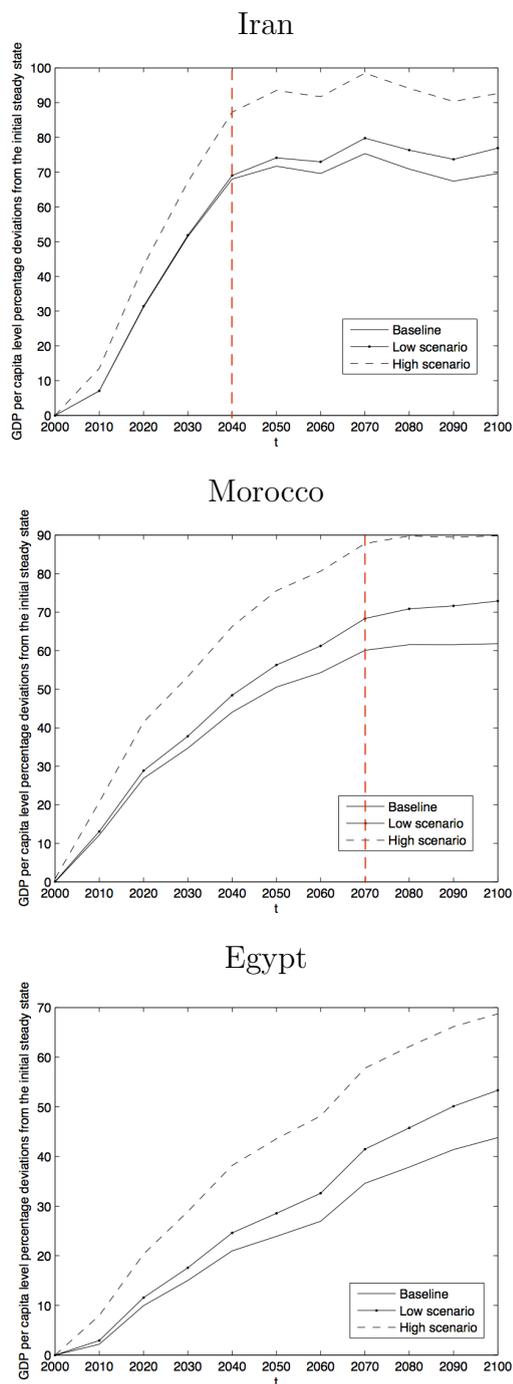
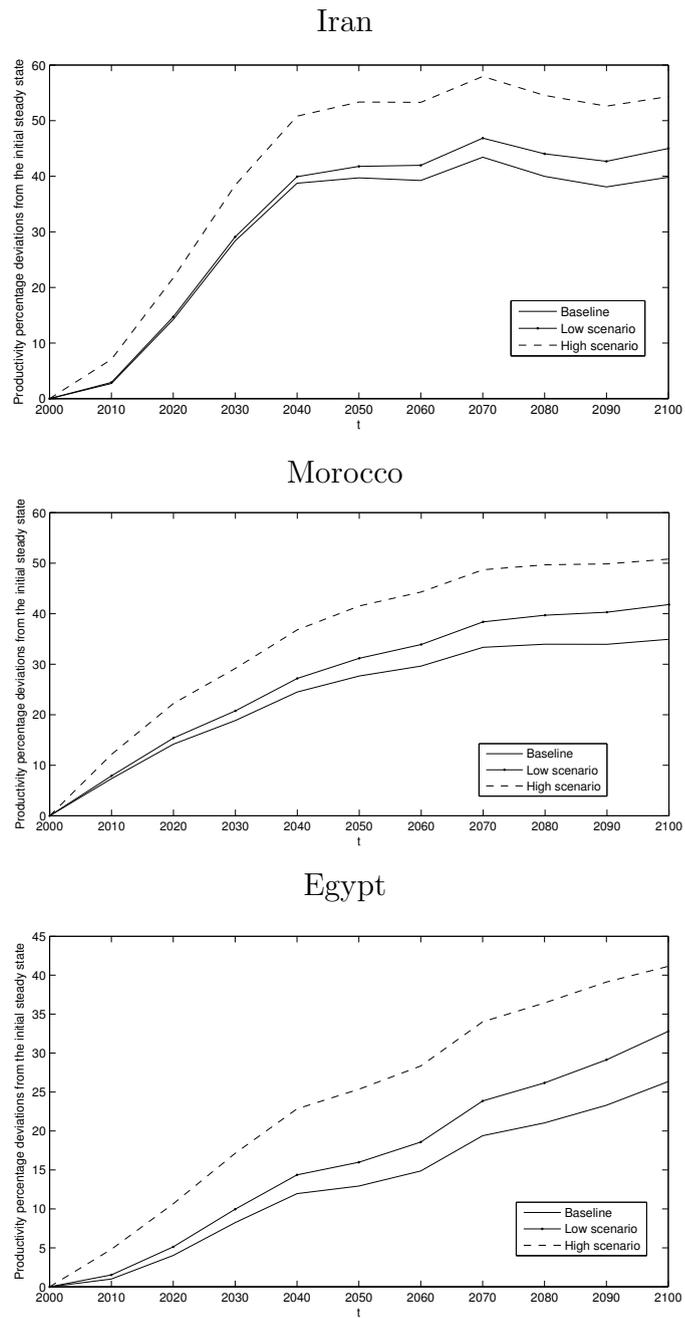


FIGURE 2.3 – Productivity, percentage increase compared to initial steady state



Note : Productivity is calculated as GDP level divided to employed population, in other words, GDP per worker.

FIGURE 2.4 – Unemployment rate evolution by age after the demographic shift

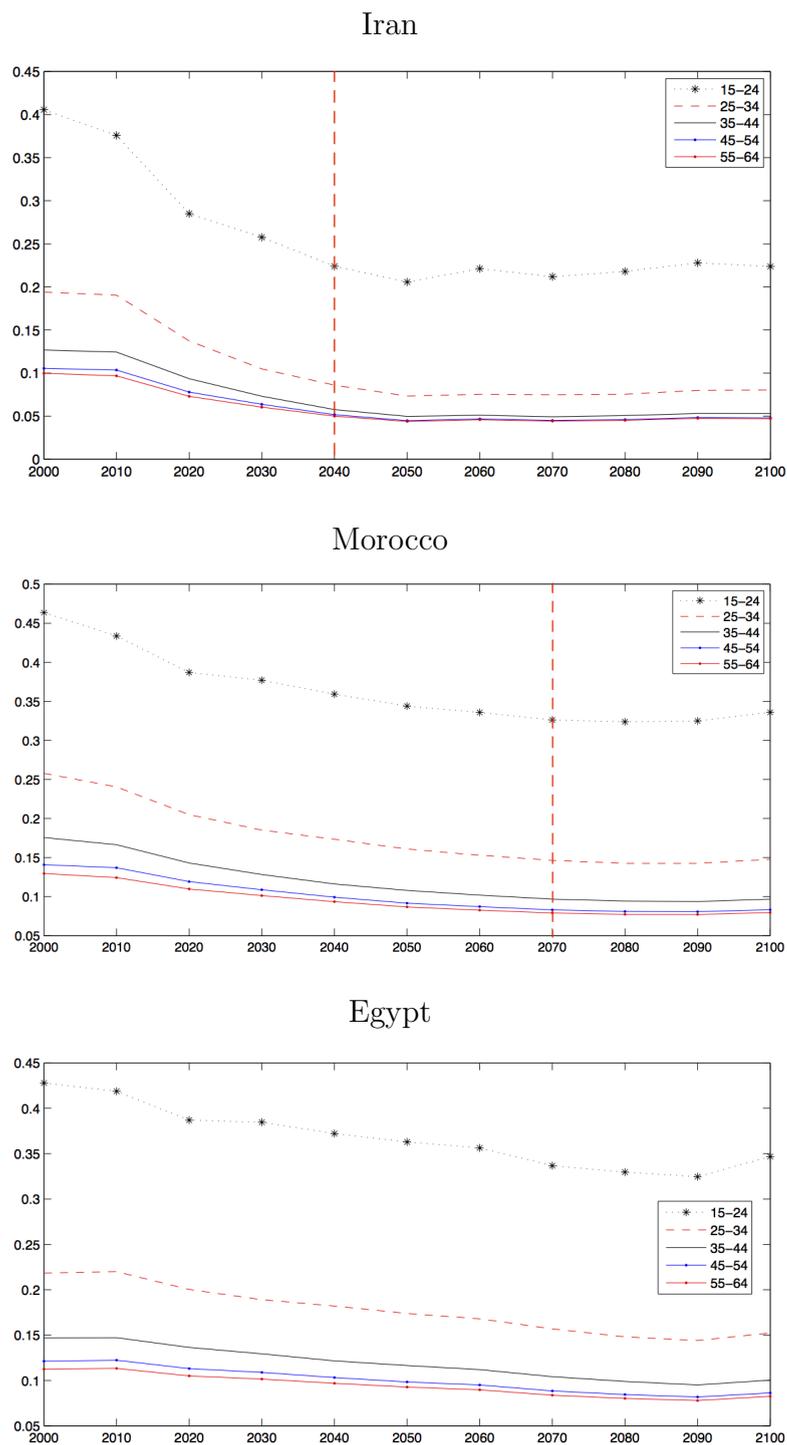


FIGURE 2.5 – Total unemployment rate evolution

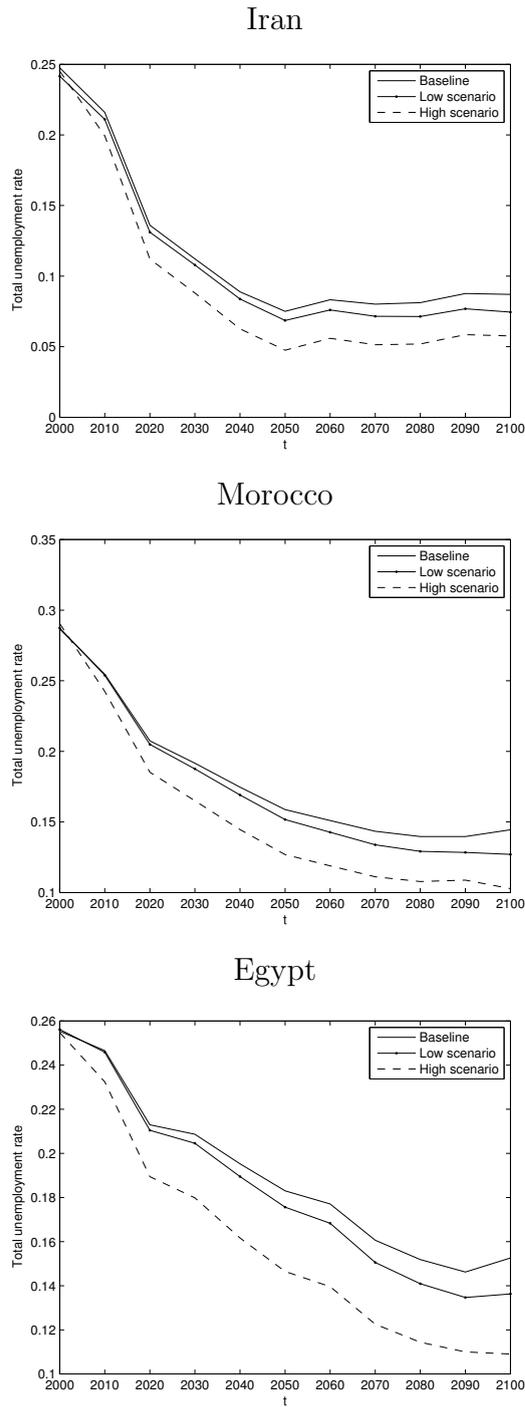


FIGURE 2.6 – Total savings evolution, percentage deviation from the initial steady state

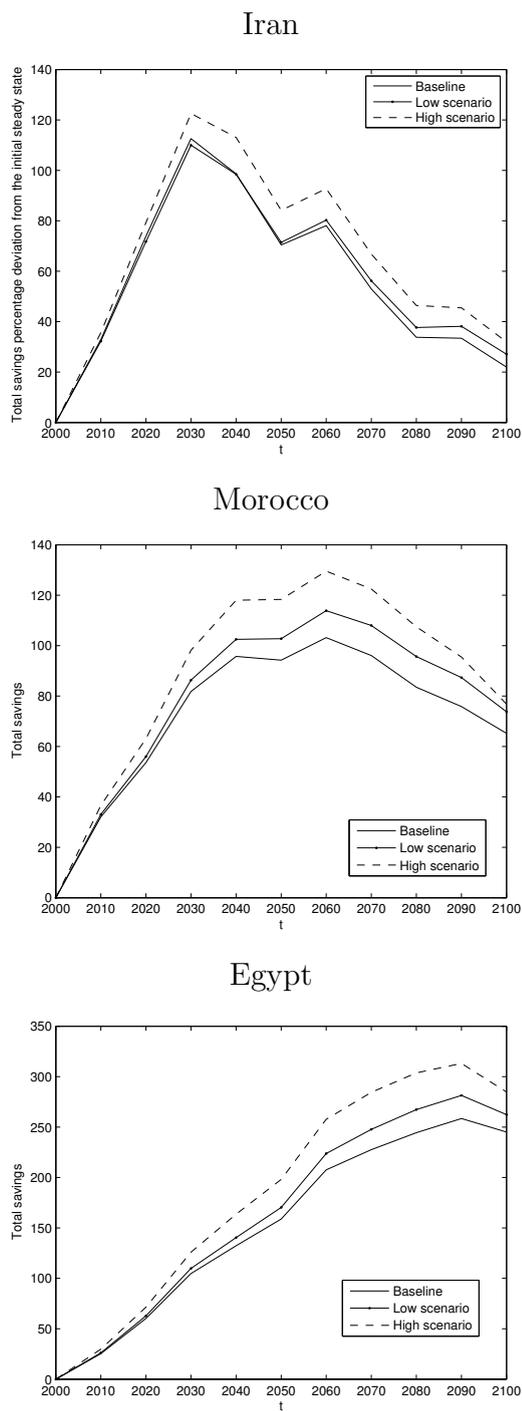
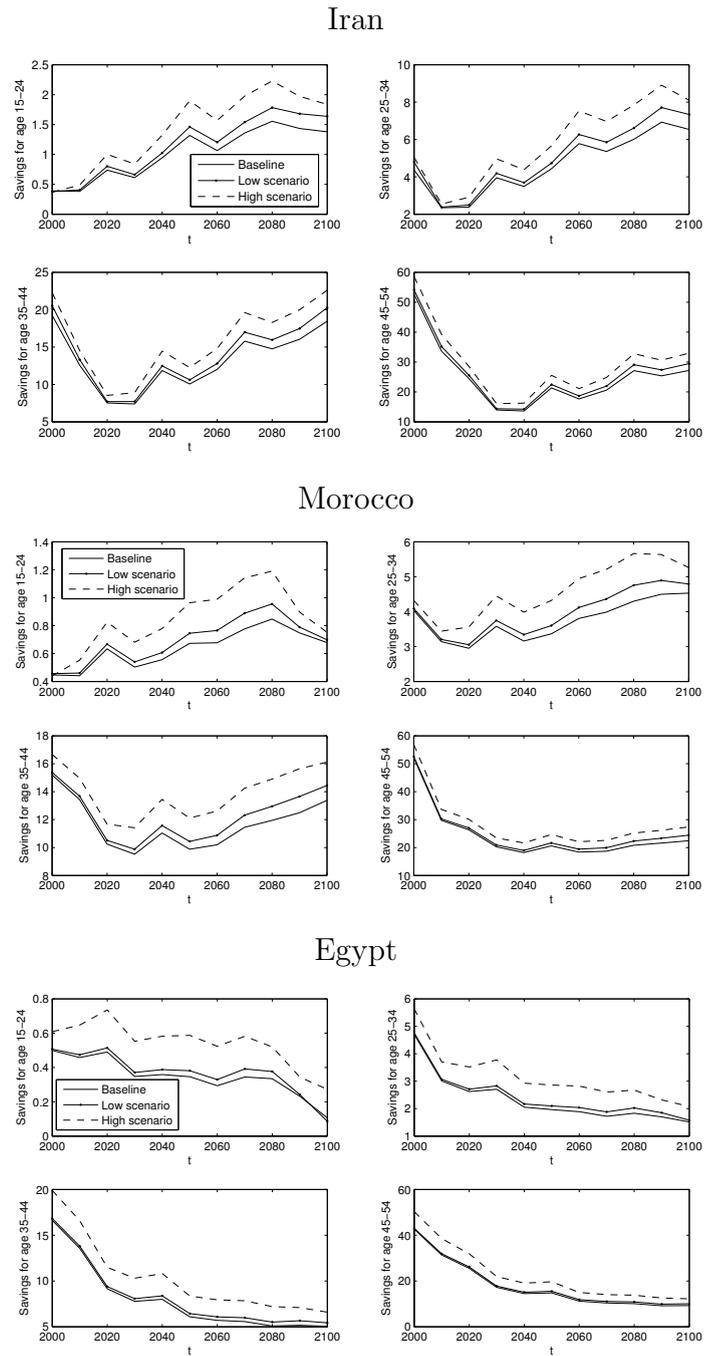


FIGURE 2.7 – Savings per capita evolution by age



Note : Savings per capita for different age groups. According to model's assumptions, the savings are null for the last age group (of ages 55 to 64)

FIGURE 2.8 – Wage evolution by age

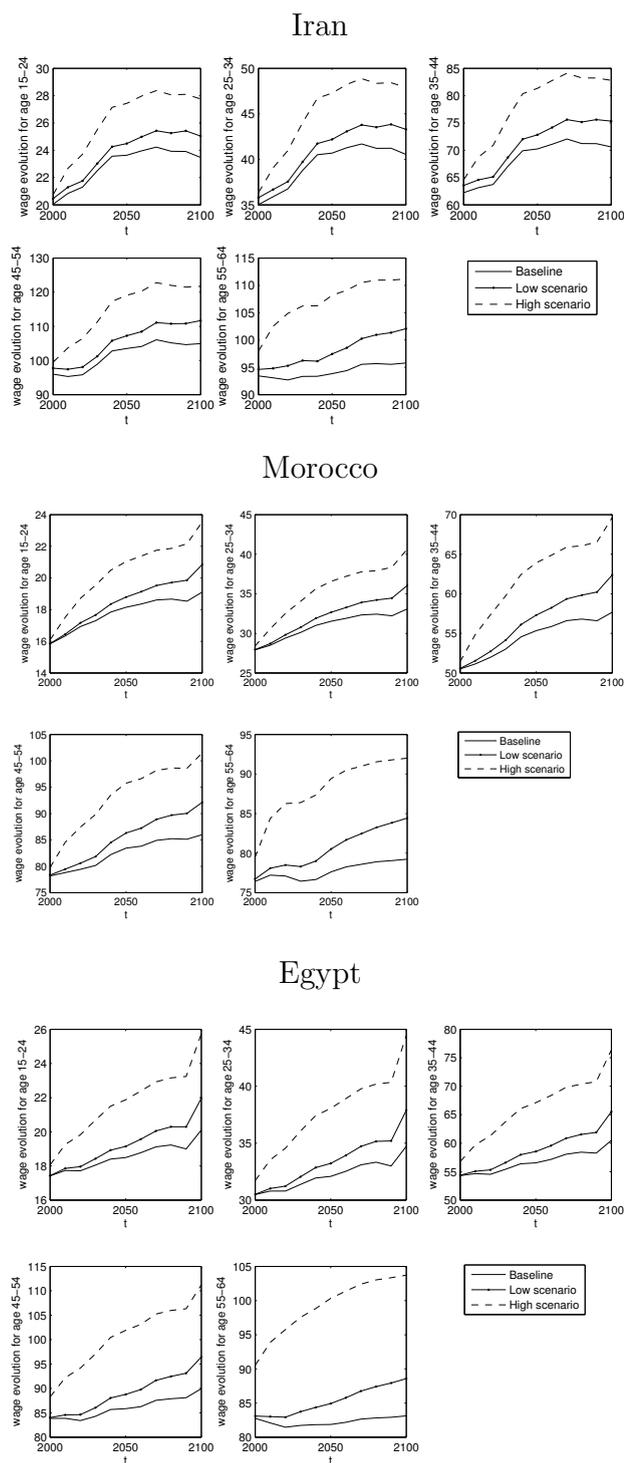
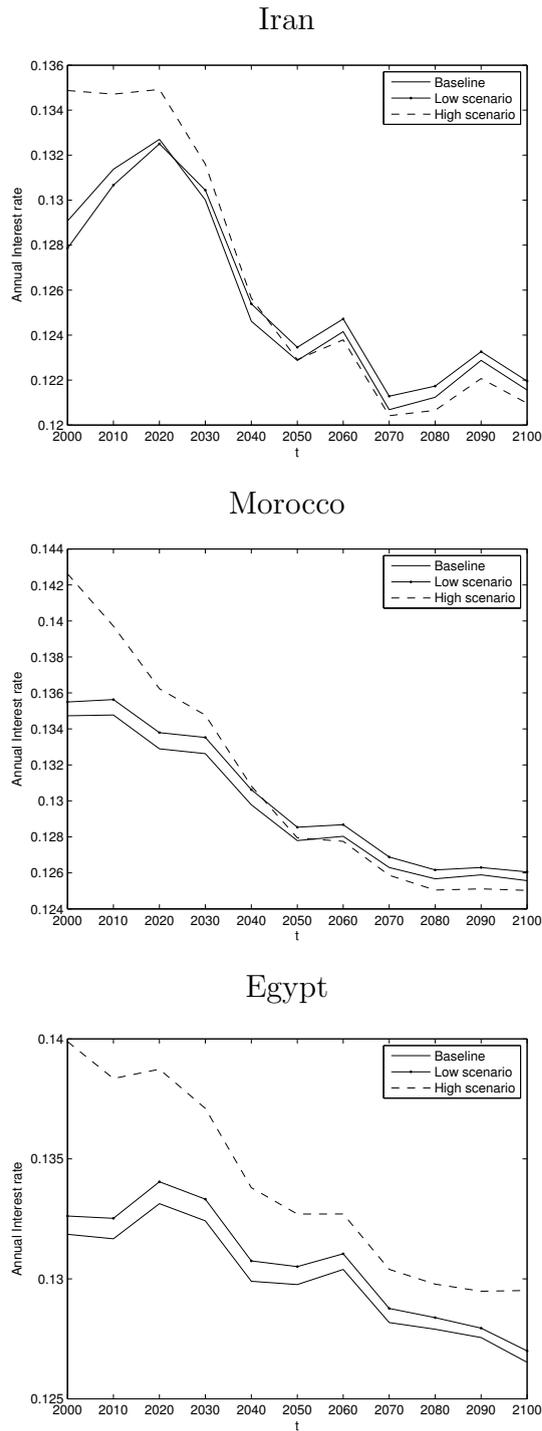


FIGURE 2.9 – Interest rates evolution



5 Conclusion

The demographic transition is a universal phenomenon. However, the speed of the transition varies from one country to another, with many developed and emerging countries having already undergone through the process, and currently facing an aging population; others merely started the decline in the fertility rates. In the MENA region, the transition came relatively late but rather quickly, with a very sharp decline in fertility rates, leading MENA to be the youngest region of the world. This evolution in the next few decades will eventually put an end to the dominance of the share youth in total population. This paper studies the impact of this demographic changes and financial market developments on the real economy in Iran, Morocco and Egypt.

We use a dynamic general equilibrium framework with overlapping generations and highlight that lower costs for investment leads to lower unemployment rates and higher output. The use of the OLG framework is due to significant differentials in unemployment rates for youth and old in the selected countries and generally in the region, which is discussed as one of the main sources of political tensions in the region. Our results suggest that the age structure of the labor force is a key component for employment and production dynamics and a more efficient financial sector helps to reduce the gap among younger and older age groups to some extent.

