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Four Essays in Applied Economics: the EU-emission trading system, financial inclusion and gender inequality

Préparée sous la direction de Bertrand KOEBEL

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Dedicace

A mon père.

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Thesis summary

Summary

This thesis was written entirely in English to ease the discussion and the diffusion of its results. For French readers, a summary of the thesis is available. The thesis is made of four independent chapters. Each chapter contains its own contextual elements and a review of literature specific to the issue addressed in the chapter.

1. Assessing the impact of the EU ETS using firm-level data

The first chapter assesses the impact of the European Union Emission Trading System Using Firm-Level Data. The Emission Trading System (ETS) established by the European Union (EU) is the biggest emissions trading scheme in the world. It is designed as a classical cap-and-trade system that specifies a maximum amount of cumulative greenhouse gas (GHG) emissions and allocates tradable allowances to firms covered by the scheme. Allowing trade through these permits results in a market price for allowances. The price provides an economic signal in which mitigation measures are worthwhile. The EU ETS is divided into two phases: the trial phase from 2005 to 2007, and the phase from 2008 to 2012, which coincides with the first commitment period of the Kyoto Protocol. The rules of trading and the initial allocation of pollution permits have differed substantially between the two phases.

The chapter addresses the following questions: first, do the observed emissions reductions (from 2005 to 2009) indicate that the EU ETS resulted in emissions reductions, or are those reductions explained by changes in the economic environment? Second, did the structural break between the first EU ETS phase (2005-07) and the second EU ETS phase (2008-12) led to a change in abatement behaviour? Third, what are the influences of the initial allocation on the reduction effort of regulated firms? Fourth, what is the treatment effect of the EU ETS on companies' performances? Several authors have studied the effect of the EU ETS empirically. A concise overview is given in Anderson and Di Maria (2011).

Our contribution is threefold. First, in contrast to other studies using country-specific firm level data (Anger and Oberndorfer, 2008) we cover the entire European Union. Second, we explicitly take into account the structural break between the EU ETS phases. This allows us inter alia to study the effect of changing allocation on emissions. Third, previous literature on the effect of initial allocations on reduction behaviour has been either of theoretical nature or based on numerical simulations. With our unique data we are able to estimate the effect of initial allocation empirically. This firm-level data offers several more advantages. It allows us to eliminate the impact of aggregation over firms or installations when performing estimations. Furthermore, it allows exploiting a wide heterogeneity of firms with respect to their host country, turnover, employment, profit margin, sector and initial allocation.

We find that the EU ETS induced emissions reductions in the second phase and that there were substantial differences in abatement behaviour across phases. Moreover, the initial allocation of permits and ex-post verified emissions are correlated. However, according to our findings, the EU ETS at most modestly affected profits, employment, and the added value of regulated firms.

2. Unlocking Access to Finance for Small and Medium-Sized Enterprises: A Cross-Country Analysis

The second chapter seeks to inform policymakers by identifying the main constraints to SME financial inclusion. It takes a comprehensive approach, looking back not only at legal and institutional constraints, but also at the impact of macroeconomic and financial sector indicators, as well the role of the business environment on SME access to finance.

The chapter focuses on the Middle East and North Africa and Pakistan (MENAP) and Caucusus and Central Asia (CCA) regions. These regions lag behind most other regions in terms of the access SMEs have to bank finance. The average share of loans to SMEs in total bank lending in the MENAP and CCA regions was about 7% in 2018. According to the World Bank Enterprise Survey, a comparatively high percentage of firms in the MENAP region (about 32%) report access to credit as a major constraint (against a world average of 26%). The percentage is lower in the CCA region (18%).

Our contribution to the literature is two-fold: we compute a novel index of SME access to finance and identify the macroeconomic and institutional constraints that are likely to influence SME access to finance. Our analysis shows that economic fundamentals and financial sector characteristics, such as macroeconomic stability, limited public sector size (to avoid crowding out SME access to credit), financial sector soundness, a competitive banking system and, more broadly, a competitive and open economy are important factors to boost SME access to finance. Institutional factors, such as strong governance and financial regulatory and supervisory capacity, credit information availability, and a supportive business environment, including modern collateral and insolvency frameworks, and legal systems that allow to adequately enforce property rights and contracts are also key drivers of SME bank credit.

Policymakers should also be aware that higher financial inclusion could be associated with lower safety buffers for banks. To counteract this, additional steps may be needed to guarantee financial stability, and future research should look more carefully into the tradeoff between financial stability and financial inclusion. Future research could also look at the role of demand versus supply factors in explaining the low levels of SME financial inclusion.

3. Financial Inclusion in the Middle East and North Africa region

The third chapter documents the level of financial inclusion, of firms and households in MENA economies[1] compared to peer economies and highlights the macroeconomic relevance of ensuring that households and businesses in MENA economies can access appropriate, affordable, and timely financial products and services. It also assesses the impact of fintech, macroeconomic and institutional developments in reaching layers of the population that are still marginalized. Finally, it reviews government public interventions—in particular, during the COVID-19

[1]Financial inclusion is defined as the access to and use of formal financial services. MENA includes the following countries: Algeria, Bahrain, Djibouti, Egypt, Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Yemen, UAE.

pandemic—and provides recommendations on how to accelerate progress on financial inclusion. Its focus is primarily on the macroeconomic and policy aspects of financial inclusion, and not all issues relevant to financing are covered. Specifically, Islamic finance, correspondent banking relationships, leasing and factoring, microfinance, and informal finance are not addressed in depth, either due to data limitations or because their macroeconomic relevance is less pronounced or they are separately subject to in-depth analytical and policy work.

This paper finds that the financial inclusion of households and SMEs (Small and medium-size enterprises) in the MENA (Middle East and North Africa) region lags behind that of other regions. The percentage of adults with an account in a formal financial institution – commonly referred to as the share of the "banked population" – is similar to that of the CCA (Caucasus and Central Asia) region but lower than in other regions, with the exception of SSA (Sub-Saharan Africa). The average share of SMEs in total bank lending in MENA countries is only about 9% in 2021, the lowest in the world.

This paper highlights the macroeconomic relevance of financial inclusion in the MENA region and offers policy recommendations to expand financial inclusion. The contribution to the literature is two-fold: we document the level of financial inclusion for households and SMEs in the MENA region and offers a comprehensive review of policies that are most likely to influence access to finance for these two groups. Second, we provide a comprehensive review of government interventions to reduce the financial inclusion gap of SMEs and households, particularly in the aftermath of the Covid-19 crisis.

The empirical results suggest that a holistic approach is needed to address the main market frictions and other obstacles holding back financial inclusion. This approach would encompass a broad range of areas, such as institutional quality, macroeconomic stability, and adequate financial policy frameworks, as well as legal and regulatory conditions. In particular, policymakers should consider enhancing financial sector competition, credit information, and encourage the development of fintech activities. For increasing household financial inclusion, efforts at facilitating opening of basic accounts, channeling government payments directly into bank accounts, and enhancing trust in the financial system—including through targeted financial

education programs—have proved effective. Broad strategies for financial development and inclusion can have an important impact as well, provided they are well-designed and are not limited to the achievement of a rigid and narrow numerical target for financial inclusion.

These policies are also likely to trigger a virtuous circle of greater financial inclusion and reduced informality, bringing about broader benefits to the economy. In contrast, partial policy approaches, such as strategies focusing solely on direct government interventions through state-owned financial institutions or, credit guarantees, or interest rate caps, are unlikely to yield substantial benefits.

4. Implication of Gender Inequality on Growth: A cross-country analysis

This fourth chapter (Implication of Gender Inequality on Growth: A cross-country analysis) seeks to quantify the impact of gender inequality on growth. Growing empirical evidence regarding the adverse effects of gender inequalities on economic growth (Cuberes & Teignier, 2015a; Elborgh-Woytek et al., 2013; Gonzales et al., 2015b; IMF, 2015a; WEF, 2014) raises questions regarding its impact and persistence in low-income countries. Thus, the objective of this paper is to investigate the impact high gender inequality has had on growth, particularly in low-income countries. This can better inform policy making to foster inclusive growth and progress towards the Sustainable Development Goals (SDGs), which include the objectives of reducing gender inequalities.

By making use of panel data of about 100 countries of regions including Middle-East and North Africa (MENA), Latin American and Caribbean (LAC), Sub-Saharan Africa (SSA), Asia over the period 1990 to 2014., this paper differs from others by testing for the effects of gender inequality on growth at different stages of development while accounting for the impact on income inequality on growth. Previous empirical work has mainly focused on the effect of one dimension of inequality at a time (Ostry, Berg, and Tsangarides 2014; Gonzales and others 2015b). We allow for the relationship to be different between low-income countries and the other countries in the sample, to account for possible heterogeneity. Our analysis thus tests for the joint effects of both concepts of inequality while allowing to test whether the growth-inequality

relationship varies between low-income and other countries in general. Using system-GMM estimations, the paper finds that income and gender inequality are found to jointly impede growth mostly in the initial stages of development. These findings are robust to alternative measures of income inequality.

Overall, the chapter's findings highlight the importance for countries, particularly in MENA and SSA, to make progress with reducing gender inequalities to achieve sustained growth. In this context, the fact SDGs explicitly recognize gender inequality as separate goals is timely. Removing gender discrimination in the legal framework, ensuring that women, especially those living in rural areas, have access to safe transportation and supporting equal participation in education can all help boost labor force participation. Gender budgeting could be all be used as a tool to help reduce gender inequality.