The originality of this paper is that we take into account the evolution of both physical and human capital, contrary to the existing literature that only focus on one of these aspects. Secondly, this paper uses real data on population structure, which not only considers fertility rates, but also information about mortality rates that may have a different effect on GDP per capita. The focus of this paper on Iran, Morocco and Egypt is another novelty, each country is facing the demographic transition at a different pace. To our knowledge there is no similar model calibrated for MENA countries.

Globally the demographic forces lead to a significant decline in unemployment rates for all age groups. Furthermore, the effect of a demographic shift on unemployment and GDP is mainly influenced by the dynamics of the share of youth in the working age population. GDP per capita rises and stabilizes as the share of older workers dominate the share of youth in the labor force. In the long run, the demographic transition alone accounts for 16, 14.2 and 10.3 pp. decline in the unemployment rates in Iran, Morocco and Egypt. Moreover, it will lead to 70%, 62% and 44% increase in GDP per capita in Iran, Morocco and Egypt, hence faster demographic transition is associated with higher GDP per capita.

We use the cost for capital mobilisation as a proxy for financial market development, and develop two different scenarios for the financial sector development. Our results suggest that financial efficiency improvements lead to better economic performance in terms of higher GDP per capita and lower unemployment rates in the case of an inevitable demographic change in MENA region. If the financial sector succeeds in reducing the investment cost by half in each decade, it will lead to at least 3 p fall in total unemployment rate by 2100. Of course the gain is much higher for younger age groups and can reach 8.3 pp. for those of ages between 15 and 24. Thus, we show that the unemployment rate volatility is the highest for the youngest age group, who just entered the labor force, and although the effect of a demographic shift always dominates the effect of a financial market improvement, the size of the effect changes according to the depth of the reform in the financial sector.

The paper can be extended in several directions. In order to apply the model on developed countries it is crucial to add the government, by imposing taxes and retirement benefits received. Another interesting extension is to add a pension system, this will allow one to study the impact of a demographic shift on the demand side of the financial sector. This extension will strengthen our results since by adding a pension system the aggregate savings will increase and the positive impact of a re-

duction in the investment cost will be more pronounced. Moreover, the demographic shift will have an even bigger impact on the production and employment.

Appendix

2.A The demographic shift parameters

TABLE 2.A.1 – Demographic parameters

t	2000	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Iran											
$Z_{0,t}$	4.489	4.672	3.11	3.768	3.246	2.487	2.63	2.473	2.106	2.106	2.046
$\beta_{1,t}$	0.927	0.999	0.99	0.985	0.987	0.987	0.987	0.989	0.99	0.99	0.992
$\beta_{2,t}$	0.956	0.998	0.995	0.988	0.987	0.989	0.99	0.99	0.991	0.992	0.993
$\beta_{3,t}$	0.929	0.992	0.963	0.982	0.983	0.984	0.987	0.988	0.989	0.991	0.991
$\beta_{4,t}$	0.875	0.895	0.942	0.956	0.962	0.964	0.969	0.973	0.976	0.979	0.981
Morocco											
$Z_{0,t}$	2.895	2.989	2.721	2.995	2.948	2.655	2.552	2.442	2.241	2.114	2.019
$\beta_{1,t}$	0.868	0.872	0.952	0.946	0.951	0.951	0.95	0.954	0.958	0.96	0.965
$\beta_{2,t}$	0.931	0.911	0.976	0.98	0.98	0.983	0.984	0.984	0.986	0.988	0.989
$\beta_{3,t}$	0.993	0.967	0.974	0.979	0.982	0.984	0.987	0.989	0.99	0.992	0.993
$\beta_{4,t}$	0.961	0.976	0.941	0.949	0.958	0.964	0.97	0.976	0.98	0.983	0.986
Egypt											
$Z_{0,t}$	3.313	3.929	3.868	5.06	5.437	5.527	6.082	6	5.937	5.884	5.661
$\beta_{1,t}$	0.936	0.971	0.966	0.967	0.974	0.976	0.978	0.982	0.985	0.987	0.989
$\beta_{2,t}$	0.984	0.986	0.988	0.989	0.991	0.992	0.993	0.995	0.996	0.996	0.997
$\beta_{3,t}$	0.958	0.968	0.981	0.981	0.982	0.987	0.988	0.99	0.993	0.994	0.996
$\beta_{4,t}$	0.877	0.886	0.901	0.914	0.926	0.935	0.947	0.957	0.964	0.972	0.978

Note : The value of $Z_{0,t}$ is calculated by normalizing the size of the youngest cohort in 1960 (i.e. $Z_{0,1960} = 1$)

2.B Robustness check for cost of investment

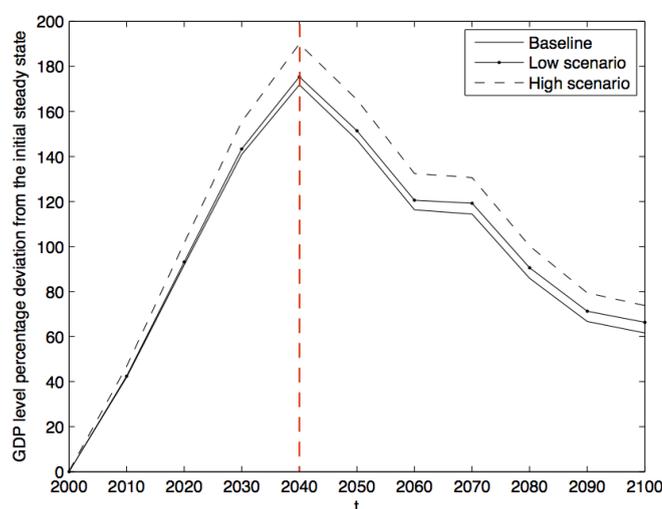
In this appendix we show that our results are robust to the initial value of $(1 - \varphi)$. In order to do so, we suppose the initial value of $(1 - \varphi)$ to be 0.1 instead of 0.2, which means that the cost of allocating capital is 10% in our baseline scenario, the definition of High and Low scenario remains the same, the value of $(1 - \varphi)$ in each case is reported in Table 2.B.1.

TABLE 2.B.1 – The value of $(1 - \varphi)$ or the cost of capital accumulation under different scenarios

Period	1	2	3	4	5	6	7	8	9	10
Baseline	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
High	0.1	0.05	0.025	0.0125	0.0062	0.0031	0.00156	0.00078	0.00039	0.00019
Low	0.1	0.095	0.090	0.085	0.081	0.077	0.073	0.069	0.066	0.063

The results qualitatively, remain the same, although the initial steady state changes slightly since the initial cost of capital is not the same. The simulation results for Iran are reported in Figures 2.B.1, 2.B.2, 2.B.3, 2.B.4, 2.B.5, 2.B.6, 2.B.7 and 2.B.8.¹⁶

FIGURE 2.B.1 – GDP level evolution (percentage deviation from the initial steady state) for Iran



16. We can perform the same exercise for Morocco and Egypt, the results remain the same.

2.B. ROBUSTNESS CHECK FOR COST OF INVESTMENT

FIGURE 2.B.2 – GDP per capita evolution (percentage deviation from the initial steady state) for Iran

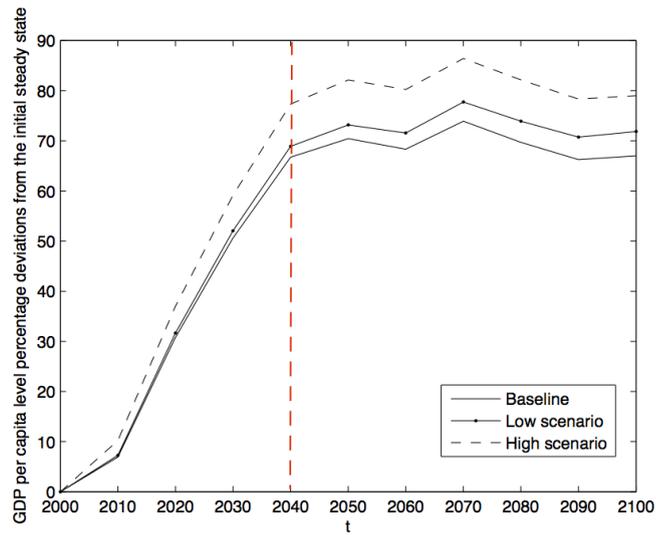


FIGURE 2.B.3 – Total unemployment rate evolution for Iran

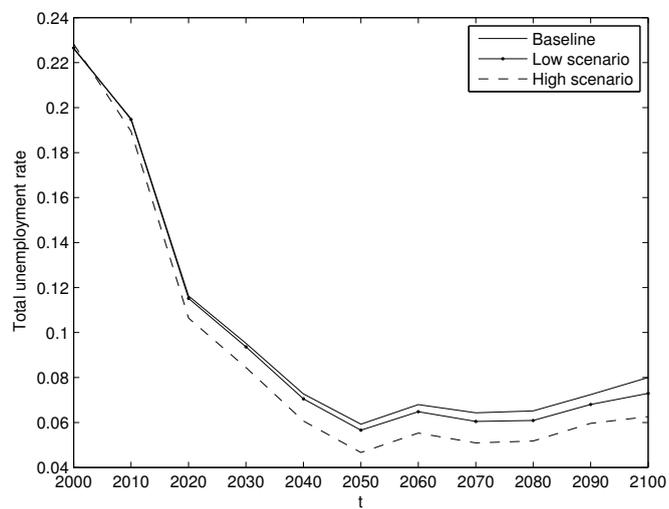


FIGURE 2.B.4 – Unemployment rate evolution by age after the demographic shift for Iran

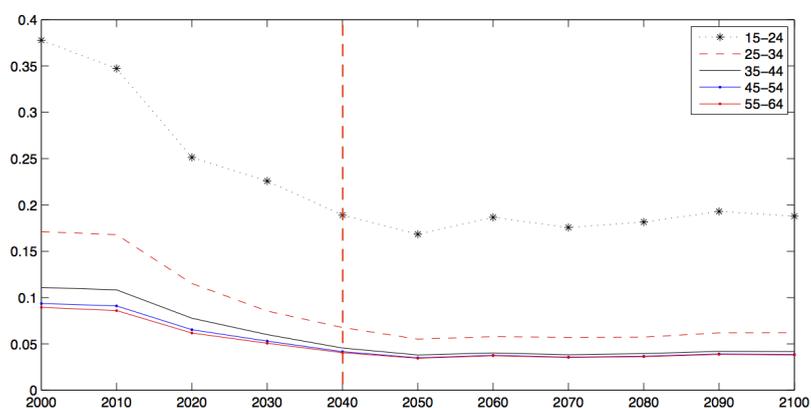
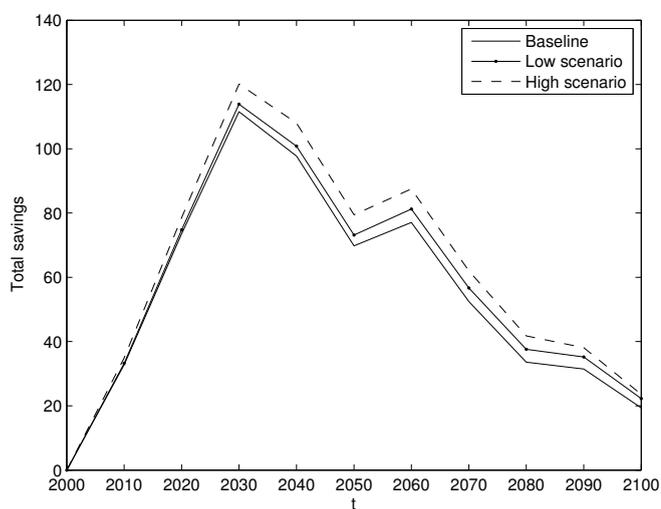
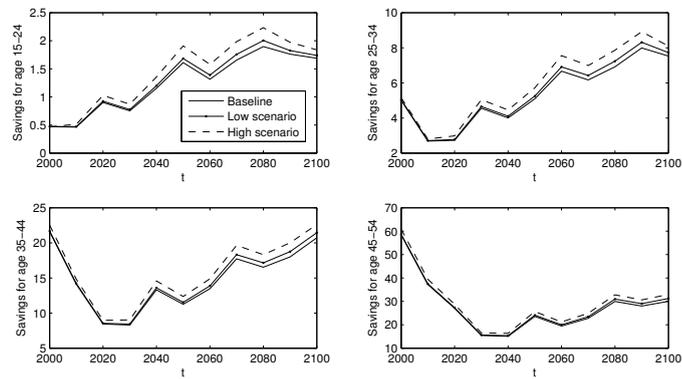


FIGURE 2.B.5 – Total savings evolution, percentage deviation from the initial steady state for Iran



2.B. ROBUSTNESS CHECK FOR COST OF INVESTMENT

FIGURE 2.B.6 – Savings per capita evolution by age for Iran



Note : Savings per capita for different age groups, according to model's assumptions, the savings are null for the last age group (55-64)

FIGURE 2.B.7 – Wage evolution by age for Iran

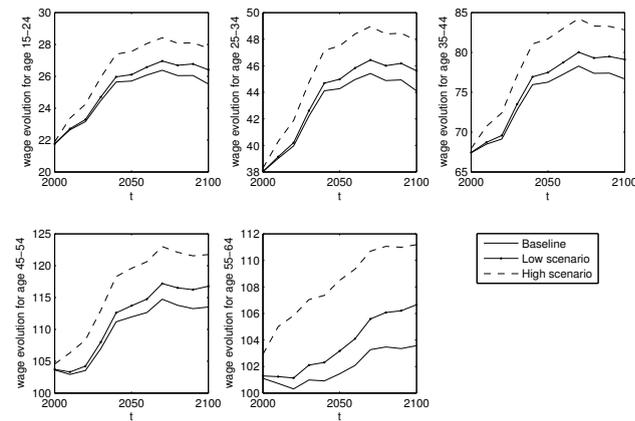
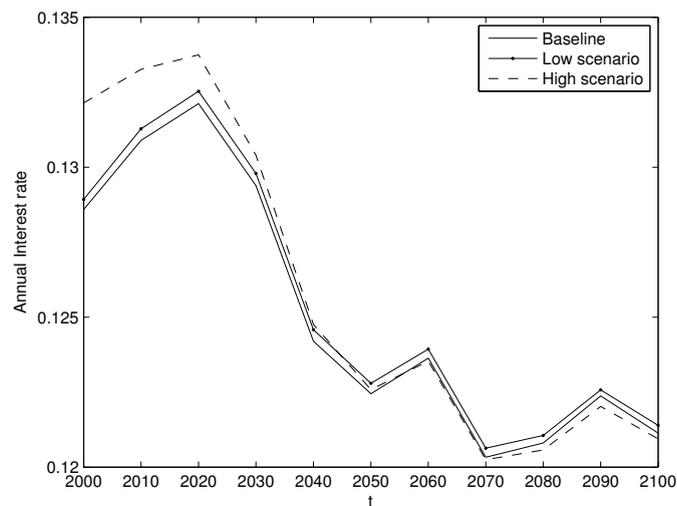


FIGURE 2.B.8 – Interest rates evolution for Iran

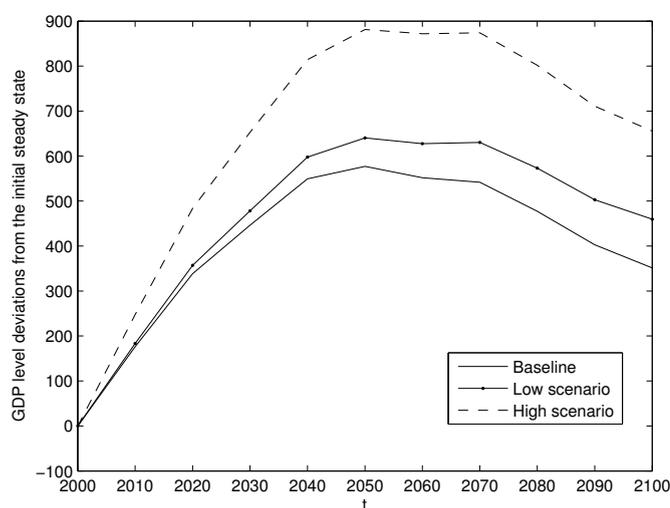


2.C Robustness check, constant human capital

One may argue that our results are merely a mechanical response to the different age specific human capital, reported in Table 2.2.

In this Appendix we perform the simulations for Morocco, and suppose a constant human capital for all age groups, i.e. $h_i = 2.5 \quad \forall i = 1, \dots, 4$. The simulation results are reported in Figures 2.C.1, 2.C.2, 2.C.3, 2.C.4, 2.C.5, 2.C.6 and 2.C.7.¹⁷

FIGURE 2.C.1 – GDP level evolution (percentage deviation from the initial steady state)



17. We can perform the same exercise for Iran or Egypt the results remain the same.

FIGURE 2.C.2 – GDP per capita evolution (percentage deviation from the initial steady state)

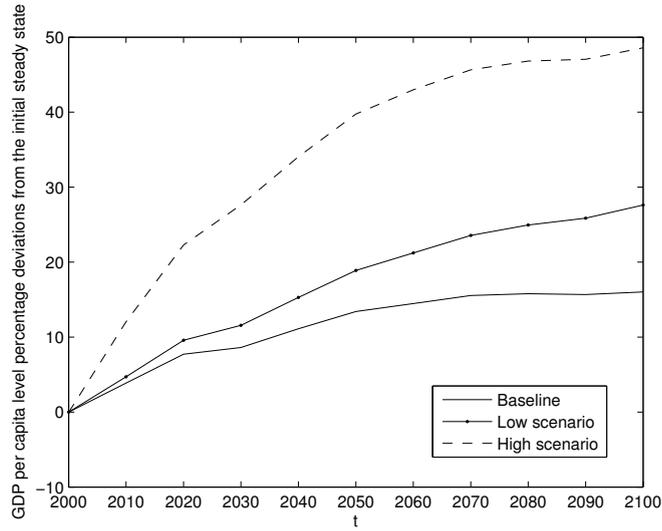


FIGURE 2.C.3 – Total unemployment rate evolution

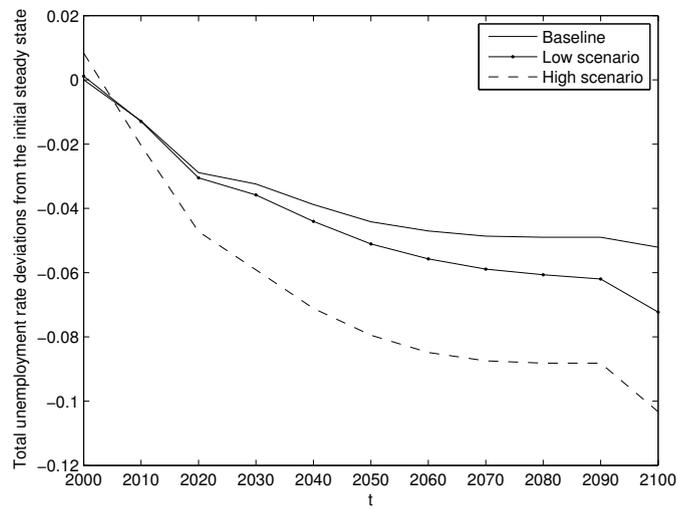


FIGURE 2.C.4 – Unemployment rate evolution by age after the demographic shift

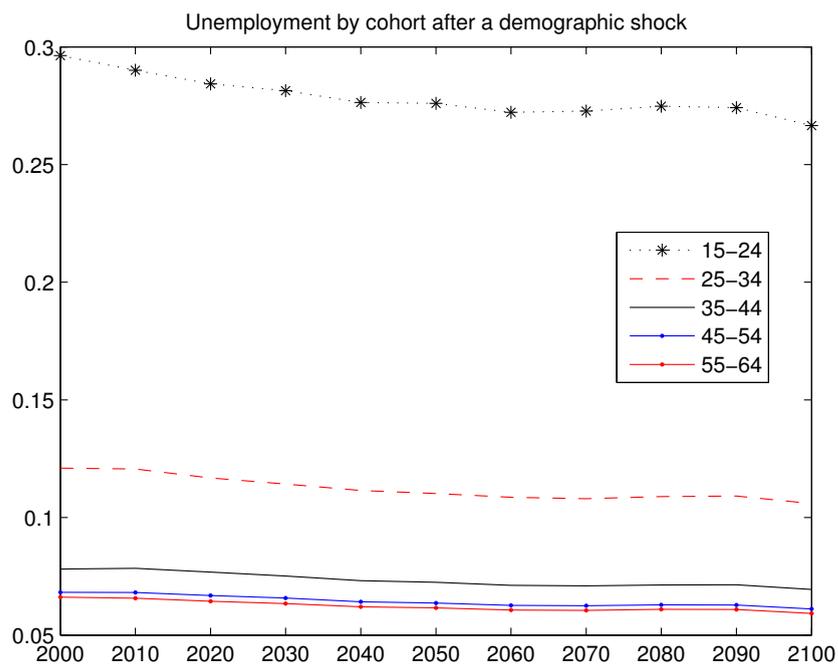


FIGURE 2.C.5 – Total savings evolution, percentage deviation from the initial steady state

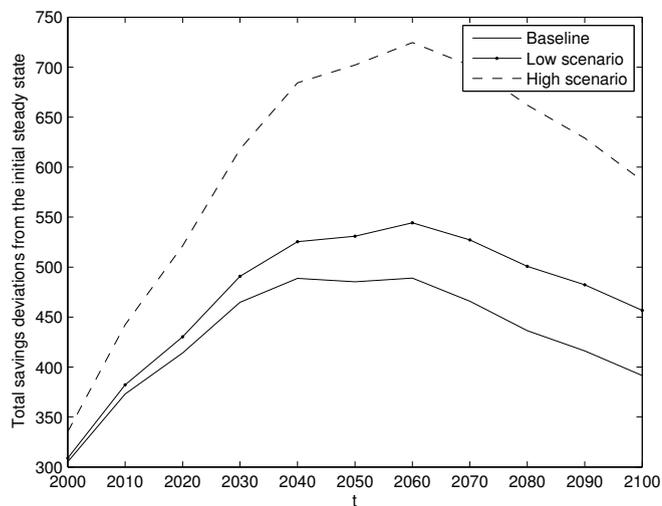


FIGURE 2.C.6 – Wage evolution by age

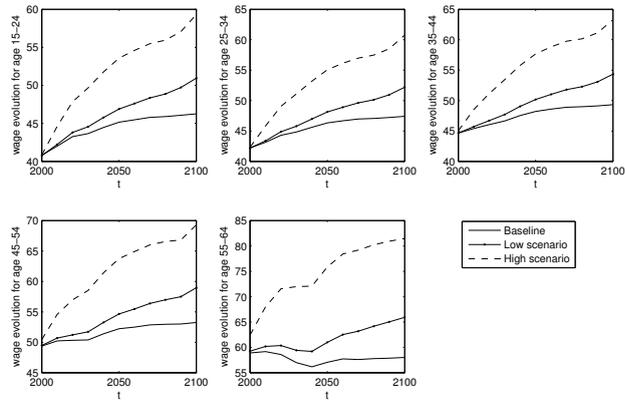
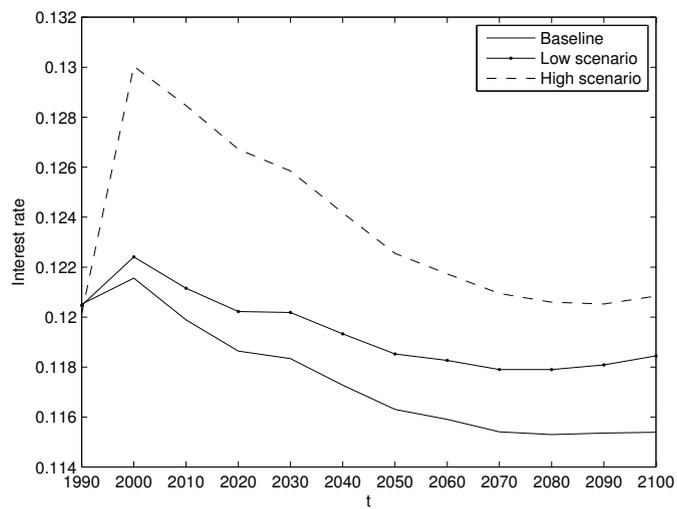


FIGURE 2.C.7 – Interest rates evolution



Chapitre 3

Financial and economic development : evidence from MENA countries

Résumé

Les marchés financiers jouent un rôle crucial dans l'amélioration de la mobilisation du capital et le transfert de l'épargne au sein de l'économie. Ils sont ainsi essentiels pour l'amélioration des performances économiques dans les pays en développement. Cependant, l'analyse empirique des pays de la région MENA de 1960 à 2011 ne confirme pas ces prédictions. Ces résultats peuvent être attribués à des caractéristiques spécifiques de la région, par exemple une forte présence du gouvernement dans le secteur bancaire, l'instabilité géopolitique, les conflits, la corruption ou l'évolution brutale des prix du pétrole. Une autre raison possible de l'impact négatif des marchés financiers sur la croissance est le niveau élevé des fuites de capitaux dans la région (due à l'instabilité économique géopolitique). Ainsi les investisseurs préférant investir à l'étranger, un secteur financier plus développé facilite les sorties de capitaux au lieu de mieux les allouer au niveau national et finit par avoir un effet

inverse sur la croissance.