Publications

Two papers from this thesis are published as working papers at the International Monetary Fund, Bruegel and BETA (Assessing the impact of the EU ETS using firm level data (repec.org), Unlocking Access to Finance for SMEs: A Cross-Country Analysis (imf.org). The third paper is a comprehensive empirical review of financial inclusion in the MENA Region, published in a book on Inclusive Growth in the Arab region (Promoting Inclusive Growth in the Middle East and North Africa: Challenges and Opportunities in a Post-Pandemic World (imf.org)). The fourth paper on gender inequality and growth is a modified and updated version of an IMF Selected Issue Paper (Morocco: Selected Issues (imf.org)).

ABRELL, J., NDOYE, A., & ZACHMANN, G., Assessing the impact of the EU ETS using firm level data, *Working Papers of BETA* 2011-15, Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, 2011

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FOUEJIEU, A., NDOYE, A., & SYDORENKO, T. Unlocking Access to Finance for SMEs: A Cross-Country Analysis. *IMF Working Papers*, No. 2020/055. Washington, DC: International Monetary Fund, 2020

BLANCHER, N., APPENDINO, M., BIBOLOV, A., FOUEJIEU, A., LI, W., NDOYE, A., & SYDRORENKO, T. Financial Inclusion of Small and Medium-Sized Enterprises in the Middle East and Central Asia. *IMF Departmental Paper*, 2019

INTERNATIONAL MONETARY FUND, Morocco 2016 Article IV Consultation. Middle East and Central Asia, 2017, Morocco: Selected Issues (imf.org).

INTERNATIONAL MONETARY FUND, Promoting Inclusive Growth in the Middle East and North Africa: Challenges and Opportunities in a Post-Pandemic World, 2022, IMF book

Presentations

These papers have also been presented in several research and policy forums

- Assessing the Impact of the European Union Emission Trading System Using Firm-Level Data: 2011 European Economic Association, 2011 Stanford University Energy Conference
- Unlocking Access to Finance for SMEs: A Cross-Country Analysis: 2018 World Bank-IMF Annual Meetings and 2018 IMF Brown Bag Seminars
- Financial Inclusion of Small and Medium-Sized Enterprises in the Middle East and Central Asia: 2019 Bruegel Seminar
- Implications of Gender inequality for growth: A cross-country analysis: 2017 IMF Brown Bag Seminar

Abstracts

Chapter 1: Assessing the Impact of the European Union Emission Trading System Using Firm-Level Data

This paper investigates the impact of the European Union (EU) Emission Trading System (ETS) at the firm level. Using panel data on the emissions and performance of more than 2,000 European firms from 2005 to 2008, we analyze the effectiveness of the ETS. The results suggest that the shift from the first phase (2005-2007) to the second phase (2008-2012) had an impact on the emission reductions carried out by firms, as did the initial allocation. This challenges the relevance of Coase's theorem (Coase, 1960) for ETS, which stipulated that the initial allocation of permits is irrelevant to the post-trading allocation of marketable pollution permits. Finally, we found that the ETS had a modest impact on the participating companies' performance. We conclude that a full auctioning system could help reduce emissions but could also have a negative impact on the profits of participating companies.

Keywords: panel data, energy, climate change, evaluation econometrics, firm behavior

Assessing the impact of the EU ETS using firm level data (repec.org)

Chapter 2: Unlocking Access to Finance for Small and Medium-Sized Enterprises: A Cross-Country Analysis

Countries in the MENAP and CCA regions have the lowest levels of financial inclusion of small and medium-sized enterprises (SMEs) in the world. The chapter provides empirical evidence on the drivers of SME access to finance for a large sample of countries and identifies key policy priorities for these two regions: economic and institutional stability, competition, public sector size and government effectiveness, credit information infrastructure (e.g., credit registries), the business environment (e.g., legal frameworks for contract enforcement), and financial supervisory and regulatory capacity. The analysis also shows that improving credit information, economic competition, the business environment along with economic development, and better governance would help close the SME financial inclusion gap between MENAP and CCA regions and the best performers. The paper affirms the need to adopt holistic policy strategies that consider the full range of macro and institutional requirements and reforms and prioritize these reforms in accordance with each country's specific characteristics.

Keywords: small and medium-sized enterprises; financial inclusion

Unlocking Access to Finance for SMEs: A Cross-Country Analysis (imf.org)

Chapter 3: Financial Inclusion in the MENA Region

This chapter documents the low level of financial inclusion of firms and households in MENA economies compared to peer economies. It highlights the macroeconomic relevance of ensuring that individuals and businesses in MENA economies can access appropriate, affordable, and timely financial products and services. It discusses the role of institutional developments in reaching layers of the population that are still marginalized. Finally, it reviews the role of fintech and government public interventions, their successes, and shortcomings on accelerating progress towards financial inclusion.

Keywords: small and medium-sized enterprises; households, financial inclusion

Promoting Inclusive Growth in the Middle East and North Africa: Challenges and Opportunities in a Post-Pandemic World (imf.org)

Chapter 4: Implications of gender inequality for growth: A cross-country analysis

Despite recent progress on gender inequality, gender gaps still remain high in low-income and developing economies. The chapter presents an overview of trends in gender inequality in developing economies. It provides empirical evidence on the impact of gender inequality on growth, particularly in low-income countries. It concludes by identifying key policy priorities to reduce gender inequality, including gender budgeting, improving legal rights for women and directing more public investments towards infrastructure that reduce the costs related to work and going to school outside the home.