Les résultats de ce chapitre indiquent qu'un secteur financier plus développé dans la région est associé à un taux de croissance plus faible, ce qui peut être la conséquence d'une faible efficacité du secteur financier dans la région. Cela signifie qu'il y a des problèmes d'attribution du crédit et une surveillance et une réglementation financières insuffisantes. Notre principale conclusion à ce stade, est que la région MENA devrait mener des politiques qui ciblent l'efficacité du secteur financier et ne pas se limiter à élargir le secteur. Les réformes ultérieures dans ce secteur devraient être mises en œuvre avec plus de prudence afin de fournir les conditions préalables essentielles d'un secteur financier qui contribue à une allocation efficace des investissements.

Nos résultats sont toutefois mis en cause par certains facteurs, le plus important étant les données manquantes, par exemple dans le cas des passifs liquides (M3). Sur 14 pays étudiés dans notre échantillon, seuls 7 disposent de quelques observations. La période d'étude étant longue, cela affaiblit l'estimateur GMM en augmentant le nombre d'instruments. D'autre part, nous n'avons pas été en mesure d'étudier l'impact des marchés boursiers sur la croissance. Les variables liées spécifiquement aux marchés boursiers ne sont pas disponibles sur le long terme. Dans le cas des pays de la région, il est intéressant de tenir compte des variables associées à la qualité des institutions et à la gouvernance dans l'analyse.

L'interprétation des mesures classiques de l'évolution financière peut être biaisée. Par exemple, les dépôts bancaires au Liban sont particulièrement très élevés et dépassent 200% du PIB. En France et aux Etats-Unis, ils s'élèvent à près de 80% alors qu'au Luxembourg il est d'environ 350% du PIB. Ce ratio élevé de dépôts bancaires ne signifie pas nécessairement que les banques luxembourgeoises sont plus performantes que les banques françaises. C'est essentiellement dû à des législations plus légères au Luxembourg, ce qui fait qu'ils attirent beaucoup de capitaux comme un paradis fiscal. Au Liban, les taux d'intérêt sont relativement élevés et le taux de

change stable, ce qui motive les dépôts bancaires très élevés notamment par les Libanais résidant à l'étranger. Il est donc indispensable d'étudier les flux internationaux de capitaux pour établir une relation plus précise entre la finance et la croissance.

1 Introduction

The Finance-Growth nexus has been largely studied in recent decades. Many use cross-country panel data without focusing on a specific region. The positive correlation between financial development and growth is accepted by the majority of the early studies. However, the causality issue is widely debated in the literature. Academics sided with either Joseph Schumpeter's view of the ability of well-developed financial systems to simulate economic growth, or with the one of Joan Robinson's that "where enterprise leads, finance follows." However, a majority of the literature is supportive of the first claim.¹

In the meanwhile, the frequent financial shocks associated with more developed and integrated financial markets highlight the contribution of the financial sector to macroeconomic volatility. Some recent studies argue that the positive correlation between financial development and economic growth is vanishing for developed countries, suggesting the relationship to be nonlinear (see Arcand et al. (2015) and Panizza (2013)). They claim that the positive impact of the financial sector on the real economy tends to diminish for more recent data sets suggesting the existence of an optimal threshold for the financial sector development. The bottom line is that financial sector development contributes to economic growth up to a certain level and if the sector grows too large the positive relationship tends to become insignificant and even negative for further development of the financial sector, specifically when the Credit to the private sector reaches 100% of GDP as estimated by Arcand et al. (2015). The logic behind is that, as the financial institutions grow the fragility

1. Levine (2005) gives a comprehensive review of this literature.

of the financial sector is transmitted to the real sector to a greater extent.

There are few studies in the literature that focus on MENA region most of them appear post 2000s and they are growing at a fast pace, as the interest in the region is rising. However, there seems to be no consensus regarding the impact of the financial sector on growth in the region, and the results vary from one study to another. Abu-Bader and Abu-Qarn (2008) and Al-Khouri (2007) find a positive impact of the financial markets, while Ben Naceur et al. (2007) and Kar et al. (2011) find no significant relationship, Ayadi et al. (2015) find a negative impact of conventional size measures of the financial sector.

As it is studied in detail in the first chapter, although financial markets are still not well developed in the MENA region, they have been subject to many reforms in the past two decade and growing quickly ever since. This chapter investigates the impact of this rapid development of the markets on growth via dynamic panel regression of a classic growth model in 18 MENA countries from the period from 1960 to 2011. We use a panel Generalized Method of Moments (GMM) estimator developed by Arellano and Bond (1991) and Arellano and Bover (1995). This methodology allows to control for time-invariant country-specific fixed effects and, under certain conditions, to establish causality by using lagged valued of the explanatory variables as instruments. The next section reviews the literature, the third section defines the variables used to proxy the financial development, the fourth section demonstrates the data employed, the fifth section details the methodology, followed by the results and the last section concludes.

2 State of art

The literature on finance-growth nexus goes back to the early works of Bagehot (1873) and Schumpeter (1911), and growing ever since. Goldsmith (1969) was the first study to show empirically the positive correlation between financial development

and economic growth. The survey of Levine (2005) is considered to be the first comprehensive literature review on finance-growth nexus, giving 300 references. We can broadly identify three main streams in the classical literature :

1. **Finance is pro growth** : Bagehot (1873) and Schumpeter (1911) are the pioneers of this school. Levine et al. (2000) and Rajan and Zingales (1998) are among the most influential research providing evidence in this direction.
2. **Growth leads to financial development** : As countries grow in terms of income and wealth, they tend to become more developed in terms of financial institutions as well Robinson (1952).
3. **Finance is over-stressed in explaining growth** : The seminal paper by Lucas (1988), argues that the importance of financial sector in the growth process is over-stressed, financial markets are not always constructive in the economy, sometimes they do more harm than good and they are mainly the origin of crisis and volatility in the economy. Demetriades and Hussein (1996) use time series techniques and find no evidence of a causal relationship from finance to growth in about half of the 16 countries included in their sample. Ayadi et al. (2015) using a sample of northern and southern Mediterranean countries for the 1985 to 2009 period, indicate that credit to the private sector and bank deposits are negatively associated with growth, which confirms deficiencies in credit allocation in the region and suggests weak financial regulation and supervision. However, on the stock market side, the results seem to indicate that stock market size and liquidity play a significant role in growth, especially when accounting for the quality of an institution. Ahmed (2013) investigates the role of financial liberalization in promoting financial deepening and economic growth in Sub-Saharan African countries (SSA). By applying a more efficient system GMM estimator in dynamic panel data that combines first difference and original level specification to deal with the problems of weak instruments. Our dataset covers 21 countries in Sub-Saharan Africa over the

period of 1981 to 2009. Hence, they provide support for the skeptical empirical view of financial liberalization in emerging markets, which show that liberalization, by itself, might be associated with lower economic growth through leading to destabilization, stimulating domestic capital flight and increasing the risk of financial fragility.

The financial crisis, for which 2008 is a recent example, caused both academics and policymakers to reconsider their prior conclusions. The crisis has illustrated the possibilities that a malfunctioning financial systems can directly and indirectly waste resources, discourage saving and encourage speculation, resulting in underinvestment and a misallocation of scarce resources. As a consequence, it may be that the economy stagnates, unemployment rises and poverty is exacerbated. Some stress the existence of a “dark side of finance” and the possible negative spillovers from the financial sector to the real sector.

The main idea that the financial sector may distort the allocation of talents was introduced by Tobin (1984) and has been modeled by Bolton et al. (2016). There is empirical evidence is provided by Kneer (2013) showing that high wages in the financial sector may indeed have negative spillovers on non-financial firms.

Some of these studies claim that an over-sized financial sector could result in misallocation of resources and instability, they introduce the possibility of a financial frontier, meaning that the positive effects of financial sector on the real sector tends to vanish after a specific level of financial development. This idea is developed in several recent papers such as Beck and Feyen (2013), Arcand et al. (2015). The main idea is that when the financial sector grows too large it will create higher instability at the macro level followed by higher probability of having a financial crisis. Of course the globalization will not help much in that case, providing major transmission channels between different countries (such as the situation we saw during the 2008-2009 crisis).

Many cross-country regressions are applied in the literature, such as Goldsmith (1969), who used 34 countries and the direction of causality was not tackled. King and Levine (1993), improved the previous work by using a sample of 77 countries, adding control factors, and presenting new financial development measures (liquid liabilities over GDP, bank credit/bank credit+ central bank domestic assets, credit to the private sector/GDP) but they don't study the causality issues and focus only on the banking sector. La Porta et al. (2002), study the public ownership of banks Levine and Zervos (1998), introduce the stock market development to cross country studies. Levine et al. (2000) study the simultaneity bias and use the legal origin measure as an instrument for financial development and find out that the positive impact of financial development on growth does not come from the simultaneity bias. Imam and Kpodar (2016) focus on the role of the islamic finance using a sample of 52 countries with data covering the period 1990 to 2010. The results illustrate that, Islamic banking is positively associated with economic growth in spite of, its relatively small size compared to the economy and the overall size of the financial system.

Studies addressing finance-growth nexus in MENA region are somehow inconclusive. Abu-Bader and Abu-Qarn (2008), use a quadivariate vector autoregression vector (VAR) methodology to test for Granger causality, and show that finance indeed leads to growth in five of the six countries.² Al-Khouri (2007), also uses Granger causality for seven MENA countries and find that the banking sector Granger causes economic growth in six countries, in three of them economic growth also Granger causes the banking sector. Hamdi and Hakimi (2015) study eleven countries in the region for the period from 1995 to 2010, using a GMM estimator, they find a positive relationship between banking and financial developments and economic growth, however for the stock markets they argue that markets are still at an early stage of development and the sector needs the implementation of deep policy reforms to

2. Algeria, Egypt, Morocco, Syria and Tunisia. Only for Israel the causality runs the other way around, meaning from economic growth to financial development and the causality runs weak.

attract investors and to promote the contribution of the financial market in economic development. Kar et al. (2011), also investigate the direction of causality, for fifteen MENA countries, and find no clear consensus, concluding that the findings are country specific. Ayadi et al. (2015) focus on the Southern Mediterranean region over 1984-2010 and using panel data estimation find that the credit to the private sector and bank deposits are negatively associated with economic growth. Ben Naceur et al. (2007) use a dynamic panel model with GMM estimators for eleven MENA countries, and find no significant relationship between the banking sector development and growth, their results are similar for the stock market development and growth. They conclude that this lack of relationship must be linked to the MENA's underdeveloped financial sector that hampers economic growth and that these countries should improve their financial sector in order to prevent their economies from negative impacts of shaky financial markets. Ben Naceur et al. (2008) also focus on the impact of the stock markets on growth, and find a negative impact in the short run that turns to positive in the long run. Samargandi et al. (2014) investigate the effect of financial development on economic growth in the context of Saudi Arabia, an oil-rich economy find that financial development has a positive impact on the growth of the non-oil sector, and its impact on the oil-sector growth and total GDP growth is either negative or insignificant suggests that the relationship between financial development and growth may be fundamentally different in resource-dominated economies Moradbeigi and Law (2017) examines whether more developed financial markets can channel the revenues from oil into more productive activities and thus offset the negative effects of oil abundance on growth and show that a better financial development dampens the negative impact of oil abundance on economic growth, using a common correlated effect mean group estimator. Hassan et al. (2011) Study the low- and middle- income countries classified by geographic regions, for MENA they include 13 MENA countries. They estimate both panel regression and variance decompositions of annual GDP per capita, with a focus on

trade and government expenditure and find that a well-functioning financial system is a necessary but not sufficient to reach steady growth in developing countries.

3 Financial market indicators

One of the major issues in studying the financial sector, is to find a suitable indicator for the financial sector development. Since the stock and bond markets in the region are not very well developed, as argued in Ben Naceur et al. (2007), we do not use indicators of the stock market development and focus on three different size measures of the financial sector that are widely used in the literature :

- Private Credit : equals the value of credits by financial intermediaries to the private sector divided by GDP. This measure of financial development is more than a simple size measure of financial sector. It isolates credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises. Furthermore, it excludes credits issued by the central bank. “Private Credit” is the preferred measure of financial development and is widely used in the literature.
- Liquid liabilities : equals liquid liabilities of the financial system (currency plus demand and interest-bearing liabilities of banks and nonbank financial intermediaries) divided by GDP. This is a typical measure of financial depth and thus of the overall size of the financial intermediary sector (see King and Levine (1993)). However, this commonly used measure of financial sector development has shortcomings. It may not accurately gauge the effectiveness of the financial sector in ameliorating informational asymmetries and easing transactions costs. Also, “Liquid liabilities” includes deposits by one financial intermediary in another, which may involves double counting
- Deposit money bank : Claims on domestic real non financial sector by deposit money banks as a share of GDP. This is our measure of banking sector deve-

lopment. Since in most of MENA countries financial sector is bank based it is relevant to look at the banking sector expansion.

These indicators are normally meant to measure the financial intermediation, however the financial sector has gradually extended its activity beyond the traditional intermediation between providers and users of funds toward non-intermediation financial activities, such as proprietary trading, market making, provision of advisory services, insurance and other non-interest income generating activities. As a result, the traditional measures of intermediation activities have become less and less consistent with the reality of modern financial systems Beck et al. (2014). However this trend is mostly observed in advanced countries, therefore in this study we stick into the classical indicators mentioned above.

4 Data

The study is based on a panel of 15 MENA countries³, from the period 1960 to 2011. The data for financial indicators are from *Global Financial Development Database* based on Čihák et al. (2012), for the control variables we use *World Development Indicators* Penn World Table Feenstra et al. (2015). The definition of each variable all along its source is reported in following table :

TABLE 3.1 – Variable description and source

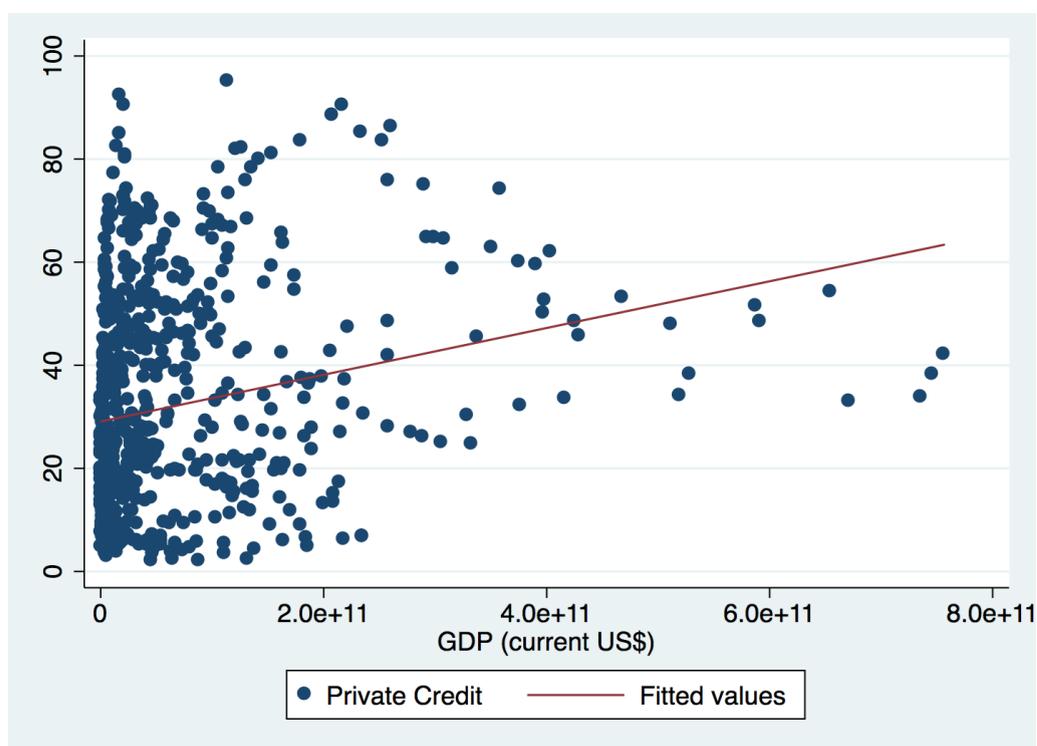
Variable name	Variable definition	Source
Private credit	Private credit by deposit money banks to GDP(%)	Financial Development and Structure Dataset
Bank deposit	Bank deposits to GDP (%)	Financial Development and Structure Dataset
Liquid liabilities	Liquid liabilities to GDP (%)	Financial Development and Structure Dataset
GDP	PPP Converted GDP Per Capita (Laspeyres)	Penn World Table, version 9.0
Government Exp	General government final consumption expenditure (% GDP)	Word Development Indicators
Inflation	Inflation, consumer prices (annual %)	Word Development Indicators
Savings	Gross domestic savings (% GDP)	Word Development Indicators
Openness	Openness at 2005 constant prices (%)	Penn World Table, version 9.0
Schooling	School enrollment, secondary (% gross)	Word Development Indicators
Population growth	Population growth (annual %)	Word Development Indicators

The summary statistics of the data, and the mean of the financial indicators for

3. The countries of our interest are Algeria, Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syrian, Tunisia, United Arab Emirates

each country, are reported in Appendix 3.B. Figure 3.1 illustrates the relationship between an indicator of financial development and GDP per capita and there seems to be a positive correlation.

FIGURE 3.1 – Financial development and GDP per capita



5 Methodology

The econometrics of finance and growth can be summarized in the following simple regression model (see Beck (2008) and Beck et al. (2014))

$$g_{it} = \alpha_0 + \alpha_1 F_{it} + \alpha_2 C_{it} + \mu_i + \varepsilon_{it} \quad (3.1)$$

Where g is the growth rate of GDP per capita, F is an indicator of financial development, C is a set of control variables and μ and ε are error terms with μ a country specific term. The sign and significance of α_1 is the center of debate, however its estimated value can be biased for a handful of reasons, among them,

measurement error, reverse causation and omitted variable bias.

The estimator we use is GMM, developed for dynamic panel models by Arellano and Bover (1995). Bond et al. (2001) show that the GMM dynamic panel estimation is capable to correct for unobserved country heterogeneity, omitted variable bias, measurement error, and endogeneity problems frequently arise in growth estimation.

The estimated model in this study is inspired by Levine et al. (2000), who found a robust and significant impact of the financial market development on economic growth, both in a standard cross country growth regression and a GMM dynamic panel estimation. The particularity of this study is that, contrary to Levine et al. (2000) we focus on an specific region. As argued in the first chapter the main characteristics of the financial sector in the region is that the markets are not very well developed, and the financial sector remains largely bank-based. Furthermore there is a strong concentration in banking sector with an extensive government presence. Yet the sector is growing rapidly in many countries of the region.

We start by the traditional cross-country growth regression, same as Equation (3.1) :

$$y_{i,t} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta F_{i,t} + \gamma X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (3.2)$$

Where $y_{i,t}$ is the natural logarithm of real per capita GDP, F is an indicator of financial market development, X is a set of control variables, including inflation, government expenditure, savings level, years of schooling and openness. η is the country specific fixed effect, ε is the error term and the subscripts i and t represent country and year, respectively. Following Arellano and Bond (1991), The country specific fixed effect is eliminated by using the first difference of Equation (3.1) as follows :

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta(F_{i,t} - F_{i,t-1}) + \gamma(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (3.3)$$

By construction, this procedure allows us to solve the omitted variable bias in Equation (3.3), but the new error term, $\varepsilon_{i,t} - \varepsilon_{i,t-1}$ is correlated with the lagged dependent variable, $y_{i,t-1} - y_{i,t-2}$. We assume that the error term is not serially correlated and the explanatory variables are uncorrelated with the future realizations of the error term. So the moment conditions are given by :

$$E[y_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } s \geq 2; \quad t = 3, \dots, T \quad (3.4)$$

$$E[X_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } s \geq 2; \quad t = 3, \dots, T \quad (3.5)$$

Two different estimation methods can be used :

- Difference GMM : This difference dynamic-panel estimator, developed by Arellano and Bond (1991) and Holtz-Eakin et al. (1988), has increasingly been used in studies of growth. The difference estimator is a two-step estimator : in the first step the error terms are assumed to be independent and homoskedastic across countries and over time. In the second step, the residuals obtained in the first step are used to construct a consistent estimate of the variance-covariance matrix, thus relaxing the assumptions of independence and homoskedasticity. The two-step estimator is thus asymptotically more efficient relative to the first-step estimator.
- System GMM : Since lagged values of financial development frequently make weak instruments for forecasting changes in financial development. This weak instrument problem can induce biases in finite samples and poor precision even asymptotically. Alonso-Borrego and Arellano (1999), the System GMM mitigates this problem by complementing the difference specification with the original regression specified in levels. This system estimator, developed by Arellano and Bover (1995), offers dramatic improvements in both efficiency and consistency in Monte Carlo simulations. System GMM is considered more

superior than difference GMM. Bond et al. (2001), argue this method is able to correct unobserved country heterogeneity, omitted variable bias, measurement error, and potential endogeneity that frequently affect growth estimation.

Hence, the use of GMM estimator is more adapted for our dynamic panel data. This estimator was originally developed for dynamic panel Where the cross-section dimension is large and the time-series dimension is small, GMM dynamic panel estimators, are specifically designed to address the econometric problems induced by unobserved country-specific effects and joint endogeneity of the explanatory variables in lagged dependent-variable models, such as growth regressions. In order to address the consistency of the GMM, we consider Sargan test of over-identifying restrictions which tests for overall validity of the instruments and the null hypothesis is that all instruments as a group are exogenous. the null hypothesis is that all instruments as a group are exogenous. The Sargan p-value is in most cases lower than the critical value of 0.01 so we can hardly validate this test.