Keywords: education, labor force participation, gender, inequality, growth

Published earlier as an IMF selected Issues Paper

Morocco: Selected Issues (imf.org).

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Chapter 1

Assessing the Impact of the European Union Emission Trading System Using Firm-Level Data[2]

1.1 Introduction

The Emission Trading System (ETS) established by the European Union (EU) is the biggest emissions trading scheme in the world. It is designed as a classical cap-and-trade system that specifies a maximum amount of cumulative greenhouse gas (GHG) emissions and allocates tradable allowances to firms covered by the scheme. Allowing trade through these permits results in a market price for allowances. The price provides an economic signal in which mitigation measures are worthwhile.[3]

A cap-and-trade system is by design effective in keeping the emissions of participating entities below the cap. Thus, the relevant question is if the cap and emissions are below the levels one would expect in the absence of the system. There are two reasons why the cap might be too high and thus ineffective. First, setting the cap *ex ante* is difficult. Emissions depend on numerous factors that are hard to predict (most notably, economic development). Therefore, setting a cap that is both ambitious and attainable is a difficult political exercise. Second, there

[2] Updated version of a co-authored paper with Jan Abrell and Georg Zachmann. Published as a BETA and Bruegel Working paper in 2011 and in the book "The great transformation: decarbonising Europe's energy and transport systems. Bruegel Blueprint 16, February 2012". Presented at the EEA conference and Stanford Annual Conference with over 70 citations to date and referenced in the EU handbook on the EU ETS

[3] A comprehensive description of the rules and economics of the EU ETS can be found in Ellerman et al. (2010).

are several flexibility mechanisms embedded in the design of the EU ETS. Most notable are the transferability of the Clean Development Mechanism (CDM) and Joint Implementation (JI) credits into EU emission allowances (EUA) and the bankability of allowances across phases.[4] Those instruments – which partly serve as security valves against allowance prices that are too high – inflate the cap to an unpredictable degree. Consequently, it is not immediately clear if companies will have to reduce their emissions due to the EU ETS.

This chapter addresses several questions. First, do the observed emissions reductions from 2005 to 2009 (see section 3) indicate that the EU ETS resulted in emissions reductions, or are those reductions explained by changes in the economic environment? Second, did the structural break between the first and second EU ETS phases lead to a change in abatement behaviour? Third, what influences shaped the initial allocation of the reduction efforts of regulated firms? Fourth, what is the treatment effect of the EU ETS on the performance of companies?

The EU ETS is divided into two phases: the trial phase from 2005 to 2007, and the phase from 2008 to 2012, which coincides with the first commitment period of the Kyoto Protocol.[5] The rules of trading and the initial allocation of pollution permits have differed substantially between the two phases. There are several more notable changes. First, the cap, i.e., the total amount of permits allocated, was much lower in the second phase. Second, the regulation of the

[4] Under the Kyoto Protocol, the Joint Implementation and Clean Development Mechanism reward projects that reduce GHG emissions with credits that can be used to meet the Kyoto reduction targets. The EU Linking Directive allows JI or CDM credits to be converted by member countries into allowances that can be used for EU ETS compliance.

[5] The EU ETS is thus one of the European tools to fulfil the Kyoto commitments of the EU member states.

transfer of pollution permits between phases changed. In the trial phase, the transfer of permits to future phases (banking) and vice versa (borrowing) was precluded. Thus, the trial phase was completely isolated from subsequent phases. In contrast, banking from the second to future phases is allowed. Third, uncertainty about the future availability of pollution permits decreased in the second phase as the long-term reduction target for 2020 was revealed in 2008.[6] This raises the question of how the structural break between phases affects the abatement decisions of firms.

Studying the link between the carbon spot price and emissions is a way to answer this question. However, the carbon spot price was a short-term signal in the first phase because allowances were only to be used within the three-year span. By contrast, the carbon spot price in the second phase should also encompass a long-term signal, as allowances are bankable at least until 2020 (bankability beyond is not ruled out by the current directives) and the future rules of trading are less certain. Consequently, spot prices in the first and second phase are not comparable. Moreover, emission-reduction strategies are not entirely based on the marginal abatement cost of companies if the strategic motives of the regulated firms are taken into account. Given that the initial allocation with valuable emission rights is established on a base year, firms try to manipulate emissions in that year to inflate their initial allocation.[7] Consequently, we have chosen to study the changes in abatement behavior between phases instead of using the carbon price to investigate the effectiveness of the scheme.

[6] Given the on-going discussion about a 30% reduction until 2020, there still is some uncertainty about the future supply of pollution permits.

[7] Another form of strategic behaviour is associated with market power in either the permit or the output market (or both) (e.g., Hahn, 1984; Matti and Montero, 2005).

Another question that arises in the context of the ETS is the impact of the rules of initial allocation on actual emissions. The invariant thesis of the Coase theorem (Coase, 1960) suggests that the initial allocation of permits is irrelevant for the post-trading allocation of marketable pollution permits. Put differently, the initial allocation does not affect the reduction behavior of regulated firms, but it certainly matters under distributional aspects, i.e., who receives the income of carbon regulation. However, the Coase theorem was derived under idealized conditions (Coase, 1992). One line of theoretical reasoning against the neutrality of initial allocation originates in the theory of second best: if the trading system is imposed on an economy in which taxes exists, the initial allocation matters for the efficiency of the system (e.g., Goulder et al., 1999). Furthermore, initial allocation matters if regulated firms possess market power (e.g., Burtraw et al., 2001). If we find that the initial allocation matters for reduction behavior, this would have significant implications for the design of emissions trading schemes, as compensation through initial allocation would no longer be emissions neutral.

Several authors have studied the effects of the EU ETS empirically. A concise overview is given in Anderson and Di Maria (2011). The contribution of the present study is threefold. First, in contrast to other studies that use country-specific firm-level data (Anger & Oberndorfer, 2008), this study addresses the entire EU. Second, it explicitly takes the structural break between the EU ETS phases into account. This allows us to study the effect of changing allocations on emissions. Third, the previous literature on the effect of initial allocations on reduction behavior has either been theoretical in nature or based on numerical simulations. With the unique data presented here, we are able to estimate the effects of initial allocation empirically. This firm-level data offers several other advantages. It allows us to eliminate the impact of aggregation over firms or installations when performing estimations. Furthermore, it allows us to exploit a wide

heterogeneity of firms with respect to their host countries, turnover rates, employment, profit margins, sectors, and initial allocation.

We find that the EU ETS induced emissions reductions in the second phase and that there were substantial differences in abatement behaviors across phases. Moreover, the initial allocation of permits and ex-post verified emissions are correlated. However, according to our findings, the EU ETS modestly affected profits, employment, and the added value of regulated firms.

This chapter is structured as follows. The next section describes and qualitatively analyzes the dataset. The section after outlines the methodological procedure and analyzes the results of the estimation process, and then a final section concludes the chapter.

1.2 Data

The dataset consists of a panel of European firms under the EU ETS. We match the emissions data obtained from the European Commission (Community Independent Transaction Log, CITL) to firm-level performance data from the AMADEUS database. From the CITL emissions data, we extract information on the free allocation of emissions allowances and verified emissions (2005-2008) at the installation level.[8] The availability of the data until 2008 is important because it allows us to include the second phase of the EU ETS. Some data issues with respect to the CITL data have been reported (Trotignon & Delbosc, 2008). In particular, during the first phase of the EU ETS, the use of New Entrants Reserves was not available in CITL's

[8] According to Article 3(e) of the EU ETS Directive, an installation is a stationary technical unit where one or more activities under the scope of the European Union Emissions Trading Scheme (EU ETS) and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution.

public area, leading to some bias in the assessment of installation positions. We avoid these issues by selecting a balanced panel over the three-year span, i.e., we include installations that were already present in CITL's public area in 2005.

From AMADEUS, we extracted information on employment, turnover, profit margins, added value, labor, and fixed capital costs (2003-2008). Both sets of data were matched via the addresses of the installations and produced a set of 2,101 firms (3,608 installations) that represent, on average, 59% of the total verified emissions.[9] We compute an allocation factor (AF), which is defined as the quotient of the free allocation of emissions allocated to the verified emissions (Anger & Oberndorfer, 2008). An AF > 1 suggests that an installation has received allowances that exceed its emissions, whereas the opposite suggests that this installation should either buy additional emission allowances or abate some of its emissions in order to comply with the EU ETS. Table A.1 in Appendix A compares emissions and allowances in our sample of matched installations to the original CITL data.

Our matched sample is representative of the biggest installations of the original CITL data in terms of emissions and allowances as illustrated in Table A.1. There is also more heterogeneity in our installations than in the original CITL data. We classify firms into five sectors based on the two-digit NACE Rev.2 code. Groups of countries were created with the geographic proximity as the main criteria. Firms are classified into 18 regions or countries.

[9] The matching procedure contains three steps. First, an automatized pre-matching stage identifies potential matches based on the similarities of company name, addresses, and zip-codes. Then this generous matching is narrowed down by selecting the actual matches from the computer-generated proposed matches. Finally, matches for the biggest unmatched installations are searched "by hand." In the last two steps, additional sources of information are drawn upon in cases of ambiguity.

Tables 1.1 and 1.2 show the sectoral and regional distribution of our regulated firms. Other non-metallic mineral products, along with electricity and heat sectors, represent more than two-thirds of our sample. The two most represented countries in the sample are Spain and Germany, with an aggregate frequency of 35%, and we retrieved one-third of the installations from the biggest emitting country (Germany). The following section gives more information on the aggregate emissions by country.