6 Results

The results of the linear GMM estimation are reported in Table 3.1, the baseline estimation is reported in column 1, 3 and 5 of the table for different measures of the financial development. In column 2, 4 and 6 additional control variables are added. This table mainly shows that the financial sector development is to some extent associated with lower growth in the case of MENA countries. The negative coefficient stays negative for all three indicators of financial sector size, however the coefficient is strongly significant only for Liquid liabilities. The Government expenditure has a positive impact of growth, It comes as no surprise that Openness is mostly positively associated with growth.

In order to capture the non-linear relationship between finance and growth highlighted in most of the recent literature, we add the linear GMM estimator (Equation

6. RESULTS

TABLE 3.1 – Dynamic panel linear regression

VARIABLES	(1) GDP _g	(2) GDP _g	(3) GDP _g	(4) GDP _g	(5) GDP _g	(6) GDP _g
L.GDP _g	-0.044 (0.062)	-0.166** (0.074)	-0.208** (0.083)	-0.314*** (0.091)	-0.046 (0.062)	-0.188** (0.073)
Private credit	-0.039 (0.030)	-0.033 (0.034)				
Government Exp	0.101*** (0.033)	0.200** (0.084)	0.041 (0.042)	0.291** (0.126)	0.097*** (0.033)	0.217** (0.086)
Inflation	-0.038 (0.061)	-0.036 (0.081)	-0.137 (0.083)	-0.193* (0.108)	0.000 (0.059)	-0.022 (0.075)
Openness	-0.010 (0.016)	-0.007 (0.021)	0.067** (0.028)	0.046 (0.030)	-0.009 (0.015)	-0.022 (0.021)
GDP1990		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)
Schooling		-0.089** (0.039)		0.013 (0.044)		-0.066 (0.044)
Population growth		-0.687 (0.483)		-0.626 (0.656)		-0.338 (0.504)
Savings		-0.001 (0.102)		0.136 (0.147)		-0.033 (0.107)
Oil		3.690 (2.549)		0.503 (3.009)		6.440** (2.929)
Liquid liabilities			-0.119*** (0.041)	-0.195*** (0.049)		
Bank deposit					-0.025 (0.024)	-0.060* (0.034)
Constant	-5.672* (3.261)	-11.331 (10.062)	1.277 (3.724)	-22.153 (15.524)	-5.807* (3.259)	-12.678 (10.282)
Observations	358	280	179	149	362	284
Number of country	15	14	7	7	15	14
No. of instruments	97.000	80.000	93.000	80.000	97.000	80.000
AR1 p-value	.	0.000	0.000	0.000	.	0.000
AR2 p-value	0.000	0.000	0.356	0.114	0.000	0.000
Sargan p-value	0.000	0.000	0.167	0.500	0.000	0.001

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.10

(3.3)) the quadratic form of the financial size measure :

$$y_{i,t} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta F_{i,t} + \beta' F_{i,t}^2 + \gamma X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (3.6)$$

The results of this estimation is reported in Table 3.2, the coefficient for “Private Credit” stays significative and negative while the coefficient for the square of private credit is positive and significative, which implies that the negative impact of the financial deepening on growth is diminishing as the sector develops, while for “Liquid liabilities” the results are inconclusive and for Bank deposit the coefficient stays negative (non-significative for the benchmark model and significative after adding the complementary control variables) and for the square of Bank deposit the coefficient is positive in the complete model and non-significative in the benchmark setting. The Sargan p-value is in most of our GMM estimations⁴ is lower that the critical value of 0.01 so we can hardly validate this test. Therefore, it is necessary to re-estimate the model using a classical OLS panel estimator. The results are reported in Tables 3.3, 3.4 and 3.5 for Private credit, Liquid liabilities and Bank deposit respectively. This panel regressions estimate the original Equation (3.1). In these tables the first and second column correspond to the benchmark and complete estimations, the third column studis the non-linearities.

According to these panel estimations, all three measures of financial development are negatively and significantly associated with GDP per capita growth in the MENA region, this uncommon negative impact of the financial development on growth can be due to diverse factors, on one hand, there sector is highly concentrated with a few politically well connected actors which leads to lack of competition and low efficiency⁵ On the other hand, the weak legal framework and investor protection can discourage private investors to enter the markets and hinder the financial sector to

4. The null hypothesis is that the instruments are not correlated with the residuals.

5. We try to study directly the impact of financial sector efficiency by integrating “Net interest margin” and “Overhead cots” in the estimation but fail to establish any significant relationship majorly because of a lot of missing data. This estimation is reported in Appendix 3.C.

6. RESULTS

TABLE 3.2 – Dynamic panel quadratic regression

VARIABLES	(1) GDPg	(2) GDPg	(3) GDPg	(4) GDPg	(5) GDPg	(6) GDPg
L.GDPg	-0.043 (0.063)	-0.161** (0.076)	-0.247*** (0.082)	-0.340*** (0.094)	-0.045 (0.063)	-0.190** (0.075)
Private credit	-0.290** (0.113)	-0.293** (0.128)				
PrivateC2	0.003** (0.001)	0.004** (0.002)				
Government Exp	0.098*** (0.034)	0.226** (0.088)	0.041 (0.038)	0.129 (0.121)	0.099*** (0.032)	0.241*** (0.087)
Inflation	-0.023 (0.062)	-0.005 (0.085)	-0.192** (0.080)	-0.230** (0.103)	-0.013 (0.061)	-0.017 (0.077)
Openness	-0.008 (0.016)	0.000 (0.022)	0.070*** (0.026)	0.035 (0.030)	-0.013 (0.016)	-0.008 (0.023)
GDP1990		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)
Schooling		-0.103** (0.041)		0.036 (0.050)		-0.076* (0.043)
Population growth		-0.893* (0.510)		-0.087 (0.672)		-0.570 (0.514)
Savings		0.040 (0.108)		-0.142 (0.144)		0.017 (0.109)
Oil		3.316 (2.647)		4.835 (3.039)		5.271* (3.013)
Liquid liabilities			0.079 (0.110)	-0.382** (0.153)		
Liquidl2			-0.002** (0.001)	0.001 (0.001)		
Bank deposit					-0.024 (0.060)	-0.278*** (0.087)
Bank deposit2					-0.000 (0.001)	0.002*** (0.001)
Constant	-2.491 (3.598)	-11.488 (10.427)	-3.886 (4.443)	7.082 (14.578)	-5.640* (3.237)	-12.311 (10.265)
Observations	358	280	166	139	357	279
Number of country	15	14	7	7	15	14
No. of instruments	97.000	80.000	93.000	80.000	97.000	80.000
AR1 p-value	.	0.000	0.000	0.000	.	0.000
AR2 p-value	.	0.000	0.713	0.175	0.000	0.000
Sargan p-value	0.000	0.004	0.004	0.043	0.000	0.005

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

TABLE 3.3 – Panel regression : economic growth and credit to the private sector with country fixed effects table

	(1) GDP _g	(2) GDP _g	(3) GDP _g
Private credit	-0.0563*** (0.0217)	-0.0425* (0.0220)	-0.0691 (0.0703)
Government Exp	0.0958** (0.0371)	0.161*** (0.0539)	0.162*** (0.0541)
Inflation	-0.147*** (0.0437)	-0.123*** (0.0438)	-0.123*** (0.0439)
Openness	0.0144 (0.0185)	0.00668 (0.0186)	0.00840 (0.0191)
Schooling	0.0220 (0.0233)	-0.0113 (0.0248)	-0.0105 (0.0249)
Population growth		-1.040*** (0.320)	-1.047*** (0.321)
Savings		0.100* (0.0578)	0.102* (0.0580)
PrivateC2			0.000317 (0.000798)
_cons	-7.245 (4.493)	-11.06* (6.592)	-11.01* (6.604)
<i>N</i>	282	282	282
<i>R</i> ²	0.072	0.113	0.114
r2_a	0.00811	0.0450	0.0419

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 3.4 – Panel regression : economic growth and Liquid Liabilities with country fixed effects table

	(1) GDPg	(2) GDPg	(3) GDPg
Liquid liabilities	-0.160*** (0.0358)	-0.108*** (0.0400)	-0.0550 (0.107)
Government Exp	0.155*** (0.0567)	0.203** (0.0841)	0.165* (0.0876)
Inflation	-0.275*** (0.0797)	-0.250*** (0.0783)	-0.264*** (0.0740)
Openness	-0.00331 (0.0309)	-0.00853 (0.0303)	-0.0197 (0.0294)
Schooling	-0.00357 (0.0320)	-0.0733* (0.0390)	-0.0807* (0.0422)
Population growth		-2.141*** (0.731)	-1.831*** (0.698)
Savings		0.135 (0.107)	0.101 (0.110)
Liquidl2			-0.000327 (0.000703)
_cons	-0.924 (7.110)	-2.617 (11.65)	1.146 (11.29)
<i>N</i>	150	150	139
<i>R</i> ²	0.207	0.256	0.259
r2_a	0.144	0.185	0.176

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

TABLE 3.5 – Panel regression : economic growth and Bank Deposits to GDP with country fixed effects table

	(1) GDPg	(2) GDPg	(3) GDPg
Bank deposit	-0.0842*** (0.0244)	-0.0726*** (0.0244)	-0.0586 (0.0455)
Government Exp	0.0968*** (0.0365)	0.153*** (0.0531)	0.153*** (0.0533)
Inflation	-0.163*** (0.0436)	-0.137*** (0.0438)	-0.141*** (0.0443)
Openness	0.00751 (0.0183)	0.00180 (0.0184)	0.00105 (0.0187)
Schooling	0.0584** (0.0267)	0.0240 (0.0285)	0.0214 (0.0297)
Population growth		-0.970*** (0.316)	-0.946*** (0.323)
Savings		0.0879 (0.0578)	0.0837 (0.0588)
Bank deposit2			-0.000127 (0.000344)
_cons	-7.017 (4.414)	-10.02 (6.520)	-9.994 (6.557)
N	286	286	281
R^2	0.091	0.125	0.128
r2_a	0.0297	0.0592	0.0575

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

properly fulfill its task of channeling funds to the most productive use. In the same time, the political instabilities in the region increase the investment risk and play as barrier to the success of the financial markets.

Among the control variables, it comes as no surprise that government expenditure has a positive impact on growth, while inflation has a negative impact, which is in line with the economic literature (see Rioja and Valev (2004) Beck et al. (2000)). Savings has a positive and slightly significant.

7 Conclusion

Financial markets play a crucial role for better economic performance both in developing and developed countries. However, the empirical study of the MENA countries from 1960 to 2011, is surprisingly not supportive of these predictions. These results, may be due to specific characteristics of the region, for instance, the over-presence of the governments in the market, geopolitical instability, conflicts, corruption or brutal changes in oil prices. Another hypothetical reason is the high level of capital flights in the region, as response to volatile economic situation and pronounced geopolitical risks, capital owners prefer to invest abroad. Under such circumstances, a more developed financial sector facilitates capital outflows instead of better allocating them and end up having an inverse effects on growth.

These results broadly indicate that a more developed financial sector in the region is associated with lower growth rate, that can be a consequence of poor efficiency of the financial sector in the region. Meaning that there are problems of credit allocation and weak financial supervision and regulation. Our main conclusion at this point is that, MENA should adopt policies that target the efficiency of the financial sector and not solely its size, probably the further reforms in the sector should be implemented more cautiously in order to provide the essential prerequisite of a well-functioning financial sector beforehand, for instance as a sound legal framework with

sufficient regulation that limits corruption.

Our results are weakened by a handful of factors, the most important one is the lack of data, for instance in the case of Liquid liabilities, out of 14 countries in our sample only 7 are subject to some observations. The period of study is too long that weakens the GMM estimator by increasing the number of instruments, but shortening the period will lead us to lose valuable observations. On the other hand, some important factors are set aside because simply there is not enough observation, we were not able to measure the impact of the stock markets on growth since market related variables are not observed in a sufficiently long period which is related to their relatively small size and market under-development in the region.

In the case of MENA countries, it is interesting to consider variables associated with the institutional quality and governance in the analysis. Although Ben Naceur et al. (2017) find no evidence to support that the financial development depends on country's policy regime or institutional soundness. The degree of positive or negative spillovers from the financial sector to the real sector largely depends on the country's regulatory framework. In the "World governance indicators" database developed by the World Bank; governance indicators start from 1996 and are not observed in a sufficiently long enough period to be employed in our estimation, hence they are dropped from the model despite their theoretical interest.

The classical measures of the financial development can send misleading messages, for instance the bank deposits in Lebanon strikingly high and exceeds 200% of GDP, in France and US this figure is around 80%, while in Luxembourg it is around 350% of GDP, this high ratio of bank deposit does not necessarily mean that the banks in Luxembourg are performing better than French ones, it is basically due to slight regulations in Luxembourg so it attracts a lot of capital as a fiscal paradise. In Lebanon high interest rates and reliable fixed exchange rates motivate the outflows of capital, leaving the bank deposits very high, and the impact of this high inflows on growth is not straight forward and should be addressed separately.

Hence, it is indispensable to study the international capital flows to establish a more accurate relationship between finance and growth. Moreover, problems of this sort justify the use of a composite index that takes to account diverse aspects of the financial sector as a proxy for financial sector development, one individual indicator may come short to represent the global concept of the financial sector and bias the estimation.

This is the main motivation for our next chapter, that constructs a comprehensive composite index for the financial sector development for the countries in the region.

Appendix

3.A Variable definition and sources

3.B Summary statistics

TABLE 3.B.1 – Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Year	1985.5	15.018	1960	2011	780
Private credit	30.852	21.302	1.448	92.377	442
Bank deposit	40.321	27.366	1.751	212.959	446
GDP growth	1.852	8.023	-42.809	76.618	580
Liquid liabilities	50.776	25.604	6.121	196.808	295
Government Exp	97.930	20.958	18.454	208.809	562
Inflation	6.818	7.696	-9.798	59.484	545
Savings	26.516	19.928	-66.953	80.483	562
Openness	87.522	35.987	35.28	224.798	604
Oil	0.6	0.49	0	1	780
GDP1990	15294.807	17291.266	2332.815	64198.285	780
Schooling	62.134	25.421	0	110.46	495
Population growth	3.716	2.775	-3.093	17.695	776

TABLE 3.B.2 – Correlation table for the underlying data

	GDP growth	Private credit	Bank deposit	Liquid L.	Gov. Exp	Inflation	Openness	GDP1990	Savings	Oil	Schooling	Pop. growth
GDP growth	1											
Private credit~t	-0.2357	1										
Bank deposit	-0.2629	0.8068	1									
Liquid liabilities	-0.3086	0.7138	0.8488	1								
Government Exp	0.0323	0.062	0.1002	0.465	1							
Inflation	-0.1508	-0.333	-0.3483	-0.2084	0.0098	1						
Openness	-0.0967	0.4642	0.532	0.6784	0.5599	-0.0821	1					
GDP1990	-0.0046	0.4235	0.4324	0.0647	-0.5888	-0.1752	-0.0542	1				
Savings	-0.0077	-0.1369	-0.1718	-0.4914	-0.9113	0.1091	-0.5147	0.4615	1			
Oil	-0.0255	0.028	0.0364	-0.18	-0.6489	0.2368	-0.2319	0.5246	0.7941	1		
schooling	-0.0439	0.4716	0.6479	0.3326	-0.1617	-0.1854	0.4013	0.4927	0.141	0.2008	1	
Population growth	-0.1686	0.3337	0.3914	0.4862	0.1594	-0.0574	0.4275	0.3607	-0.2108	0.0006	0.0737	1

3.C Financial efficiency and growth

We estimate whether higher efficiency of the financial sector is associated with higher growth, but the limited data we have fails to establish any significant relationship.

TABLE 3.C.1 – Panel regression for financial efficiency and growth with country fixed effects table

	(1) GDPg	(2) GDPg	(3) GDPg	(4) GDPg
Overhead	0.0275 (0.611)	-0.253 (0.592)		
Government Exp	-0.0484 (0.0579)	-0.0669 (0.0954)	-0.0498 (0.0588)	-0.0682 (0.0961)
Inflation	0.0798 (0.110)	0.286** (0.118)	0.0837 (0.110)	0.283** (0.117)
Openness	-0.0694 (0.0473)	-0.0355 (0.0454)	-0.0697 (0.0471)	-0.0343 (0.0453)
Schooling	0.144** (0.0552)	0.128** (0.0565)	0.146** (0.0560)	0.128** (0.0569)
Population growth		-0.850*** (0.267)		-0.851*** (0.267)
Savings		-0.0599 (0.0937)		-0.0539 (0.0916)
Net Interest Margin			-0.0845 (0.580)	-0.209 (0.548)
_cons	0.932 (6.523)	5.523 (10.34)	1.194 (6.743)	5.523 (10.40)
<i>N</i>	108	108	108	108
<i>R</i> ²	0.091	0.216	0.092	0.216
r2_a	-0.0801	0.0467	-0.0799	0.0463

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Chapitre 4

A new comprehensive index for the financial sector development in the MENA region

Résumé

Le secteur financier est un élément essentiel de la structure économique d'un pays, ce secteur est composé de deux principaux volets, les institutions financières et les marchés financiers. Une seule variable ne suffit pas à déterminer son développement. Dans ce chapitre, un indicateur composite pour le développement du secteur financier dans la région MENA est construit.

Bien que le secteur ne soit pas encore aussi développé que les pays européens à revenu élevé ou les États-Unis, la région se développe rapidement. De nombreuses réformes ont en effet mises en œuvre au cours des dernières décennies. Un indicateur spécifique à une région nous permet de mieux prendre en compte les spécificités des pays étudiés et de mieux évaluer le développement financier. Cela nous permet également d'inclure les variables les plus pertinentes dans le contexte de la région, tel que la concentration des banques qui est une variable pertinente aux pays MENA,

car la concentration est encore très élevée dans de nombreux pays de la région. De plus, cette forte concentration est l'une des sources d'inefficacité du secteur bancaire.

L'indicateur de développement du secteur financier présenté dans ce chapitre est une amélioration par rapport aux autres mesures précédemment développées dans la littérature. Contrairement à Creane et al. (2006), l'indicateur n'est pas fondé sur les réponses qualitatives aux enquêtes. Grace à l'analyse de séries de données pays, l'indicateur peut être facilement actualisé. Cet indicateur est plus complet que celui introduit par Svirydzenka (2016), principalement parce qu'il inclut non seulement les variables associées à la performance des marchés financiers et des institutions financières, mais aussi la performance macroéconomique. Comme beaucoup l'ont souligné, un environnement macroéconomique sain est essentiel à la performance du secteur financier. Les indicateurs de gouvernance sont ainsi inclus dans ce troisième pilier de notre indicateur composite.

Les pays pétroliers disposent d'un secteur financier plus développé, ce qui peut être dû aux forts entrées de capitaux et à l'abondance des réserves de change. L'instabilité politique et les guerres civiles sont des freins au développement financier.

1 Introduction

Financial sector is an important factor to promote countries and to foster economic growth. There is a massive body of literature in favor of the positive impact of the financial sector on economic growth, from the early works theoretical of Schumpeter (1911) and Goldsmith (1969) who argue that financial sector contributes to a more efficient allocation of capital and reducing the transaction cost ; to the empirical literature brought together by Levine (2005). Although the most recent studies find a vanishing effect of the financial development on growth and highlight the nonlinearities in finance-growth nexus (Law and Singh (2014), Arcand et al. (2015), Dabla-Norris and Srivisal (2013) and Ben Naceur et al. (2017)), the importance of

the financial sector in the growth process remains a key concern.

Financial sector by nature is a complex and multidimensional aspect of the economy and solely one indicator falls short to shed light on all of its aspects. The empirical literature, finds conflicting results according to the measure chosen to proxy the financial sector. With some traditional measures may send misleading messages, for instance, although a higher ratio of broad money (or M2) to GDP is generally associated with greater financial liquidity and depth, the ratio may decline as a financial system develops because people are provided with diverse alternatives to invest in longer-term or less liquid financial instruments.

This paper introduces a composite index to assess the development of the financial sector in Middle East and North Africa. Comparing MENA countries is particularly a challenging task. The region is subject to great heterogeneity, financial deepening, access and particularly market development varies largely among these countries. Some countries, such as United Arab Emirates, Qatar and Bahrain host leading financial centers.¹ Azzam (2015), while others such as Yemen do not even possess, a public stock exchange or in Algeria the size of the market is too small to have any significant influence on the real sector.

There are few research dealing with the impact of the financial markets on growth in the region and there seems to be no consensus, which could be due to the heterogeneity, limited data available, poor institutional framework or an underdeveloped financial sector. Ben Naceur et al. (2017) show that the effect of the financial development on growth in the region is different than the rest of the world, notably measures for stability and efficiency of the sector carry unexpected signs, and highlight the importance of country-specific circumstances. In this work we take into account the specificities of the financial sector in the MENA region, and introduce a measure for financial development that goes beyond a simple aggregate indicator. Financial

1. There are only four financial centers in the region, namely, Dubai International Financial Center (DFIC) : <https://www.difc.ae/>; Qatar Financial Center (QFC) :<http://www.qfc.qa/>; Bahrain Financial Harbor (BFH) : <http://www.bfharbour.com/> and King Abdullah Financial District in Riyadh (KAJD) : <http://www.kafd.com.sa/>

sector is a multifaceted concept, encompassing not only financial institutions and markets but also regulation and macroeconomic performance; we incorporate all these three pillars in the construction of our composite index. Our purpose is to go beyond a simple standard quantitative indicator, such as credit to the private sector to GDP or the ratio of broad money (M2) to GDP or the ratio of liquid liabilities to GDP or deposit money bank assets to total banking sector assets. We intend to determine where do economies of the MENA region stand in terms of the development of the financial sector, also to monitor the efficiency of financial institutions and markets in the region.

Financial markets have various important tasks in the economy from allocation of capital, providing funds, risk amelioration, information provision. In order to take into account of all the important aspects of the financial markets in one indicator, the best course of action is to construct a composite indicator. Composite indicators can summarize multidimensional realities are easy to interpret since they reduce the size of a set of individual series without dropping the underlying information base, hence useful as a tool for conveying summary performance information and signaling policy priorities. They are widely used nationally and internationally in health care and other sectors, offering an understandable assessment of the “big picture” for public.

There is an ongoing debate on the usefulness of composite indicators, advocates argue combining indicators gives us useful benchmarks that can get the policy makers attention, as the identification of trends in many separate indicators is more complicated than the interpretation of a single composite indicator. Meanwhile, opponents argue that in the aggregation process we lose a lot of worthy information that remains sensitive to the weighing process. The dispute is yet far from being resolved, and although composite indicators are argued to send misleading policy messages if they are poorly constructed or misinterpreted and subject to critics related to methods of allocation of weights and the aggregation of many variables, they

are increasingly used and remain a good tool to make a complex phenomena with multiple aspects, measurable and comparable.

This paper is organized as follows, section 2 reviews the literature, the methodology for the indicator is detailed in section 3. Results are represented in section 4 and section 5 concludes.

2 Literature Review

Finding the best indicator that measures the financial sector development has long been a challenge in the literature addressing finance-growth nexus. Empirical works are usually based on standard quantitative indicators such as the ratios of liquid liabilities to GDP, deposit money bank assets to banking sector assets, and credit to the private sector to GDP (a detailed review of this literature is reported in the Third Chapter). These measures are suitable for studying a broad cross-section of countries since long time series are available for a wide range of countries over time.

However, as mentioned before and highlighted by Goyal et al. (2004), these simple measures do not necessarily capture the different structural and institutional details of what is broadly meant by financial development. The financial structure of a country is composed of a variety of markets and financial products, and it is difficult to identify a few measures that could adequately capture all relevant aspects of development. Huang (2005) identifies four main dimensions for the financial development, namely, institutional quality, macroeconomic policies, geographic characteristics, as well as the level of income and cultural characteristics. They use a Bayesian model to measure the significance of 39 variables. Although this study is valuable to determine the important aspects of the financial development, it does not quantify the financial sector within a country making it comparable across countries and over time.