Table 1.1: *Sectoral Distribution of the Sample Companies*

Sectors	Number of firms	Frequency (%)
Other non-metallic mineral products	806	38.36
Electricity and heat	660	31.41
Paper and paper products	416	19.8
Basic metals	159	7.57
Coke and refined petroleum products	60	2.86

Table 1.2: *Regional Distribution of Sample Companies and CITL Installations*

	Total CITL	**Sample of Matched Firms**		
Countries	No. of installations	No. of firms	No. of installations	Country share in total sample firms (%)
Spain	1106	420	567	19.99
Germany	1971	314	644	14.95
Portugal	277	236	183	11.23
France	1118	199	291	9.47
Czech Rep.	421	120	219	5.71
Poland	930	114	205	5.43
Italy	1124	113	167	5.38
Finland	649	103	412	4.9
UK-Ireland	1247	85	163	4.05
Bulgaria-Romania	399	73	114	3.47
Sweden	798	71	116	3.47
Austria	222	68	118	3.24
Belgium-Lux	372	67	43	3.19
Slovakia	193	62	94	2.95
Netherlands	437	47	92	2.24
Denmark	403	39	62	1.86
SI-HU	365	33	42	1.57
EE-LV-LT	280	27	66	1.29
Greece	157	N/A	N/A	N/A
Cyprus	13	N/A	N/A	N/A
Malta	2	N/A	N/A	N/A
LI	2	N/A	N/A	N/A
Norway	115	N/A	N/A	N/A

Note: UK= United Kingdom, SI = Slovenia, HU =Hungary, EE = Estonia, LV=Latvia, LT=Lithuania, LI= Liechtenstein

Descriptive statistics of the main variables of interest are presented in Table 1.3. The relatively large difference between the value of the mean and the value of the median for these

variables could indicate the presence of outliers in our sample. In the analysis, we should keep in mind that the identified companies/installations are significantly larger than the average AMADEUS company/average CITL installation. Larger firms are overrepresented because it is more likely that we will retrieve the matching AMADEUS entry for larger firms. The table also shows that 75 % of companies/installations received allocations that exceeded their emissions.

Table 1.3: *Characteristics of the Sample Companies*

	Added Value	**Employees**	**Fixed Capital**	**Profit Margin**	**Allocation Factor**
1%	-1048	2	0	-46.69	0.50
5%	470	10	309	-17.18	0.75
25%	2343	43	2968	0.05	1.00
Median	8673	150	12125	4.2	1.15
Mean	88541	663	159216	4.5	6.61
75%	35014	447	49279	10.62	1.43
95%	288316	2170	443055	25.37	3.31
Std	389039	2580	909914	14.32	178

1.3 The General Performance of the EU ETS

The EU ETS is divided into two phases. The first three years (2005-2007) were intended as a trial phase so that participants could become familiar with the new instrument. The second phase (2008-2012) coincides with the first commitment period of the Kyoto Protocol. While the first phase was isolated from the second, i.e., the shifting of emissions from one phase to another – through banking and the borrowing of allowances – was not permitted, banking is allowed from the second phase to subsequent phases. In these first two phases, the initial allocation of allowances was done by EU member states via National Allocation Plans (NAPs), which had to be approved by the European Commission. There was great variation in the plans for different countries. For example, the base phase for calculating historic emissions was very different for

each member state.[10] Most of the emission allowances were allocated freely to installations based on historic emissions (so-called "grandfathering").

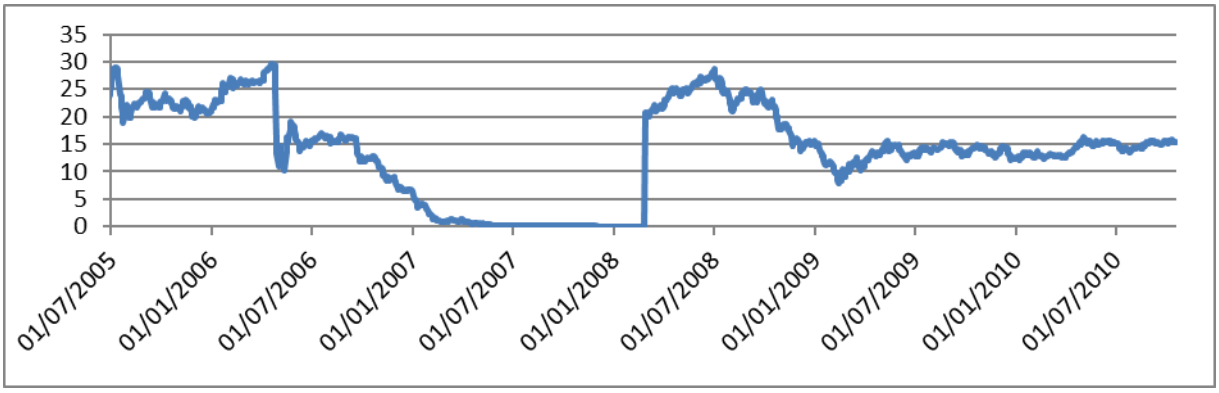
During the first phase of the EU ETS, the total emissions of the participating installations grew by about 2%. This was possible due to a generous cap and/or unexpectedly low abatement cost. In fact, the average annual cap in the first phase of the EU ETS was about 3% higher than the emissions in 2005. Consequently, the total amount of allowances distributed exceeded the verified emissions by 2.3% during the first phase. When market actors became aware that more allowances than the amount needed were available, the price for allowances in the first phase crashed to below €1 per EU Allowance Unit (EUA) of one ton of CO_2 (Figure 1.1).[11]