Composite indices are widely used in the literature mostly by international institutions, among the most popular, there are composite indices of well-being constructed by the United Nations Development Programme (UNDP) such as the Human Development Index (HDI), Human Poverty Index (HPI), and Gender related Development Index (GDI). A few studies have developed a composite index that represents the level of the financial sector development or depth of the financial intermediation. Cardarelli et al. (2006) take into account only the advanced economies (high income European, Japan, United States, Canada and Australia) and construct a new Financial Index to summarize the extent of the arm's length content of a financial system, since it appears to be a factor affecting the portfolio allocation decisions of international investors. The overall financial index in this study is constructed as the simple average of three sub-indices capturing the traditional banking intermediation, new types of financial intermediation and the role of financial markets respectively, that is (1) the existence of well-functioning mechanisms to enforce contracts and thus reduce the frictions that may impede the development of arm's length relations; (2) the ability of firms to access markets to finance their activities; and (3) the liquidity and depth of stock and bond markets. Another index for the financial sector was developed by Dorrucchi et al. (2009), who constructs a composite index based on three dimensions. Firstly, "Institutions" regroups variables regarding the quality of institutions and regulatory and judicial framework. Secondly, "Size and access to markets" that takes into account size measures of the financial markets, financial innovation and possibility for residents to access finance. Thirdly, "Market performance" that includes, banks' efficiency and profitability, liquidity and the distribution of domestic asset base between the private and the official sector. They construct the indicator for 30 countries, both emerging and mature economies in 2006 and find evidence of a catch up in financial terms that have already started in certain emerging economies. Gelbard and Leite (1999) Also go beyond the standard quantitative indicators, and use measures of market structure, financial products,

financial liberalization, institutional environment, financial openness, and monetary policy instruments to construct a comprehensive index for 38 sub-Saharan African countries, for 1987 and 1997.

The most recently developed indicator, without a focus on a specific region, is constructed by Svirydzenka (2016), its framework is based on the matrix of financial system characteristics developed by Čihák et al. (2012), and takes into account measures of depth, access and efficiency of both financial markets and financial institutions. However, one important pillar for well-performing institutions is neglected in the construction of this indicator, Macroeconomic Environment. The ME combines Governance and national business environment and play a crucial role in the effective performance of every institution in the economy, especially financial institutions that are prone to instability and subject to systemic risks. The ME is yet more important in the case of MENA region since the main reason that many institutions in the region fall behind in terms of performance is related to corruption or political instability. Our goal is to complete the financial development indicator presented in Svirydzenka (2016), by adding the new dimension of ME. We take into account the specificities of the region. While in other papers mentioned earlier the index is constructed for almost every country of the planet regardless of their region and their particularities.

There has been little work on measuring and assessing financial sector development in the MENA region, mainly due to lack of data Dept (1996) overviews the financial sector reforms in the region and highlight that the thirteen MENA countries included in their analysis have made significant progress in financial deepening. But in most of these countries financial markets are thin and tightly regulated, government ownership is prevalent, and market forces play a limited role. Nashashibi et al. (2001) find that most Arab countries had made progress over the past decade in financial reform, but were still at an early stage in the process. Their financial systems are dominated by commercial banks, and, in some, by public banks,

and capital market development is hindered by legal, institutional, financial, and economic factors. Lagoarde-Segot and Lucey (2008) analyze the impact of market development, corporate governance and economic liberalization on the efficiency of the stock markets in Egypt, Morocco, Tunisia, Jordan, Lebanon, Israel and Turkey using a multinomial ordered logistic regression and highlight heterogeneous levels of efficiency in the MENA stock markets.

Regarding the financial sector development in the MENA region, currently, there is only one index available developed by the International Monetary Fund via Goyal et al. (2004) and Creane et al. (2006), the indicator measures financial market development in 20 MENA countries for 2000-01 and 2002-03, based on 48-question survey (responded based on IMF staff reports), encompassing six themes : monetary sector development and monetary policy, banking sector development, nonbank financial sector development, regulation and supervision, financial openness, and institutional environment. Although this indicator takes into account various aspects of the financial sector, it solely depends on survey data and remains a fairly qualitative indicator for the financial markets in the region.

3 Methodology

The composite index is constructed following the standard steps (see Saltelli (2007) and OECD (2008)), namely :

- Theoretical framework, the very first step to create a composite indicator is to define its structure. We construct the financial index based on three pillars, namely, macroeconomic environment, financial institutions and markets.
- Data preparation and selection, our final goal is to build a dataset with complete and comparable data series. Hence, we need to construct the largest set of observations with the minimum number of missing values. This step is specifically challenging for the countries of the region, who are most likely to face

incomplete data series. We aim to gather a large dataset composed of many relevant variables coming from reliable diverse datasets so that the final composite index reflects maximum amount of information available regarding the financial sector.

- Dealing with missing data and imputations, countries at lower development levels are more prone to facing missing data, the literature underlines that if a variable has more than 5% missing values, cases should not be simply deleted, since the missingness is not occurring at random. In order to address missing data many imputation methods are developed in the literature such as mean / median / mode substitution, regression imputation, hot and cold deck imputation, and Markov Chain Monte Carlo algorithm. A mean imputation is usually order preserving by having minimum effect on the ranking of the countries due to the fact that the mean value keeps the ranking of the country intact for a specific indicator.
- Normalization, we need to normalize the indicators so to make different indicators expressed in various measurement units comparable. Moreover, since some indicators may be positively correlated with the phenomenon to be measured and others maybe negatively correlated, we need the normalization so that an increase in the normalized indicators corresponds to an increase in the composite index.
- Weighting and aggregation of the normalized individual variables to one composite index, weighting process is going to determine the relative importance of each variable in the final index. Aggregation is the final step of the composite index construction, it is essential to take into account the degree of substitutability among different variables before performing this step.
- Robustness checks, we show that the constructed indicator is not too sensitive to the choice of, weights, normalization and aggregation method. It is important to study the relationship of the index with the conventional measure of

the financial sector development in the literature.

3.1 Theoretical framework

The composite index for the financial sector is founded on three main pillars, namely, macroeconomic environment, financial markets and financial institutions. The choice of “Financial Institutions” and “Financial Markets”, as two main pillars for the financial sector introduced by Čihák et al. (2012), remains a fairly straight forward and a common approach in the literature (Dorrucci et al. (2009) and Sviydenka (2016)), similarly, we follow Čihák et al. (2012) matrix of financial system characteristics and divide each aspect to *size*, *access* and *efficiency*. However, unfortunately data series that captures the access to the financial markets are largely unavailable for the countries of the region and we are obliged to drop this dimension.

We even go beyond Čihák et al. (2012) and add another pillar to overall index, that is “Macroeconomic Environment” (ME). It is clear that a hostile ME for instance, poor governance; transparency; accountability; inadequate judicial system; and weak property, creditors, and investor rights all play a role in the poor development of the financial sector and an effective regulatory system facilitates the development of equity and bond markets that allow more effective risk diversification and lead indirectly to higher returns, leading to better financial sector performance. Although this choice of ME as a pillar for the financial sector development is less common in the literature, there is a large number of studies emphasizing the role of legal institutions in shaping financial development. Porta et al. (1997) stress the importance of legal frame work for the financial sector development, showing that countries with poorer investor protections, measured by both the character of legal rules and the quality of law enforcement, have smaller and narrower capital markets. Beck and Levine (2005) outlines this growing body of research examines the role of legal institutions in explaining financial development. Levine et al. (2000) and Chinn and Ito (2006) provide empirical support for that the regulatory framework affects

TABLE 4.1 – MENA Countries in the sample

Country Name			
Algeria	Israel	Morocco	Tunisia
Bahrain	Jordan	Oman	United Arab Emirates
Egypt, Arab Rep.	Kuwait	Qatar	West Bank and Gaza
Iran, Islamic Rep.	Lebanon	Saudi Arabia	Yemen, Rep.
Iraq	Libya	Syrian Arab Republic	

development of the financial sector. Meanwhile a healthy macroeconomic environment in terms of strong legal frame work and government accountability and low corruption is essential to the development of the financial sector to ensure trust in banks and to provide protection to creditors claims on financial assets.

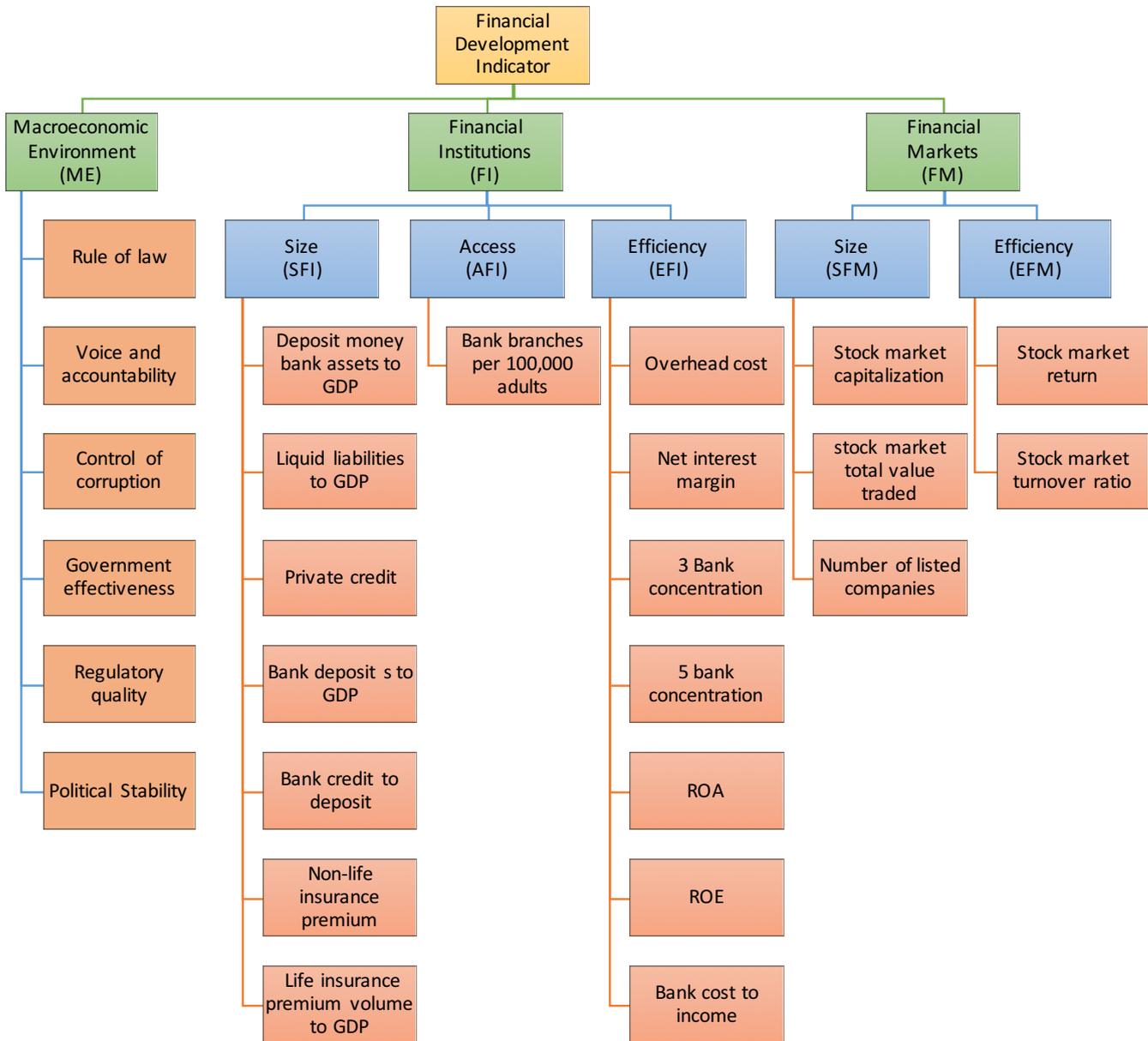
The schematic representation of these steps exhibited in Figure 4.1 demonstrates the stages behind the index construction and its components. The final index is constructed through 3 stages, in the first step, 26 variables are employed to construct the 5 sub-indices for institutions' size, access and efficiency and markets' size and efficiency (respectively, SFI, AFI, EFI, SFM and EFM) and the Macroeconomic Environment index (ME), secondly, we combine the sub-indices to build the index for financial institutions and financial markets (FI and FM). The last stage is to incorporate the sub-indices for each pillar to build the final composite index (CFI).

3.2 Data preparation and selection

Our analysis considers all the countries in the region for which, long term dataset is available. The data regroups 26 series for 19 MENA countries listed in Table 4.1, from 1996 to 2014. Table 4.2, illustrates the series that we use and the data source for each series. The exact definition of the variables are reported in Appendix 4.B. The summary statistics of the series used is reported in Table 4.3. For all 3 pillars of the composite index, one can observe strong heterogeneity among the countries of the region.

The “Macroeconomic Environment” dimension is based on six governance indi-

FIGURE 4.1 – The Structure of the Composite Financial Index (CFI)



cators extracted from Worldwide Governance Indicators dataset (latest update in September 2017), these indicators are based on over 30 data sources, and each is a composite index itself, the methodology and key analytical issues regarding their construction is presented in Kaufmann et al. (2011) and Kaufmann et al. (2009). There is a sharp dispersion for “Political stability and absence of violence/terrorism” among different countries this is due to the fact that some countries in our panel suffer from political instability and civil wars. The minimum value of -3.18 corresponds to Iraq in 2004 right after the US invasion in 2003. In 2014 the most unstable country is Syria with the stability indicator of -2.75.

Variables representing Financial Markets and Institutions are collected from Financial Development and Structure Dataset (June 2017) or Global Financial Development Database (June 2017), which is an extension of Financial Development and Structure. Both these datasets are based on a “4x2 framework” Čihák et al. (2012) and include measures of the size, activity, efficiency and stability of financial institutions and markets.

The heterogeneity is notably strong among the variables associated with “Financial Institutions”, in particular for the banking activities. There is a significant gap for “Liquid liabilities to GDP”, varying from 252.72 for Lebanon in 2014 to 20.62 for Iraq in 2008. “Deposit money bank assets to GDP” reach over 100% of GDP only in Lebanon and Jordan. Access to the banking sector remains globally weak in the region, according to Douglas (2011) 21.3 % of adults in MENA have a loan account in a bank. Meanwhile, there is a wide regional difference in access to the banking sector, measured by “Bank branches per 100,000 adults”, ranging from 1.72 for Yemen in 2013 to 30.82 for Lebanon in 2004. Insurance remains at a low level of development for all countries in our sample.

The level of Financial Markets’ development differs significantly from one country to another. Yemen has no public stock exchange hence the values for financial market variables are null for this country, justifying the minimum value of 0 for the stock

market variables. In Iraq the stock exchange (ISX) was established in 2004 under unfavorable economic and political climate. Its activity remains marginal. Libyan stock market (LSM) was established in 2006 and its activity remain minor with only 24 listed companies (according to the LSM's official website). Although the Algerian stock market (SGBV) was established in 1993, it is subject to a very sluggish growth and still remains among one of the smallest stock exchanges in the world with only 5 listed companies (according to the SGBV's official website).

TABLE 4.2 – Variables in sub-indicators

Sub-indicator	Variables	Data sources
Macroeconomic Environment		
	Rule of Law	Worldwide Governance Indicators
	Voice and Accountability	Worldwide Governance Indicators
	Control of Corruption	Worldwide Governance Indicators
	Government Effectiveness	Worldwide Governance Indicators
	Regulatory Quality	Worldwide Governance Indicators
	Political Stability and Absence of Violence/Terrorism	Worldwide Governance Indicators
Financial Institutions		
	Size	
	Liquid liabilities to GDP	Financial Development and Structure
	Deposit money bank assets to GDP	Financial Development and Structure
	Private credit by deposit money banks to GDP	Financial Development and Structure
	Bank deposits to GDP	Financial Development and Structure
	Bank credit to bank deposits	Financial Development and Structure
	Life insurance premium volume to GDP	Financial Development and Structure
	Non-life insurance premium volume to GDP	Financial Development and Structure
	Access	
	Bank branches per 100,000 adults	Global Financial Development *
	Efficiency	
	Bank overhead costs to total assets	Financial Development and Structure
	Net interest margin	Financial Development and Structure
	3-bank asset concentration	Financial Development and Structure
	5-bank asset concentration	Global Financial Development
	Bank ROA	Financial Development and Structure
	Bank ROE	Financial Development and Structure
	Bank cost to income ratio	Financial Development and Structure
Financial Markets		
	Size	
	Stock market capitalization to GDP	Financial Development and Structure
	Stock market total value traded to GDP	Financial Development and Structure
	Number of listed companies per 10,000 population	Financial Development and Structure
	Efficiency	
	Stock market return	Global Financial Development
	Stock market turnover ratio	Global Financial Development

*For Bahrain this series is available since 2005 from “Central Bank of Bahrain financial Stability Report”

*CHAPITRE 4. A NEW COMPREHENSIVE INDEX FOR THE FINANCIAL
SECTOR DEVELOPMENT IN THE MENA REGION*

TABLE 4.3 – Summary Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Macroeconomic Environment					
Rule of Law	266	-0.16	0.73	-1.93	1.11
Voice and Accountability	266	-0.94	0.56	-2.04	0.76
Control of Corruption	266	-0.2	0.76	-1.61	1.72
Government Effectiveness	266	-0.18	0.75	-1.88	1.48
Regulatory Quality	266	-0.24	0.8	-2.15	1.32
Political Stability and Absence of Violence/Terrorism	266	-0.62	1.03	-3.18	1.21
Financial Institutions					
Liquid liabilities to GDP	262	71.25	43.66	20.62	252.72
Deposit money bank assets to GDP	265	59.63	34.93	4.39	179.09
Private credit by deposit money banks to GDP	265	41.87	24.48	2.23	96.11
Bank deposits to GDP	265	60.69	43.31	9.98	245.43
Bank credit to bank deposits	275	74.21	38.87	9.22	199.77
Life insurance premium volume to GDP	237	0.36	0.57	0.002	2.59
Non-life insurance premium volume to GDP	240	0.89	0.5	0.18	2.29
Bank branches per 100,000 adults	204	13.68	7.98	1.72	30.82
Bank overhead costs to total assets	263	1.7	0.79	0.06	6.46
Net interest margin	261	3.24	1.8	0.06	20.49
3-bank asset concentration	239	73.18	16.76	40.22	100
5-bank asset concentration	214	87.31	12.82	57.62	100
Bank ROA	263	1.35	0.98	-3.43	4.47
Bank ROE	263	13.55	18.33	-87.99	242.57
Bank cost to income ratio	263	42.65	14.55	1.83	88.29
Financial Markets					
Stock market capitalization to GDP	267	39.69	42.64	0	229.56
Stock market total value traded to GDP	272	15.95	36.4	0	331.27
Number of listed companies per 10,000 population	281	1825.33	2545.69	0	10558.12
Stock market return	180	12.65	35.74	-44.15	255.55
Stock market turnover ratio (%)	191	32.61	38.55	0.86	287.62

3.3 Treating the missing data

Data coverage varies largely among the countries of the region. Treating the missing data is specifically challenging in MENA, since lots of data series are incomplete or simply not available. We already taken into account this issue in the framework construction by choosing series that include a reasonable number of observed values. This is the main reason for the exclusion of this the dimension of “the Access to the financial markets”.

One can apply several strategies to address missing data issues : the first easy strategy is to replace the missing values by zero, however, missing series do not necessarily mean that the concerned series are inexistent and in many cases this

approach will lead to biased estimation of the measured phenomenon. Another direct way to address the issue is to omit the affected series that will again lead to biased estimation since the missing data do not necessarily occur at random. The third strategy is to impute the missing values. However it is important that the imputation technique remains simple and replicable, otherwise we may end up with values far from the reality and it would be difficult to detect the source of the divergence. Little and Rubin (2014) give a detailed explanation and comparison of different imputation methods.

A series may be unavailable due to 2 main reasons : maybe data are missing because they were not being collected, while in some cases lack of data is mainly because the markets are inexistent or missing in the country. Hence, having a general approach towards the missing data can be misleading and it is important to address each missing value of each series individually.

For the components of ME, all the series come from Worldwide Governance Indicators dataset, and are available for all countries from 1996. However, the variables are not calculated in years 1997, 1999 and 2001. For these missing values we use the average between the year before and the year after of the missing year, in other words, we use a linear interpolation.

In regard to financial institutions and specifically SFI, data are largely missing for Iraq and West Bank and Gaza and we are obliged to exclude these countries from the FI index, for instance, in the case of Iraq data start from 2007 and for “Life insurance premium volume to GDP” and “Non-life insurance premium volume to GDP” there are no observations at all. In the case of Yemen there is no observation in 2014 hence we repeat the values in 2013 although this may lead to an over-estimation of the values sine the country is suffering from exacerbating civil wars and the size of the financial sector hypothetically has declined between 2013 and 2014. Nevertheless this overestimation is not going to distort our results since Yemen takes the last place in the FI classification and is already performing poorly in 2013 (Table 4.1 in the

Results section). For Libya we face the same problem and repeat the values of 2013 for 2014. Regarding AFI, and “Bank branches per 100,000 adults”, since the number of bank branches is not a volatile variable in an economy we used the last available data point for all following missing years. For Bahrain there is no observation in the Global Financial Development dataset and we use “Central Bank of Bahrain financial Stability Report” to access the number of bank branches since 2005 that we divide by population from World Development Indicators dataset. For EFI, we need to drop Iran since the efficiency variables are all missing and when data on a specific variable were available but missing at some point in the time series, we use the last available data point for the following year.

For financial market pillars, we have no observation for Algeria, Iraq, Libya, Syria and Yemen. In the case of Yemen, this is due to the absence of a public stock market in this country, consequently, we replace the missing values with 0s. For Iraq, we access the Iraqi stock exchange daily reports and in 2014 there are only 83 listed companies and the volume of transaction is 0.00031% of GDP. Thus for Iraq we set the missing values associated to the stock markets equal to 0 since the markets are simply too small to have a significant influence on the economy. For Syria, according to the “Damascus Securities Exchange” website and the daily reports, there are currently only 24 listed companies and the market capitalization in 2014 is approximately 0.06 % of GDP. The Algerian Stock exchange, SGBV, although established in 1993 , it remains one of the smallest stock exchanges in the world since 2011, and according to the SGBV report the capitalization in 2016 is around 0.09 % of GDP. The Libyan Exchange Stock Market is also a small market with only 25 listed companies. Hence for Syria, Algeria and Libya, alike Iraq we replace the stock market values by 0. For the rest of the missing values at one point in time once again we use the last available data point in the following years.

3.4 Normalization

In view of aggregating many variables expressed in different measures we normalize each indicator to facilitate the weighting process.

Among different methods of normalization, standardization, the Min-Max and distance to a reference point are the most commonly used (see OECD (2008)). In this study, alike The Human Development Index and Svirydzenka (2016), we use a Min-Max method, with the normalized value of each variable x_t^c for country c and time t , equal to I_t^c :

$$I_t^c = \frac{x_t^c - \min_c(x_t)}{\max_c(x_t) - \min_c(x_t)}$$

Where $\min_c(x_t)$ and $\max_c(x_t)$ are the minimum and the maximum value of x_t^c across all countries c at time t . Hence the value of I_t^c lies between 0 and 1. This process helps us to have an identical range of from 0 to 1 among all indicators. This method is the most practical for the aggregation and straightforward to interpret, however, with this method the extreme values and outliers could distort the transformed indicator. Therefore we are extremely vigilant of the outliers and avoid them in the imputation process.

For variables that reflect the cost for financial institutions or their inefficiency such as, bank cost to income ratio, bank concentration and bank overhead costs, a higher value of the variable is associated with lower performance of institutions. We alter the normalization for these variables using $I_t^c = 1 - I_t^c$, in a way that higher values of the normalized variables indicate better performance of the institutions, this step is essential before the aggregation process.

3.5 Weighting

Weights represent trade-offs among different indicators, different weighting techniques may lead to different results hence this step is crucial for the construction of

the composite indicator.

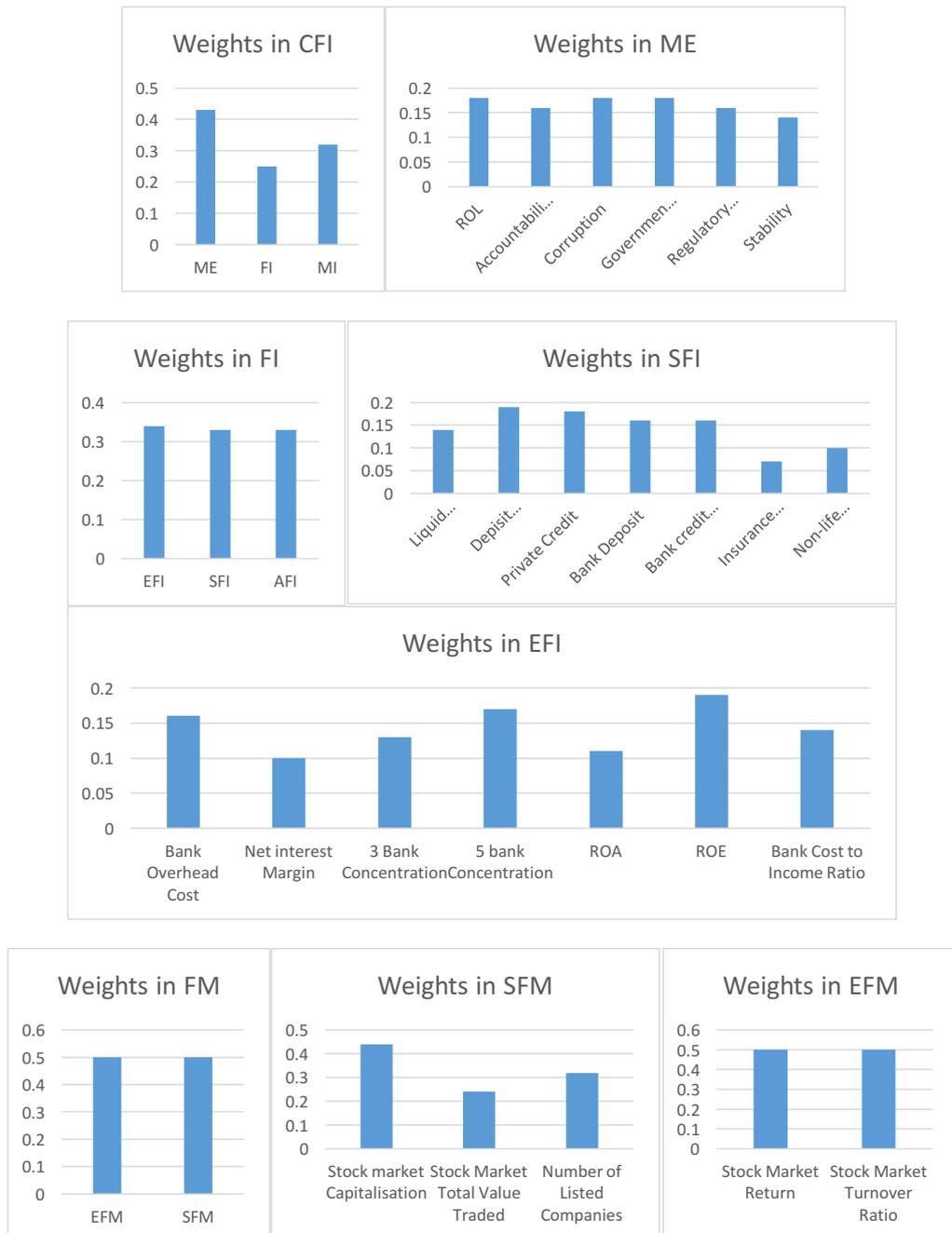
One can broadly identify three different weighting strategies in the literature. First method, is to apply equal weight to each variable, hence avoiding attributing different importance to various dimensions. This approach is straight forward and is widely used. Assigning equal weights to all variables signifies that all dimensions have equal importance and contribute equally to the overall index for instance in Human Development Index weights are equal. The second method consists of participatory techniques, through which weights are assigned based on expert or policy analyst view or judgment of individuals based on survey methods. These methods involve subjective decisions regarding the importance of each component and weights suggestions can vary from one expert to another. The third type of weighting methods is based on statistical analysis of the underlying data such as factor analysis, data envelopment analysis and unobserved component models. The advantage of these methods is that they are independent on personal judgment of individuals.

In this study we use Factor Analysis (FA) method, that models the correlation structure among variables in the multivariate response set by relating them to a set of common factors. FA is a statistical approach and based on capturing the highest variation in the data series with the smallest possible number of factors (independent vectors constructed from the series that explain to a good extent the variance in the data). The basic idea behind this method is to determine orthogonal linear combinations of a set of observed indicators chosen in such a way as to reproduce the original variance of the data as closely as possible. In this method weights are attributed according to the contribution of the underlying variable to the overall variance in the data. FA, in the statistical literature goes back to Hotelling (1933). Originally a data reduction method, today it has a wide range of applications in numerous fields such as psychology, biology, anthropology and more recently in economics and finance. The analytical expression of the principal component analysis (PCA) and FA is explained in Krishnakumar and Nagar (2008). The weights based on FA is

3. METHODOLOGY

calculated according to the following four steps and are represented in Figure 4.2 :

FIGURE 4.2 – Normalized weights following Factor Analysis



Source : Author's calculation

- Study of the correlation structure of the data; if the correlation among variables is too low it is unlikely that they share a common factor, hence the FA

cannot be implemented.

- Identification of the factors based on PCA ; this method is based on multivariate analysis, it identifies all the factors (usually we have the same number of factors as variables unless they are perfectly correlated) and the contribution of each variable to each factor. The eigenvalue of each factor represents the amount of variance in the original variables accounted for by each factor. The leading eigenvectors from the eigen decomposition of the correlation or covariance matrix of the variables describe a series of uncorrelated linear combinations of the variables that contain most of the variance. The methodology for PCA is detailed in Manly and Alberto (2016) and explained in Appendix 4.A. We only consider the factors that have an eigenvalue higher than 1 (factors that contribute significantly to the variance of the data series).
- Rotation of factors ; we use “Varimax” technique to rotate the factors, the objective is to end up with optimal factor loadings for each variable. The Varimax rotation is a change of coordinates used in PCA that maximizes the sum of the variances of the squared loadings. Thus, all coefficients (squared correlation with factors) will be either large or near zero, with few intermediate values. The goal is to associate each variable to at most one factor. The interpretation of the results of the PCA will be simplified. Then each variable will be associated to one and one only factor, they are split (as much as possible) into disjoint sets.
- Weight calculation ; each variable is associated to the factor with the highest loading and weights are calculated based on the loadings (by calculating the share of the variation in the model explained by each factor and multiplying it with the share of each variable within the corresponding factor).

In this method weights are not only a measure of importance of the associated indicator they allow to correct for the overlapping information thus high correlation among certain variables will not distort the composite index.

3.6 Aggregation

One can broadly distinguish two aggregation methods : linear and geometric. Linear additive aggregation technique is simple and independent of outliers. The most common linear additive aggregation is the sum of normalized individual indicators multiplied by their weights, in other words, the arithmetic weighted mean of individual indicators :

$$CI_t^c = \sum_{i=1}^M w^i I_t^{i,c} \quad \text{with} \quad \sum_{i=1}^M w^i = 1 \quad (4.1)$$

Where, CI_t^c is the final composite index for country c in time t , $I_t^{i,c}$ is the normalized form of indicator i , for country c in period t , w^i is the associated weight to indicator i and M is the total number of indicators we use to build the composite index. In this method, the main hypothesis is that different aspects of the markets are perfect substitutes in a way that poor performance in one component can be compensated by sufficiently high values in another. Within this aggregation method, weights are interpreted as substitution rates (trade-offs) and not solely the importance of the associated component in the final index. Therefore, this method can result in a biased composite indicator that would not reflect entirely the information of its individual components.

An alternative method is the geometric aggregation, that seems better suited for this study since we have some degree of non-substitutability among different dimensions of the financial sector, especially among sub-indices (macroeconomic environment, financial institutions and markets), and unlike linear aggregation, in this method, the degree of substitutability among different dimensions is not constant. The classical geometric aggregation takes the form :

$$CI_t^c = \prod_{i=1}^M (I_t^{i,c})^{w_t^{i,c}} \quad (4.2)$$

Although the geometric aggregator allows for imperfect substitutability, it intro-

duces a zero bias in the rankings, as a result of the zero or close to zero components drag down the multiplicative average to zero. Svirydzenka (2016), argues that it's unacceptable to use this aggregator since, on the one hand, the penalty for underperformance on one indicator gets too large, on the other hand, a large number of close to zero observations in the final index reduces the variability in the final sample, which limits the usefulness of the index for research. In order to overcome the zero bias problem, we slightly reshape the geometric aggregator (4.2), to the following form :

$$CI_t^c = \left(\prod_{i=1}^M (I_t^{i,c} + 1)^{w_i^{i,c}} \right) - 1 \quad (4.3)$$

As a result, we will no longer face the zero bias since all $I^{i,c}$ s are bounded between 0 and 1, thanks to normalization.² By construction, the final composite index, CI_t^c is also bounded between 0 and 1.

In practice, different aspects of the financial sector are not compensable and are closely interrelated, hence it is more desirable to have a harmony across all aspects, as they are only partially substitutable. For instance, if in one country stock markets are well developed and are even open to international markets, while the domestic financial institutions are not just as well developed ; financial markets will foster capital flights rather than encouraging domestic investment. This country may end up with a high rank if additive aggregation is applied, hence we believe the modified geometric aggregation represented in equation (4.3) is the most appropriate aggregator for the construction of a comprehensive composite index for the financial sector.

2. Equivalently, we could have changed the normalization by adding 1 to each variable, in the way that each variable be bounded between 1 and 2 and use the canonical geometric aggregator. However, we believe having the indicator values varying from 0 to 1 is more convenient for interpretation.

4 Results

The main ambition of the construction of a composite index is to build an instrument to classify the underlying countries regarding the development of the financial sector. The rankings for the overall composite financial index (CFI) and its sub-indices, each corresponding to one pillar is illustrated in Table 4.1 for 2014 and the respecting summary statistics is reported in Table 4.2. The detailed ranking regarding the components of the sub-indices are detailed in Appendix 4.C.

Globally, oil-exporting countries benefit from a more developed financial sector, United Arab Emirates, Qatar and Israel stand at the top of the ranking. On the other hand, countries undergoing political instability that are subject to wars such as Syria, Libya and Yemen are the worst-performing ones and are placed at the bottom of the ranking.

Although Lebanon, Morocco and Tunisia are best performing in terms of financial institutions, they rank 12th, 9th and 10th, in the final CFI index, respectively. This is due to poor ranking in the macroeconomic environment and more importantly for financial markets. Lebanon, Morocco and Tunisia are the least developed countries in terms of financial markets (FM index), right before, Algeria, Iraq, Libya, Syria and Yemen where financial markets are almost nonexistent. This poor performance is certainly not because of the young age the markets; Lebanon and Morocco are among the first countries in the region to establish a stock exchange, Table 4.3 lists the stock exchanges in the countries of the region and their date of creation. Surprisingly, one of the highest-ranking countries for FM, United Arab Emirates, hosts a relatively young stock exchanges in the region. Although the negligible size of the markets in Iraq, Libya and Syria apart from the political instability may be due to the fact that the stock markets are new in these countries, with all of them inaugurated after 2004. The oldest stock exchange in the region was established in Egypt in 1883 following Israel in 1953 and Saudi Arabia in 1954, who rank 5th, 4th

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TABLE 4.1 – Rankings for CFI index and its components (in 2014)

Country	CFI index	ME index	FI index	FM index
United Arab Emirates	1	2	5	2
Qatar	2	3	8	3
Israel	3	1	7	4
Saudi Arabia	4	10	10	1
Jordan	5	6	4	8
Bahrain	6	5	6	6
Oman	7	4	11	9
Kuwait	8	8	9	7
Morocco	9	9	2	11
Tunisia	10	7	3	12
Egypt, Arab Rep.	11	14	13	5
Lebanon	12	12	1	13
Algeria	13	13	15	14
Syrian Arab Republic	14	19	14	14
Libya	15	18	12	14
Yemen, Rep.	16	17	16	14
Iran, Islamic Rep.	n.a.	15	n.a.	n.a.
Iraq	n.a.	16	n.a.	14
West Bank and Gaza	n.a.	11	n.a.	10

Source : Author's calculation

and the 1st for the FM index. Therefore the financial market performance seems to be somehow influenced by the age of the stock market within a country, but more strongly related to the macroeconomic environment.

TABLE 4.2 – Summary statistics of indicators

Variable	Mean	Std. Dev.	Min.	Max.	N
CFI index	0.511	0.329	0	1	261
ME index	0.542	0.284	0	1	361
FI index	0.468	0.251	0	1	292
FM index	0.328	0.325	0	1	304
SFM index	0.319	0.323	0	1	351
SFI index	0.459	0.276	0	1	316
EFM index	0.331	0.309	0	1	304
EFI index	0.505	0.283	0	1	330

A primary prerequisite for a well-functioning financial sector is a healthy macroeconomic environment. As it is discussed in the previous section, the composite sub-index representing the macroeconomic environment (the ME index) of the

TABLE 4.3 – List of stock exchanges in MENA countries

Country	Name of the stock exchange	Date of creation	Official Web site
Algeria	Société de Gestion de Bourse des Valeurs	1997	http://www.sgbv.dz/
Bahrain	Bahrain Stock Exchange	1987	http://www.bahrainbourse.com/
Egypt, Arab Rep.	Egyptian Exchange	1883	http://www.egx.com.eg/
Iran, Islamic Rep.	Tehran Stock Exchange	1967	http://www.tse.ir/
Iraq	Iraq Stock Exchange	2004	http://www.isx-iq.net/
Israel	Tel Aviv Stock Exchange	1953	https://www.tase.co.il
Jordan	Amman Stock Exchange	1999	http://www.exchange.jo/
Kuwait	Kuwait Stock Exchange	1977	http://www.kuwaitse.com/
Lebanon	Beirut Stock Exchange	1920	http://www.bse.com.lb/
Libya	Libyan Exchange Stock Market	2007	http://www.lsm.ly/
Morocco	Casablanca Stock Exchange	1929	http://www.casablanca-bourse.com/
Oman	Muscat Securities Market	1988	https://www.msm.gov.om/
Qatar	Qatar Stock Exchange	1997	https://www.qe.com.qa/
Saudi Arabia	Saudi Stock Exchange (Tadawul)	1954*	https://www.tadawul.com.sa
Syrian Arab Republic	Damascus Securities Exchange	2006	http://www.dse.sy/
Tunisia	Bourse des Valeurs Mobilières de Tunis	1969	http://www.bvmt.com.tn/
United Arab Emirates	Dubai Financial Market	2000	http://www.dfm.ae/
	Abu Dhabi Securities Exchange	2000	http://www.adx.ae/
West Bank and Gaza	Palestine Exchange	1995	http://www.pex.ps/
Yemen, Rep.	-	-	-

*In the Tadawul official website it is mentioned that this stock exchange was formed in 2007.

However, according to Alkhareif (2016) and Azzam (2015) the Saudi stock exchange was established in 1954.

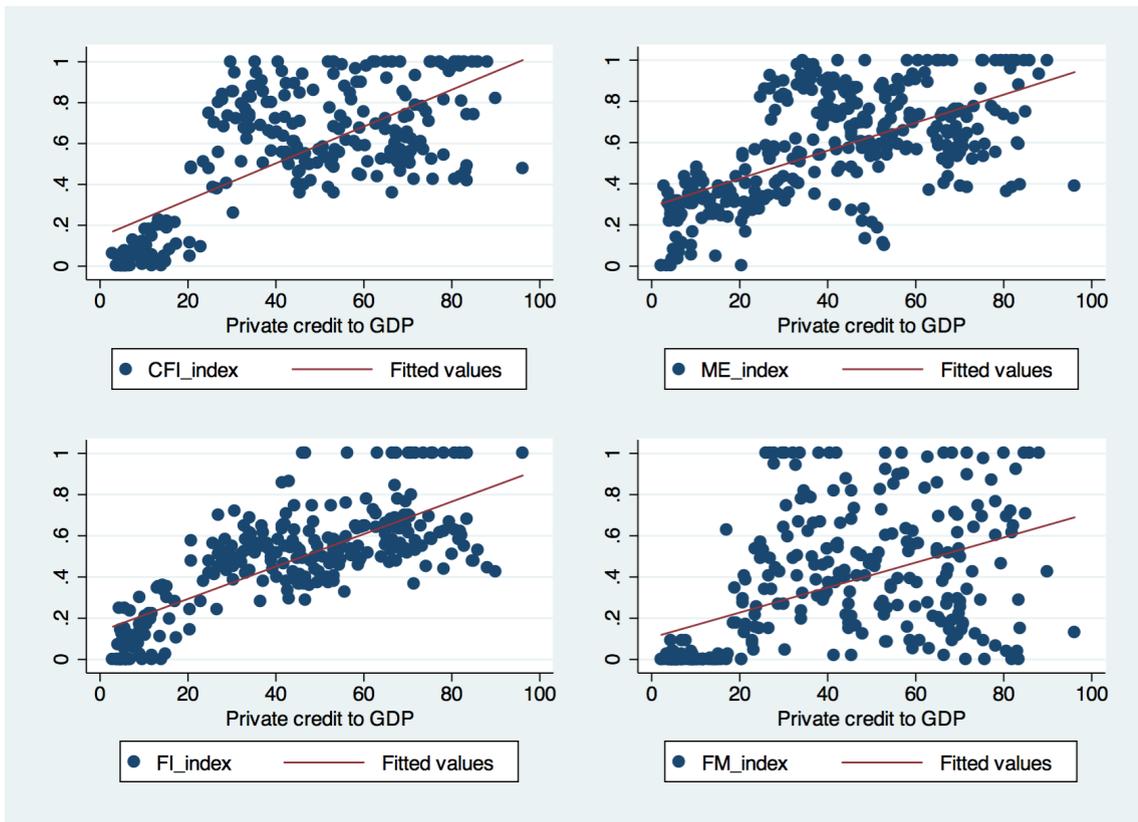
economy is composed of six governance indicators available in Worldwide Governance Indicators dataset ; namely, Rule of Law, Voice and Accountability, Control of Corruption, Government Effectiveness, Regulatory Quality, Political Stability and Absence of Violence Terrorism. The ranking for these components are represented in Table 4.C.1 in Appendix 4.C. One can observe that although Israel suffers from instability and ranks 11th in the region for “Political Stability and Absence of Violence Terrorism”. Yet, it outperforms every country in our sample for the global ME index thanks to good accountability, rule of law and regulatory quality. United Arab Emirates is the second in the ranking in spite of poor performance in accountability. It comes as no surprise that countries facing instability and civil wars such as Iraq, Yemen, Libya and Syria end up at the bottom of the ranking.

The second pillar for the financial development is financial institutions. As discussed earlier Lebanon, Morocco and Tunisia outperform other countries in the region. This high place for Lebanon is thanks to the size and accessibility of financial institutions, while for efficiency it takes the 12th place and this low efficiency is mainly due to high concentration in the banking sector and relatively low return on assets and equity with a high cost to income ratio. Israel, in spite of rather large (in terms

of size it ranks the 3rd) and accessible institutions ; ranks 11th for FI index, which is the result of an inefficient banking sector, this inefficiency originates in high concentration of banks and low returns. Yemen, Algeria and Syria have least developed financial institutions, caused by small, inefficient and non-accessible institutions.

In order to examine the consistency of the final index, it is beneficial to study its relationship with the traditional measures of the financial development. As it is shown in Figure 4.1, CFI index and all of its components are positively correlated with a conventional measure for the development of the financial sector, namely, credit to the private sector divided by GDP. The correlation is 0.7 for the CFI index. In this figure each point represents a country in a given year between 1996 and 2014.

FIGURE 4.1 – Correlation of the composite indices with a traditional measure of the financial development : credit to the private sector to GDP

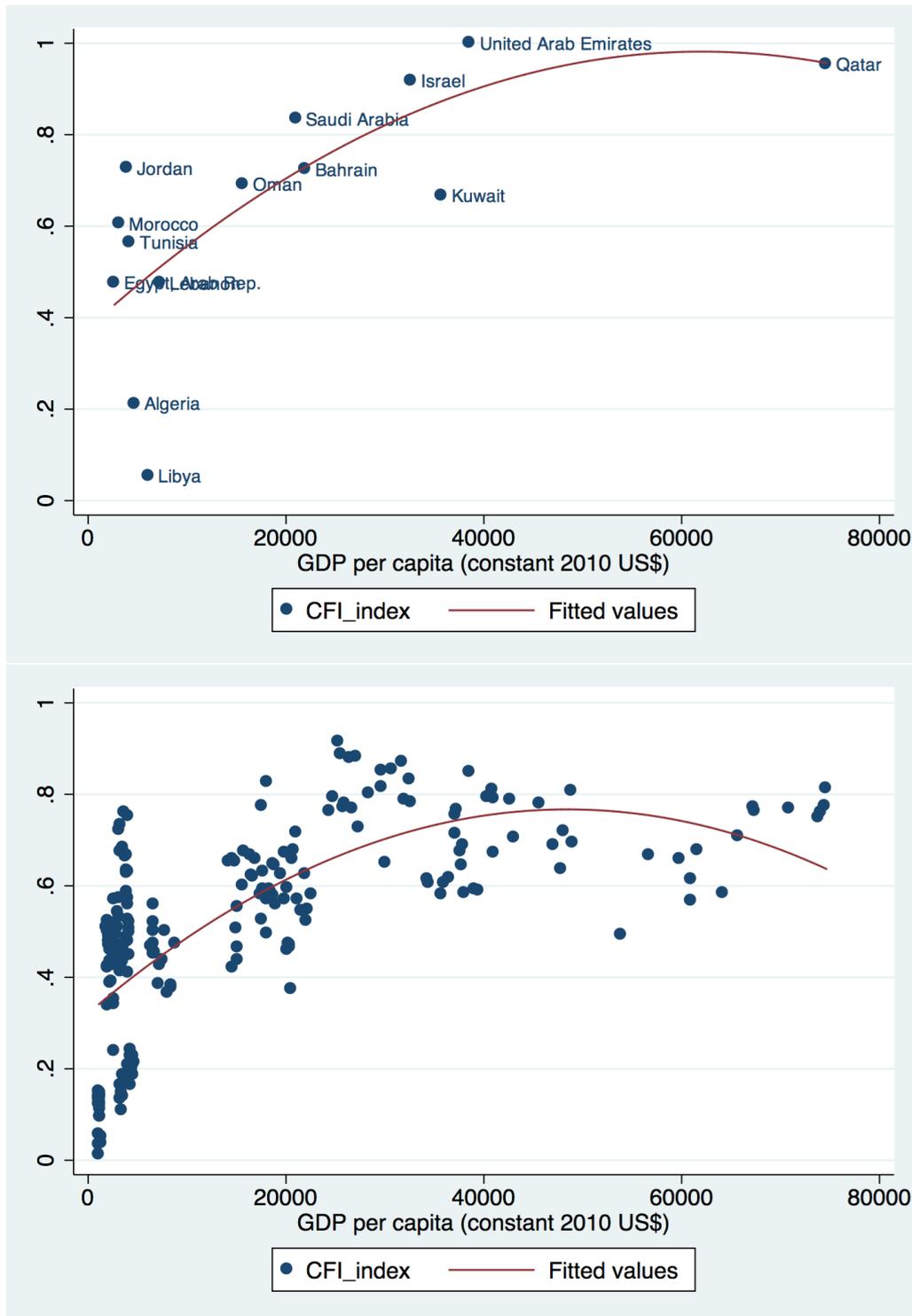


Source : Author's calculation

Considering the strong body of literature supporting the positive impact of the financial development on economic growth, one interesting application of the composite index is to examine its relationship with growth, Figure 4.2. One can easily verify that the CFI index is in line with the finance-growth literature (the existence of a positive correlation). Furthermore, it confirms the non-linear relationship highlighted in most recent paper (the literature reviewed in the third chapter) .