In the second phase, the number of allowances distributed was reduced by about 11% from 2007 to 2008. This was followed by a 2% decline in verified emissions. Consequently, in 2008 and 2009 companies were, on average, short in the allowances allocated to them. The verified emissions exceeded the allocated allowances by 2.9%. In 2008, the lack of allowances led to carbon prices of about €20 per EUA. In 2009, due to the crisis-induced demand reduction for allowances, the carbon price fell to about €15.

[10] For example, Germany used the averages from 2000 to 2002 for the first phase, while Slovakia used sector-specific base periods (for steel, the average of the ten years with the highest emissions, which was between 1990 and 2003).

[11] Hinterman (2010) shows that although this crash was most likely the consequence of an adjustment of expectations concerning aggregate emissions, the market was initially inefficient, which explains the relatively high price in 2005.

Figure 1.1: Daily Closing Price per EUA



The trends in emissions and the free allocation of allowances differs between sectors. The power sector dominates the EU ETS. It is the only sector that used more allowances in the first and the second phases than it obtained for free. All the other sectors were net sellers of allowances. Nevertheless, the power sector showed a below average decrease in emissions in the years from 2005 to 2009 (-8.9% in the power sector versus -11% in the EU ETS). Interestingly, the sectoral emission reductions for the first and the second phases are strongly negatively correlated. That is, sectors that increased carbon emissions in the good years between 2005 and 2007 reduced emissions between 2008 and 2009. If we omit the 2009 crisis year, emission reductions were seen in the following sectors: mineral oil refineries, iron or steel, glass, ceramic products, pulp and paper, and the remaining non-classified sectors, while the sectors for coke ovens, metal ore, and cement clinkers increased emissions.

Figure 1.2: ETS Emissions by Country (Emission unit-t CO2-equivalent)

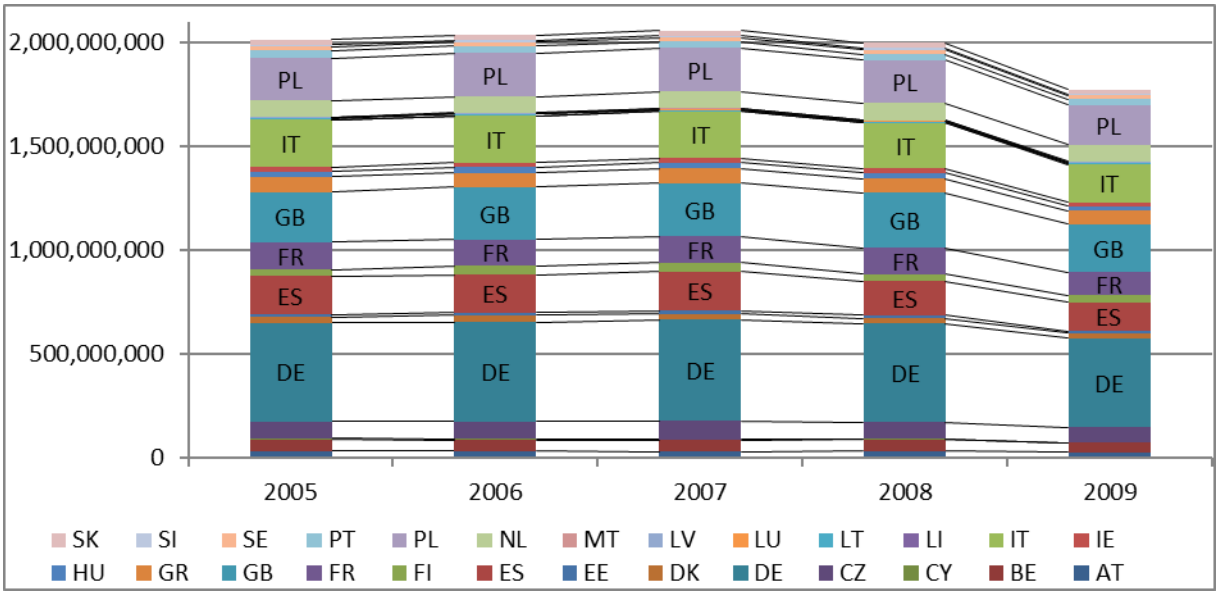


Figure 1.3: ETS Emissions by Sector (Emission unit-t CO2-equivalent)