In order to evaluate the financial performance of each country, it is worth studying the evolution of the indices per country. Figures in Appendix 4.D illustrate the evolution of CFI index and its components per country for the index could be calculated, in function of availability of the data. The institution index (FI index) remains stable while market index (FM index) is more volatile and subject to macroeconomic shocks. The overall CFI index (Figure 4.D.1) is also mostly stable. However we can identify some volatility for Israel and the increasing trend for Saudi Arabia and United Arab Emirates. The downward trend in Israel, Egypt and Kuwait since 2010 is probably due to the global financial crisis in 2008-2009. Nevertheless, this does not seem to be the case in other countries and demonstrates that the financial sector in the region is repressed and is not much influenced by the global shocks, even the downward shift in Israel, Egypt and Kuwait is very limited and highlights a weak financial openness. For the Macroeconomic evolution, Figure 4.D.1, we observe a downward trend for almost every country in the region is due to increasing instability in the region.

FIGURE 4.2 – GDP per capita and CFI



The top figure represents 2014 and the bottom figure from 1996 to 2014
Source : Author's calculation

5 Conclusion

The financial sector is an essential and multifaceted part of the economic structure of a country and solely one variable comes short to explain the development of such complex aspect of the economic structure. In this chapter, a comprehensive composite index for the development of the financial sector for MENA countries is constructed. Although the sector is not yet as developed as the high income European countries or the US, the region is moving fast in this direction and many reforms were implemented during the past decades. A region specific index allows us to take into account the specificities of the region and to effectively assess the financial development by excluding the variables that are not relevant in the region's financial sector.³ It also allows us to include the most pertinent variables in the context of the region, such as bank concentration that plays an important role since the concentration is still very high in many countries in the region with it being a source of inefficiency in the banking sector. Another specificity of the region is the wide practice of financial repression, most countries have interest rate caps and control capital flows.

The index of the financial sector development introduced in this paper, is an improvement compared to the other measures in the literature. Contrary to Creane et al. (2006) the index is not based on qualitative survey responses, we use long-term available data series so the index can be easily updated as the new data becomes available. This indicator is more comprehensive than the one introduced by Sviydenka (2016), mainly because it includes not only variables associated with the performance of financial markets and institutions but we also add a new dimension which is the macroeconomic performance. As many have pointed out the importance of sound macroeconomic environment is essential to the performance of the financial

3. For instance, government debt which is normally associated with a more developed financial sector, this is not necessarily true for the countries in the region since many oil-exporting countries depend on oil revenues to finance government budgets and simply do not need to issue government debt bonds.

sector.

Oil exporting countries acquire a more developed financial sector, this may be due to higher capital spillovers through the economy or the abundance of foreign reserves that make the monetary policy more reliable which contributes to a less risky the financial atmosphere. Naturally, political instability and civil wars are hostile for the financial development.

The age of the stock markets seem to impact the size of the markets. However a more determining factor is the political will and availability of funds and openness to external finance.

Appendix

4.A Principal Component Analysis

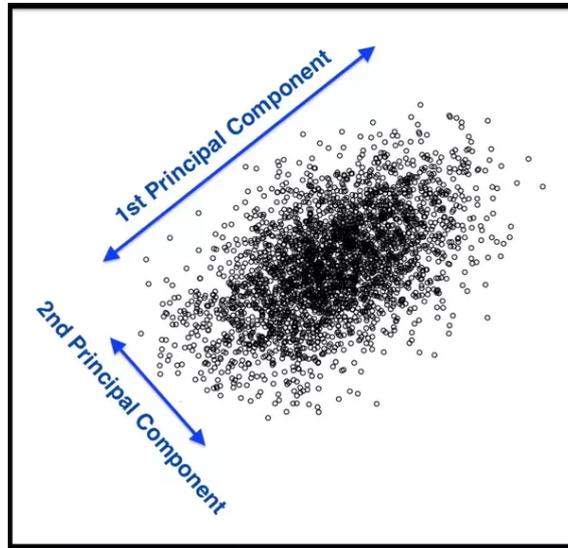
In this appendix we demonstrate the Principal Component Analysis, for more details see Vyas and Kumaranayake (2006). PCA is a multivariate statistical method used to reduce the number of variables in a data set into a smaller number of dimensions. In mathematical terms, from an initial set of n correlated variables, PCA creates uncorrelated indices or components, where each component is a linear weighted combination of the initial variables. For example, from a set of variables X_1 through to X_n :

$$\begin{aligned}PC_1 &= a_{11}X_1 + a_{12}X_2 + \dots + a_{1n}X_n \\PC_2 &= a_{21}X_1 + a_{22}X_2 + \dots + a_{2n}X_n \\&\dots \\PC_m &= a_{m1}X_1 + a_{m2}X_2 + \dots + a_{mn}X_n\end{aligned}$$

Where a_{mn} represents the weight for the n th variable in the m th principal. As displayed in Figure 4.A.1 Principal components are dimensions along which your data points are most spread out The uncorrelated property of the components is highlighted by the fact that they are perpendicular.

The weights for each principal component are given by the eigenvectors of the

FIGURE 4.A.1 – Representation of two components



Source : <https://goo.gl/GUFam8>

correlation matrix, or if the original data were standardized, the covariance matrix.

The variance (λ) for each principal component is given by the eigenvalue of the corresponding eigenvector. The components are ordered so that the first component (PC_1) explains the largest possible amount of variation in the original data, subject to the constraint that the sum of the squared weights ($a_{11}^2 + a_{12}^2 + \dots + a_{1n}^2$) is equal to one. As the sum of the eigenvalues equals the number of variables in the initial data set, the proportion of the total variation in the original data set accounted by each principal component is given by $\frac{\lambda_i}{n}$. The second component (PC_2) is completely uncorrelated with the first component, and explains additional but less variation than the first component, subject to the same constraint. Subsequent components are uncorrelated with previous components; therefore, each component captures an additional dimension in the data, while explaining smaller and smaller proportions of the variation of the original variables. The higher the degree of correlation among the original variables in the data, the fewer components required to capture common information.

4.B Variable Description

- **Rule of Law** : Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
- **Voice and Accountability** : Voice and Accountability capture perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
- **Control of Corruption** : Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
- **Government Effectiveness** : Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
- **Regulatory Quality** : Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives

the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

- **Political Stability and Absence of Violence/Terrorism** : Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.
- **Liquid liabilities to GDP** : Ratio of liquid liabilities to GDP, calculated using the following deflation method :

$$LL_t = \frac{0.5\left(\frac{F_t}{P_{e,t}} + \frac{F_{t-1}}{P_{e,t-1}}\right)}{\frac{GDP_t}{P_a}} \quad (4.4)$$

Where F is liquid liabilities, P_e is the end of period CPI, and P_a is average annual CPI.

- **Deposit money bank assets to GDP** : Claims on domestic real non-financial sector by deposit money banks as a share of GDP, calculated using the deflation method given in Equation (4.4).
- **Private credit by deposit money banks to GDP** : Private credit by deposit money banks to GDP, calculated using the following deflation method given in Equation (4.4).
- **Bank deposits to GDP** : demand, time and saving deposits in deposit money banks as a share of GDP, calculated using the deflation method given in Equation (4.4).
- **Bank credit to bank deposits** : Private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks.
- **Life insurance premium volume to GDP** : Life insurance premium volume as a share of GDP.

4.B. VARIABLE DESCRIPTION

- **Non-life insurance premium volume to GDP** : Non-life insurance premium volume as a share of GDP.
- **Bank branches per 100,000 adults** : For each country calculated as : 100,000 times reported number of commercial bank branches/adult population in the reporting country.
- **Bank overhead costs to total assets** : Accounting value of a bank's overhead costs as a share of its total assets.
- **Net interest margin** : Accounting value of bank's net interest revenue as a share of its interest-bearing (total earning) assets.
- **3-bank asset concentration** : Assets of three largest banks as a share of assets of all commercial banks.
- **5-bank asset concentration** : Raw data are from Bankscope. $(\text{Sum}(\text{data2025}) \text{ for five largest banks in Bankscope}) / (\text{Sum}(\text{data2025}) \text{ for all banks in Bankscope})$. Only reported if number of banks in Bankscope is 5 or more. Calculated from underlying bank-by-bank unconsolidated data from Bankscope.
- **Bank ROA** : Average Return on Assets (Net Income/Total Assets)
- **Bank ROE** : Average Return on Assets (Net Income/Total Equity)
- **Bank cost to income ratio** : Total costs as a share of total income of all commercial banks.
- **Stock market capitalization to GDP** : Value of listed shares to GDP, calculated using the deflation method given in Equation (4.4).
- **Stock market total value traded to GDP** : Total shares traded on the stock market exchange to GDP.
- **Number of listed companies per 10,000 population** : Number of publicly listed companies per 10K population.
- **Stock market return** : Stock market return is the growth rate of annual

average stock market index. Annual average stock market index is constructed by taking the average of the daily stock market indexes available at Bloomberg.

- **Stock market turnover ratio** : Ratio of the value of total shares traded to average real market capitalization, the denominator is deflated using the following method :

$$TR_t = \frac{\frac{T_t}{P_{at}}}{0.5\left(\frac{M_t}{P_{e,t}} + \frac{M_{t-1}}{P_{e,t-1}}\right)} \quad (4.5)$$

Where T is total value traded, M is stock market capitalization, P_e is end-of period CPI. (IFS line PCPI) and annual CPI (IFS line PCPI) are from the IMF's International Financial Statistics.

4.C Rankings for components of sub-indices

TABLE 4.C.1 – Rankings for ME index and its components

Country	ME index	ROL	Accountability	Corruption	Government Effectiveness	Regulatory Quality	Stability
Israel	1	1	1	3	2	1	11
UAE	2	3	11	1	1	2	2
Qatar	3	2	9	2	3	5	1
Oman	4	4	10	5	5	4	3
Bahrain	5	6	16	4	4	3	10
Jordan	6	5	6	6	7	7	7
Tunisia	7	10	2	8	9	12	8
Kuwait	8	8	4	10	10	10	4
Morocco	9	9	5	9	8	9	6
Saudi Arabia	10	7	18	7	6	8	5
West Bank & Gaza	11	11	8	11	14	6	15
Lebanon	12	14	3	15	11	11	14
Algeria	13	13	7	14	13	16	12
Egypt	14	12	13	13	15	13	13
Iran	15	15	17	12	12	17	9
Iraq	16	18	14	16	16	15	17
Yemen	17	16	15	18	17	14	18
Libya	18	19	12	19	19	19	16
Syria	19	17	19	17	18	18	19

Source : Author's calculation

4.C. RANKINGS FOR COMPONENTS OF SUB-INDICES

TABLE 4.C.2 – Rankings for FI index and its components

Country	FI index	SFI index	AFI index	EFI index
Lebanon	1	1	1	12
Morocco	2	2	3	9
Tunisia	3	5	6	6
United Arab Emirates	4	7	12	2
Jordan	5	4	4	14
Bahrain	6	6	10	7
Saudi Arabia	7	12	14	1
Qatar	8	10	9	5
Kuwait	9	8	7	13
Oman	10	11	8	11
Israel	11	3	5	17
Egypt, Arab Rep.	12	13	17	4
Syrian Arab Republic	13	15	18	3
Libya	14	16	11	10
Algeria	15	14	16	15
Yemen, Rep.	16	17	19	18
Iran, Islamic Rep.	n.a.	9	2	n.a.
Iraq	n.a.	n.a.	15	8
West Bank and Gaza	n.a.	n.a.	13	16

Source : Author's calculation

TABLE 4.C.3 – Rankings for SFI index and its components

countryname	SFI index	Liquid Liabilities to GDP	Deposit Money bank assets to GDP	Private Credit	Bank Deposit to GDP	Bank Credit to Deposit	Insurance Company Assets to GDP	Non-life Insurance Premium
Lebanon	1	1	1	1	1	15	3	8
Morocco	2	3	4	4	3	9	2	1
Israel	3	4	8	5	6	5	1	2
Jordan	4	2	2	3	2	10	8	4
Tunisia	5	11	7	2	13	1	7	3
Bahrain	6	7	3	6	5	6	5	5
United Arab Emirates	7	6	6	8	4	7	4	10
Kuwait	8	9	9	7	7	4	11	13
Iran, Islamic Rep.	9	16	11	9	12	8	9	6
Qatar	10	14	5	12	9	11	15	7
Oman	11	17	13	10	16	3	10	9
Saudi Arabia	12	15	12	11	17	2	12	12
Egypt, Arab Rep.	13	8	10	14	11	13	6	14
Algeria	14	13	15	16	15	16	13	11
Syrian Arab Republic	15	10	14	15	14	14	17	16
Libya	16	5	17	17	10	18	16	15
Yemen, Rep.	17	18	18	19	18	19	14	17
Iraq	n.a.	19	19	18	19	17	n.a.	n.a.
West Bank and Gaza	n.a.	12	16	13	8	12	n.a.	n.a.

Source : Author's calculation

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TABLE 4.C.4 – Rankings for EFI index and its components

countryname	EFI index	Bank Overhead Costs	Net Interest Margin	3 Bank Concentration	5 Bank Concentration	ROA	ROE	Bank cost to Income Ratio
Saudi Arabia	1	10	9	2	2	2	2	5
United Arab Emirates	2	9	16	4	3	4	6	3
Syrian Arab Republic	3	1	4	3	5	10	9	9
Egypt, Arab Rep.	4	11	14	8	6	9	4	7
Qatar	5	5	11	13	12	3	1	1
Tunisia	6	14	12	1	1	18	13	13
Bahrain	7	8	8	12	8	6	7	4
Iraq	8	17	7	7	12	1	3	8
Morocco	9	12	6	15	4	12	11	11
Libya	10	3	3	11	10	13	16	10
Oman	11	13	13	5	12	7	8	14
Lebanon	12	4	2	14	11	14	14	12
Kuwait	13	6	10	16	12	8	10	2
Jordan	14	2	1	9	9	16	17	15
Algeria	15	7	15	6	7	17	18	6
West Bank and Gaza	16	16	18	16	12	5	5	16
Israel	17	15	5	10	12	15	15	18
Yemen, Rep.	18	18	17	16	12	11	12	17
Iran, Islamic Rep.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source : Author's calculation

TABLE 4.C.5 – Rankings for FM index and its components (in 2014)

Country	FM index	SFM index	EFM index
Saudi Arabia	1	5	1
United Arab Emirates	2	8	2
Qatar	3	4	4
Israel	4	1	5
Egypt, Arab Rep.	5	12	3
Bahrain	6	6	6
Kuwait	7	2	11
Jordan	8	3	9
Oman	9	7	7
West Bank and Gaza	10	11	8
Morocco	11	10	10
Tunisia	12	13	12
Lebanon	13	14	13
Algeria	14	15	14
Iraq	14	15	14
Libya	14	15	14
Syrian Arab Republic	14	15	14
Yemen, Rep.	14	15	14
Iran, Islamic Rep.	n.a.	9	n.a.

Source : Author's calculation

4.C. RANKINGS FOR COMPONENTS OF SUB-INDICES

TABLE 4.C.6 – Rankings for SFM index and its components (in 2014)

Country	SFM index	Stock Market Capitalisation	Stock Market Total Value Traded	Number of Listed Companies
Israel	1	3	5	1
Kuwait	2	6	4	2
Jordan	3	2	6	3
Qatar	4	1	3	6
Saudi Arabia	5	5	1	10
Bahrain	6	4	12	4
Oman	7	9	7	5
United Arab Emirates	8	8	2	7
Iran, Islamic Rep.	9	10	8	11
Morocco	10	7	10	14
West Bank and Gaza	11	11	11	8
Egypt, Arab Rep.	12	13	9	12
Tunisia	13	14	13	9
Lebanon	14	12	14	13
Algeria	15	15	15	15
Iraq	15	15	15	15
Libya	15	15	15	15
Syrian Arab Republic	15	15	15	15
Yemen, Rep.	15	15	15	15

Source : Author's calculation

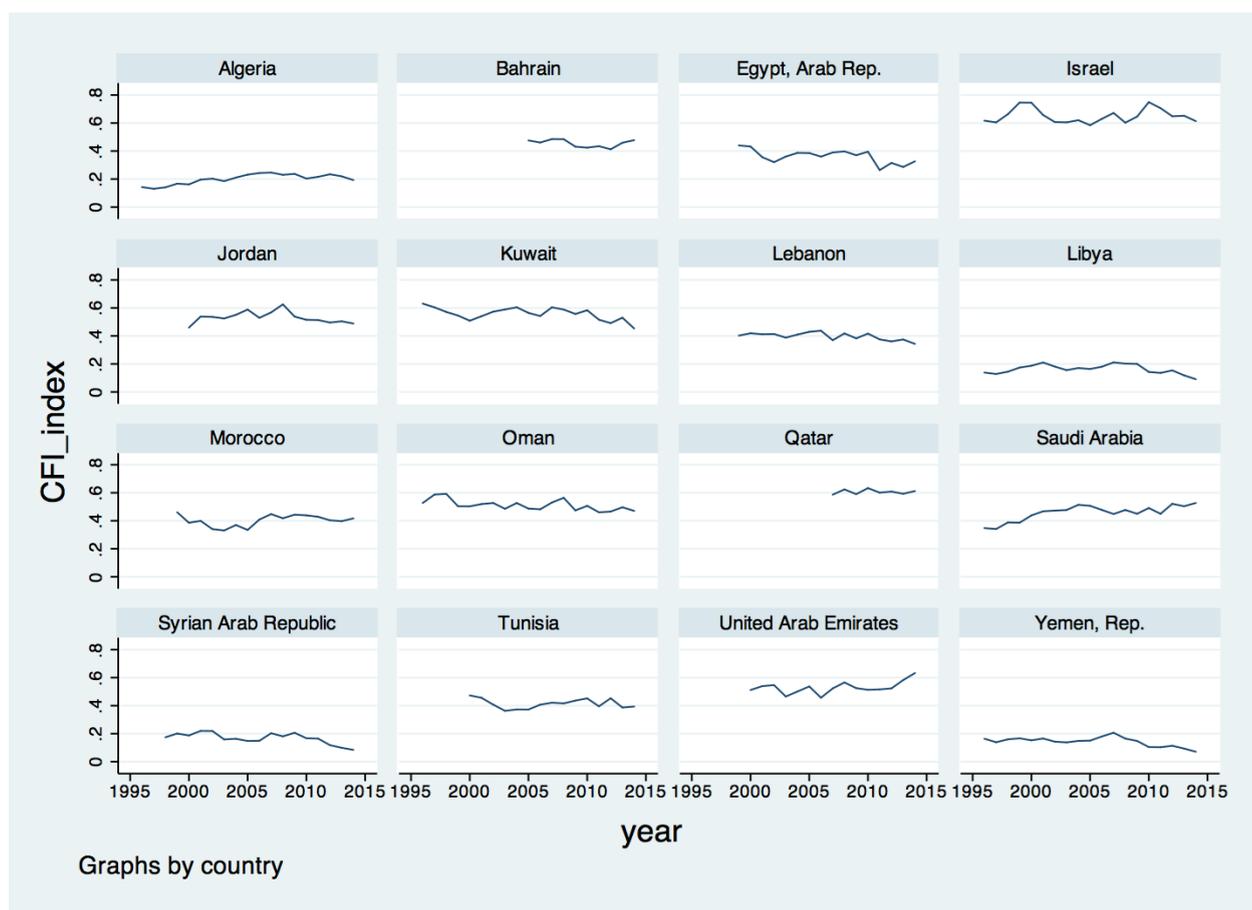
TABLE 4.C.7 – Rankings for EFM index and its components (in 2014)

Country	EFM index	Stock Market Return	Stock Market Turnover Ratio
Saudi Arabia	1	4	1
United Arab Emirates	2	2	2
Egypt, Arab Rep.	3	1	3
Qatar	4	3	4
Israel	5	6	5
Bahrain	6	5	14
Oman	7	8	7
West Bank and Gaza	8	7	11
Jordan	9	10	10
Morocco	10	9	12
Kuwait	11	18	6
Tunisia	12	12	8
Lebanon	13	11	13
Algeria	14	13	15
Iraq	14	13	15
Libya	14	13	15
Syrian Arab Republic	14	13	15
Yemen, Rep.	14	13	15
Iran, Islamic Rep.	n.a.	n.a.	9

Source : Author's calculation

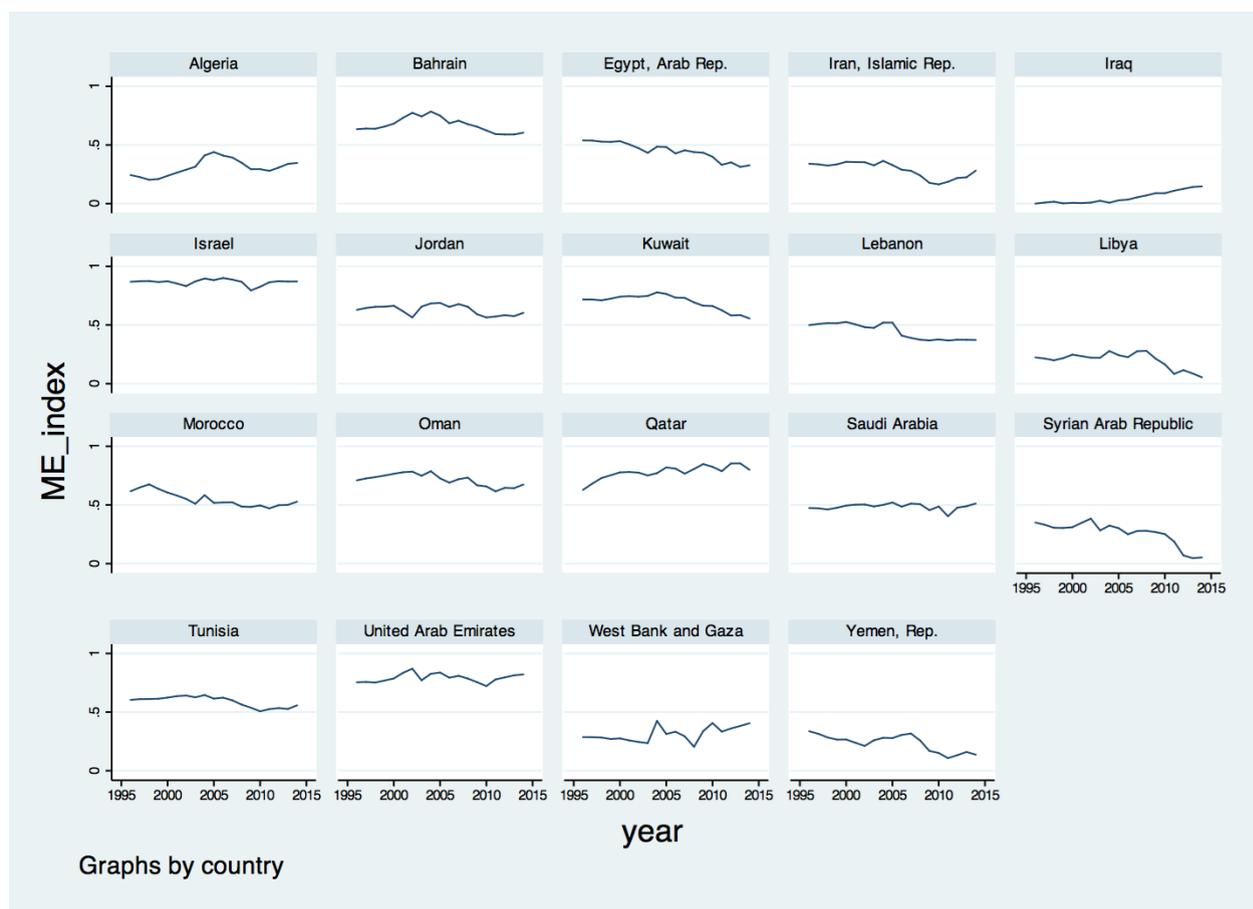
4.D Evolution of indices

FIGURE 4.D.1 – CFI evolution



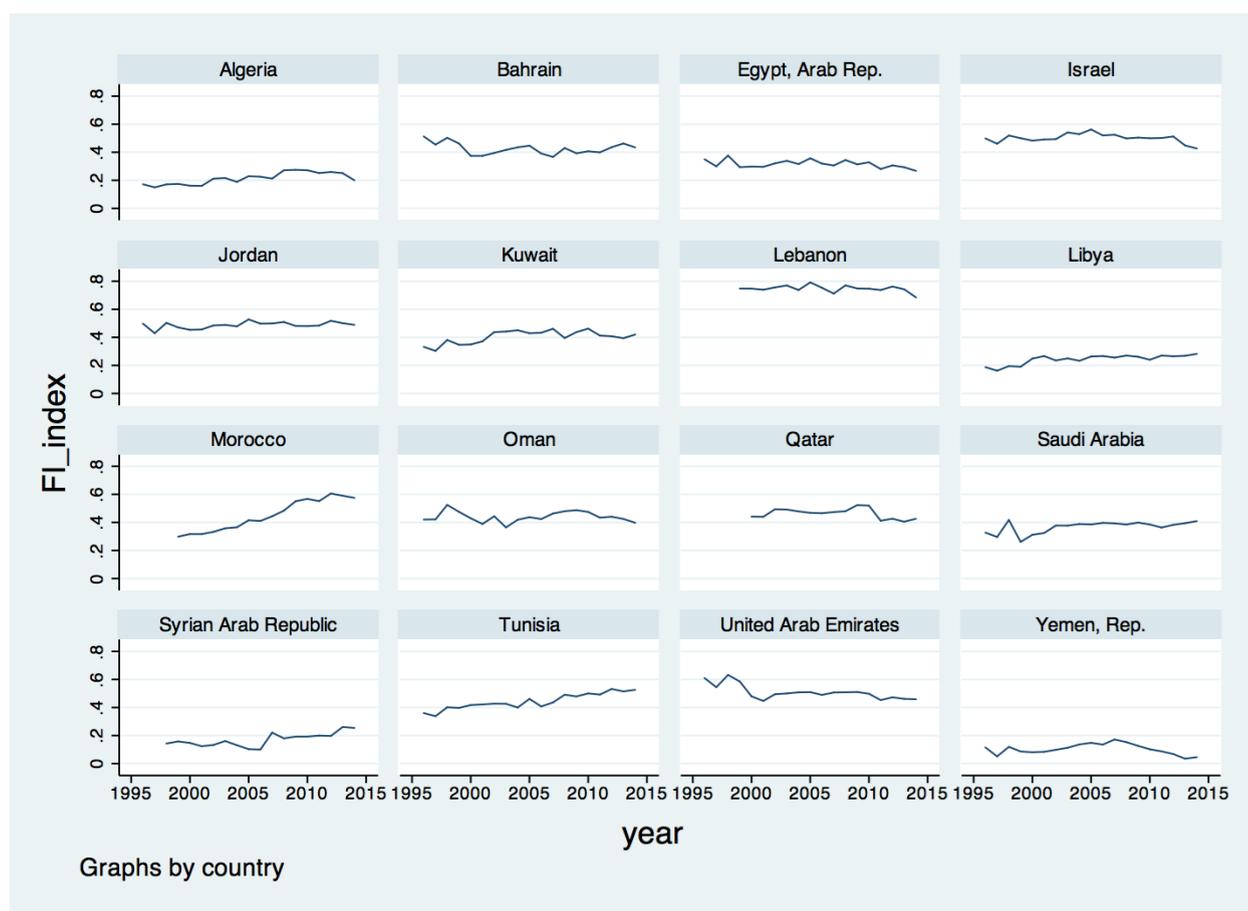
Source : Author's calculation

FIGURE 4.D.2 – ME evolution



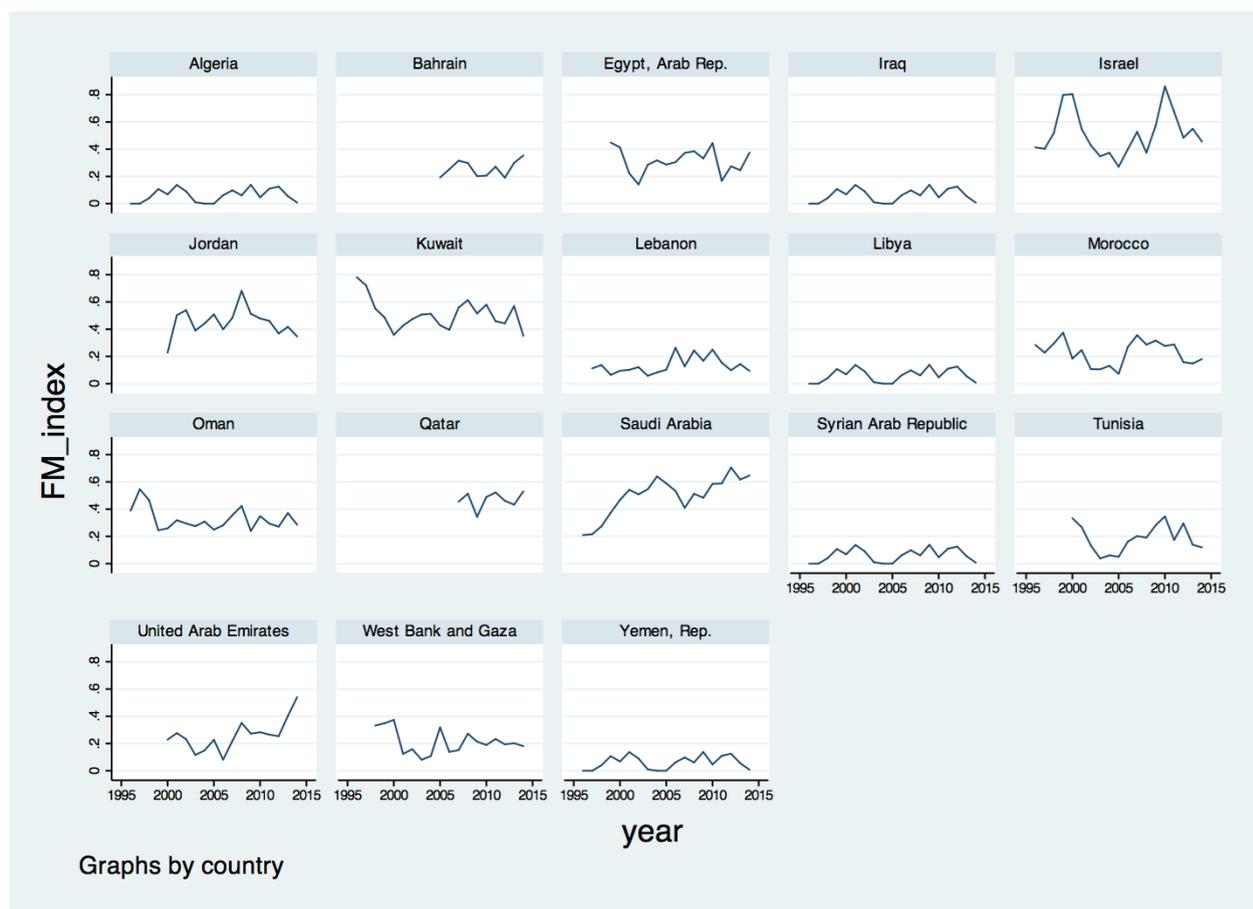
Source : Author's calculation

FIGURE 4.D.3 – FI evolution



Source : Author's calculation

FIGURE 4.D.4 – FM evolution



Source : Author's calculation

Chapitre 5

General Conclusion

Financial sector plays an important role to promote economic growth, it has five key functions, pointed out by Levine (2005) namely :

- Produce information ex-ante about possible investments and allocate capital.
- Monitor investments and exert corporate governance after providing finance.
- Facilitate the trading, diversification, and management of risk.
- Mobilize and pool savings.
- Ease the exchange of goods and services.

Financial history gives considerable support to the idea that financial development leads to economic growth. Sylla (2006), studies the historical GDP per capita relative to the world average from the 16th century and connects it to the financial development of each country, for instance, Italy in the 16th century had the highest GDP per capita while Italian city states pioneered modern financial techniques during the Medieval and renaissance era. Netherland, experienced its financial revolution during the 16th and early 17th centuries and their GDP per capita dominated the of the world in the 17th century. English financial revolution initiated from 1688 and lasted to the mid 18th century, right before the industrial revolution. The same pattern holds for United States, France, Germany and Japan, hence the

historical data suggest that finance leads to better economic performance and it is not the other way around.

The economic theory is also supportive of the idea that better finance leads to higher growth. Saint-Paul (1992), develops a theoretical framework to analyze the interaction between financial markets and technological choice, his results justify the government's intervention to encourage the development of the financial sector to move from a "low equilibrium" characterized by an under-developed financial sector and low division of labor towards a "high equilibrium" with strong financial markets and extensive division of labor. According to Saint-Paul (1992), The main channel for positive spillover from financial sector to the economy is through better risk diversification, that allows agents to invest in riskier, more innovative and productive projects. Consequently, a well developed financial sector leads to higher growth.

The empirical literature studying finance-growth relationship, however, finds conflicting results¹. Levine et al. (2000) find a strong positive causal impact of the financial development on growth for 71 countries in period 1961 to 1995. Rajan and Zingales (1998) also find the positive causal relationship and rule out the reverse causality.

While many other studies took a more skeptical approach and gained more attention specially after the 2008-2009 global financial crisis ; Rousseau and Wachtel (2002) show that the finance has no effect on growth in countries with double digit inflation ; Demetriades and Hook Law (2006) look at 72 countries for the period 1978-2000 and find that financial development does not affect growth in countries with poor institutions. One of the first studies, arguing that the finance-growth relationship can be region specific is De Gregorio and Guidotti (1995), who find that in high income countries financial depth is positively correlated with output growth over the 1960-1985 period, when they focus on a panel of 12 Latin American countries, instead, they find a negative correlation between financial depth and growth.

1. a detailed review of this literature is reported in chapter 3

Rousseau and Wachtel (2011) show that the positive correlation between finance and growth found in previous studies is not robust when more recent data is applied. Arcand et al. (2015) find that the marginal effect of financial development on GDP growth becomes negative when credit to the private sector is close to 100 per cent of GDP. One possible explanation for the vanishing effect has to do with the fact that not all credit is the same, and highlight the need to distinguish between enterprise and household.

The empirical literature is focused on financial depth and almost always on “credit to the private sector”, this is a measure of the size of financial intermediation that does not necessarily match the theoretical channels through which finance should affect economic growth, therefore, the new-new literature on finance and growth explores alternative measures of financial development Laeven et al. (2015) introduce financial innovation in a traditional Schumpeterian growth model conclude that financial innovation is a key driver of economic growth. Beck et al. (2014) use the traditional measure of financial intermediation (the log of credit to the private sector) with a new indicator of the size of the financial system computed as the value added share of the financial system in GDP and find that size is no longer statistically significant and conclude that an expansion of the financial sectors along other dimensions has no long-run effect on real sector outcomes. They conclude that over shorter time horizons a large financial sector stimulates growth at the cost of higher volatility in high-income countries. Intermediation activities stabilize the economy in the medium run especially in low-income countries.

Some studies go even further and argue that financial development has a negative impact on the real economy through misallocation of resources, Bolton et al. (2016), Tobin (1984) and Kneer (2013) argue that high wages in the financial sector may indeed have negative spillovers on non-financial firms as a greater absorption of talents in the financial sector has a negative effect on productivity in industries that for technological reasons rely relatively more on skilled labor.

In short, the literature is mostly supportive of the idea that there is no iron rule regarding the finance-growth relationship. It is essential to perform country or region specific analysis to clearly identify a clear relationship and also to establish effective reforms to promote growth at a country level.

This thesis overviews the financial markets in the MENA region and examines to what extent the financial sector in these countries contribute to economic growth, through a theoretical and an empirical framework. A comprehensive composite index for the financial market development is introduced in the final chapter to help for a better evaluation of the functionality of the financial sector.

1 Main results

The first chapter overviews the basic characteristics of MENA region by reviewing its economic perspective, demographic perspective and financial markets evolution. Globally, the economic activity is weakened by continuous conflicts. The persistent low oil prices on the other hand are considered as a blessing for the oil-importers in the region but the same cannot be said for the oil-exporters. MENA's significant young well educated population is one of the greatest assets for the concerned economies, however, this demographic gift is also the biggest challenge the region should face, since the unemployment for youth is critically high. Creating jobs, raising the living standards and providing good quality education for the youth are the top priorities in the political agenda. High unemployment rates in the region critically touch the young educated and women.

Financial markets are under developed and basically bank-based. Stock market development varies drastically from one country to another. During the recent years we observe a fast and heterogenous development of the banking system among the countries of the region. Meanwhile, the size of the other financial institutions remain small.

As the MENA region is undergoing rapid demographic transition, confronting high unemployment rates for young educated remains one of the biggest challenges in many countries in the region. In the second chapter, we develop an original general equilibrium overlapping generations model to evaluate the economic impact of the demographic transition in Iran, Morocco and Egypt. Our results suggest that the demographic shift has a powerful positive impact on GDP and employment rates. In Iran, Morocco and Egypt, it is respectively responsible for, 16, 14.2 and 10.3 percentage point decrease in the total unemployment rate, and 69.63, 61.84 and 43.78 percent increase in GDP per capita. Furthermore, we show that more efficient financial markets lead to higher levels of output and employment. Our simulation demonstrates that youth are the primary beneficiaries of this gain in efficiency of the financial sector and as the cost of capital mobilization fall, their employment rate is improved by 6.6, 5.4 and 8.3 pp in Iran, Morocco and Egypt respectively. This chapter is authentic in several dimensions. Firstly, our model introduces the cost of capital mobilization as a proxy for the financial market efficiency improvement, in a general equilibrium Overlapping Generations model, therefore we study the impact of demographic evolution and financial markets efficiency on growth in a single model. Secondly, we use real data of the demographic evolution per age group that assembles information regarding both fertility rates and mortality rates, while most researches, dealing with demography, focus only on population growth rates, that does not include information on mortality rates among cohorts. Thirdly, the paper concentrates on Iran, Morocco and Egypt, three countries in the Middle East and North Africa, a region of growing interest that is somehow neglected in the literature. To our knowledge, there is no other paper that calibrates an OLG framework for those countries.

The third chapter searches for evidence regarding the finance-growth nexus in the region by taking into account 15 MENA countries from 1960 to 2011, by estimating a growth model that includes financial indicators and a series of controls,

that are, government expenditure, population growth, schooling and inflation, using a GMM and panel estimators. The data is surprisingly not supportive of the positive spillovers from the financial sector to the real sector. This, may be due to specific characteristics of the region, for instance, the over-presence of the governments in the market, geopolitical instability, conflicts, corruption, brutal changes in oil prices and similar factors that disturb the functionality of the markets by exposing it to extra risk. Another explanation may be the high level of capital flight in the region, as response to volatile economic situation and pronounced geopolitical risks, capital owners prefer to invest abroad. Under such circumstances, a more developed financial sector facilitates capital outflows instead of better allocating them and end up having negative effects on growth. These results broadly indicate that a more developed financial sector in the region is associated with lower growth rate, which can be a consequence of poor efficiency of the financial sector in the region. Meaning that there are problems of credit allocation and weak financial supervision and regulation.

Some authors argue that the weakening empirical relationship between finance and growth in the most recent data is due to lack of an adequate measure for the financial sector that captures all diverse aspects of the financial development (see for instance, Rousseau and Wachtel (2011), Beck et al. (2014) and Laeven et al. (2015)). Chapter 4 develops an indicator for the financial sector since the financial sector is an essential and multifaceted part of the economic structure of a country and solely one variable comes short to explain the development of such complex aspect of the economy. Although the sector is not yet as developed as the high income European countries or the US, the region is moving fast in this direction and many reforms were implemented during the past decades. A region specific index allows us to take into account the specificities of the concerned countries and to better assess financial development by excluding the variables that are not relevant in the region's financial sector. Furthermore, it allows us to include the most pertinent variables in

the context of the region, for instance, bank concentration concentration is still very high in many countries in the region which, introduces a source of inefficiency in the banking sector.

2 Policy relevance

MENA region is young and vibrant and is currently standing at a critical point in its demographic transition. The region is embedded with a lot of opportunities yet still far from attaining its full growth potential. Addressing problems associated with high unemployment rate, especially among educated youth is high in the political agenda of all countries in the region.

Through the economic theory, in every growth model from Harrod-Domar to endogenous growth models, physical capital is unquestionably one of the determining factors to promote growth. Funding sources in MENA are still predominantly channeled through the banking system, with equity markets playing a minor role. This thesis argues that, although further development of such markets can in theory improve growth, the reforms should be implemented in a sound political atmosphere, the negative impact of political instabilities should not be underestimated, especially in the case of financial markets that are very sensitive to different types of risk. The rapid development of Dubai International Financial Center in United Arab Emirates in 2004, that now features among the top twenty financial centers worldwide in terms of contribution of its financial services to GDP, can continue to significantly impact the UAE's economy as it will capture the first mover's advantage in the financial sector in the region, it can also be a source of exposure to international financial risk.

This thesis establishes the link between financial markets growth while taking into account the demographic change, which is one of the main challenges, touching the region's economy in the upcoming decades. At the same time the positive impact

of the financial sector for growth is not taken for granted and we highlight the importance of addressing efficiency of the financial sector, notably by exposing it to more competition at a domestic level, the sector is probably not strong enough to be liberalized at a international level especially in the actual context of post financial crisis and the presence of uncertainty associated with instabilities in the region that will encourage more capital flights instead of attracting it.

3 Limitations and future research

This study is subject to a number of shortcomings that globally take root in data unavailability and high heterogeneity in the region. MENA countries lack of transparency is a burden to perform rigorous analysis, which could otherwise help these countries make more effective policy propositions. Data limitation and not enough transparency, put into question the possibility of making sound and reliable analysis.

Misleading information, for instance in the case of Lebanon. High performance of the financial institutions is mainly due to very high bank deposits, even higher than most high-income countries (over that 200%). This is likely due to foreign deposit inflows from the large Lebanese diaspora attracted by high interest rates and exchange rate stability. In Iran, almost every adult has a bank account, but this is due to extremely high inflation rates that reached up to 30% in 2012, and does not necessarily reflect that people have sufficient access to all banking services.²

Significant difference among oil-exporting and non-oil-exporting makes the interpretation of results more challenging. Probably adding a simple dummy variable is not sufficient to capture all these differences. Samargandi et al. (2014) study the Saudi Arabia's case and highlight that the impact of the financial development is negative on oil sector, while the impact on non-oil sector is positive. Thus it is im-

2. The main motivation for having a bank account is that it is inconvenient to carry a bulk of paper money and to benefit from high interest rates (around 20%).

3. LIMITATIONS AND FUTURE RESEARCH

portant to distinguish between the oil and non-oil sector within an economy. Further research is needed in this direction to examine the relationship at the sector level, and specially for oil dependent industries.

The capital flights from the region are significant, according to Michael et al. (2013) : “The Middle East has one of the highest proportions of the wealthy using foreign wealth managers - with roughly 70% of wealth ending up in Switzerland, London, New York and other international banking centers.” Under such circumstances a more liberal financial sector causes more harm than good in a country by allowing for massive capital flight from the domestic country. Further research is needed to address this issue.

Islamic financial instruments, are growing fast, there are 600 financial institutions across 75 countries offering sharia-compliant products and services, yet they are largely underdeveloped due to a lack of standardization of instruments such as Sukuk Azzam (2015). Although some study of Islamic finance such as Imam and Kpodar (2016) find a positive contribution of Islamic banking on growth. It is specifically challenging to access data regarding this types of assets which is due to a lack of a universal definition of such assets.

All these challenges can be addressed in future research to lead us to a better understanding of the financial development in the region and its interaction with economic growth.

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Résumé

Cette thèse étudie l'impact des marchés financiers sur la croissance économique dans la région MENA. Le premier chapitre présente la situation économique, démographique et financière de la région. Le deuxième chapitre présente un modèle d'équilibre général à générations imbriquées, qui relie la croissance économique, les marchés financiers et l'évolution démographique. Le modèle est calibré et simulé pour trois pays de la région, présentant des tendances démographiques diverses. Les résultats montrent qu'un secteur financier plus performant conduit à une meilleure performance économique et à des taux d'emploi plus élevés. Par ailleurs, les jeunes sont les premiers bénéficiaires de la réforme du secteur financier. Le troisième chapitre teste empiriquement l'impact du secteur financier sur le secteur réel et la croissance dans 15 pays de la région MENA et constate un impact négatif du développement du secteur financier sur la croissance. Ces résultats soulignent l'inefficacité de secteur financier dans la région et le besoin urgent de cibler des politiques qui améliorent l'efficacité du secteur et pas seulement sa taille. Dans le quatrième chapitre, un indicateur de développement des marchés financiers est construit pour les pays de la région. Cet indicateur est basé sur les 3 piliers que sont l'environnement macroéconomique, les institutions financières et les marchés financiers. Il prend en compte les spécificités des pays de la région MENA et permet de classer les pays de la région en fonction de leur performance dans le secteur financier.

Mots Clés

Marchés Financiers; Développement; Croissance Economique; Région MENA; Changement Démographique; Indicateur financier

Abstract

This thesis studies the impact of the financial markets on economic growth for MENA region. The first chapter presents a general overview of the region, with a focus on economic, demographic and financial market outlook of the region. In the second chapter an overlapping generation model is presented, that links economic development, financial markets and demographic shift. The model is simulated for three countries in the region with different speeds in demographic shift. The results show that a more efficient financial sector leads to better economic performance and higher employment rates, furthermore, youth are the primary beneficiaries of the reform in the financial sector. The third chapter tests empirically the link between the financial sector and the real sector in 15 MENA countries and finds a negative impact of financial sector development on growth. These results underline the expansion of an inefficient financial sector in the region, and the urgent need to focus on policies that target the efficiency of the sector and not solely its size. A comprehensive composite index for the financial sector development is developed in the fourth chapter. This index is based on three pillars that are, macroeconomic environment, financial institutions and financial markets. The index takes into account the specificities of MENA countries and allows us to rank the countries in the region according to their performance in the financial sector.

Keywords

Financial Markets; Development; Economic Growth; MENA Countries; Demographic Change; Financial index