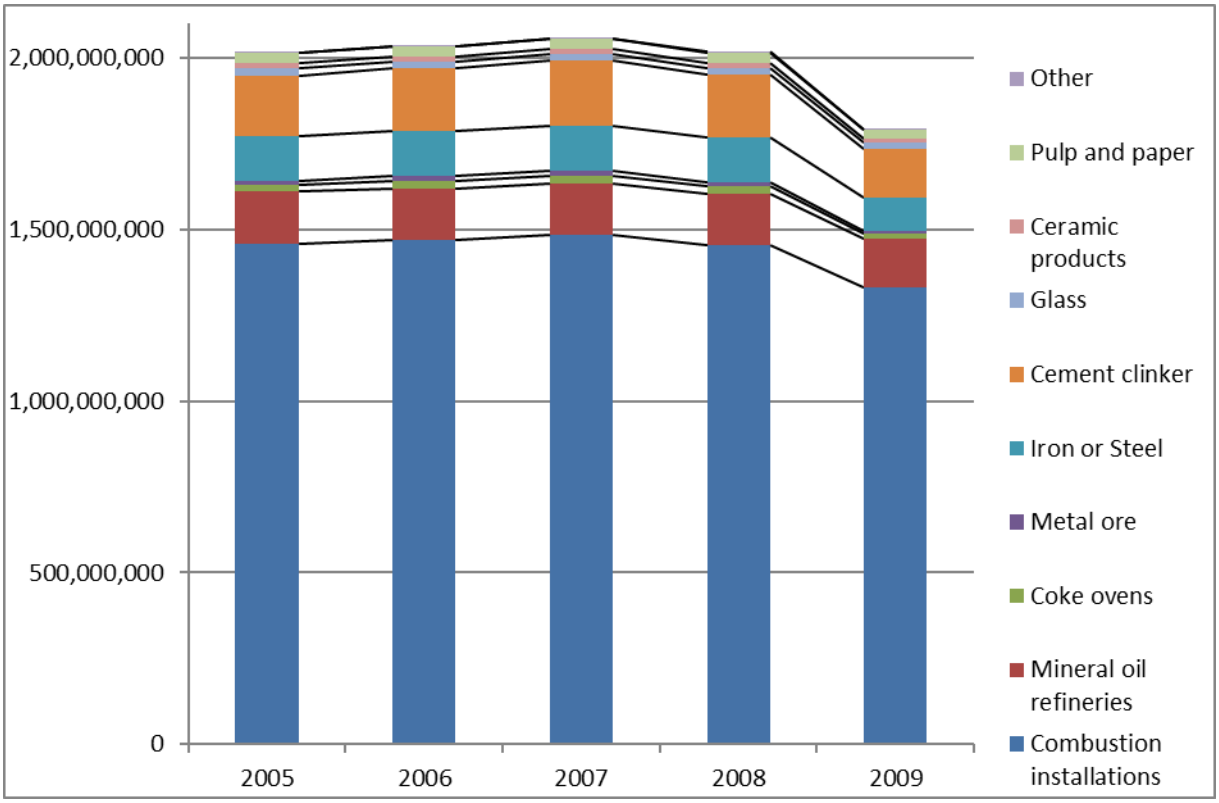


Figure 1.4: Excess Allocation by Country

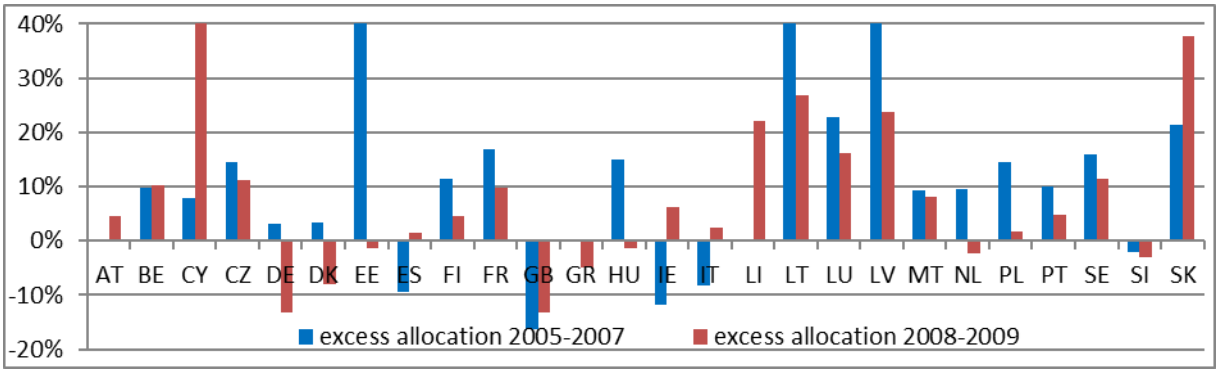
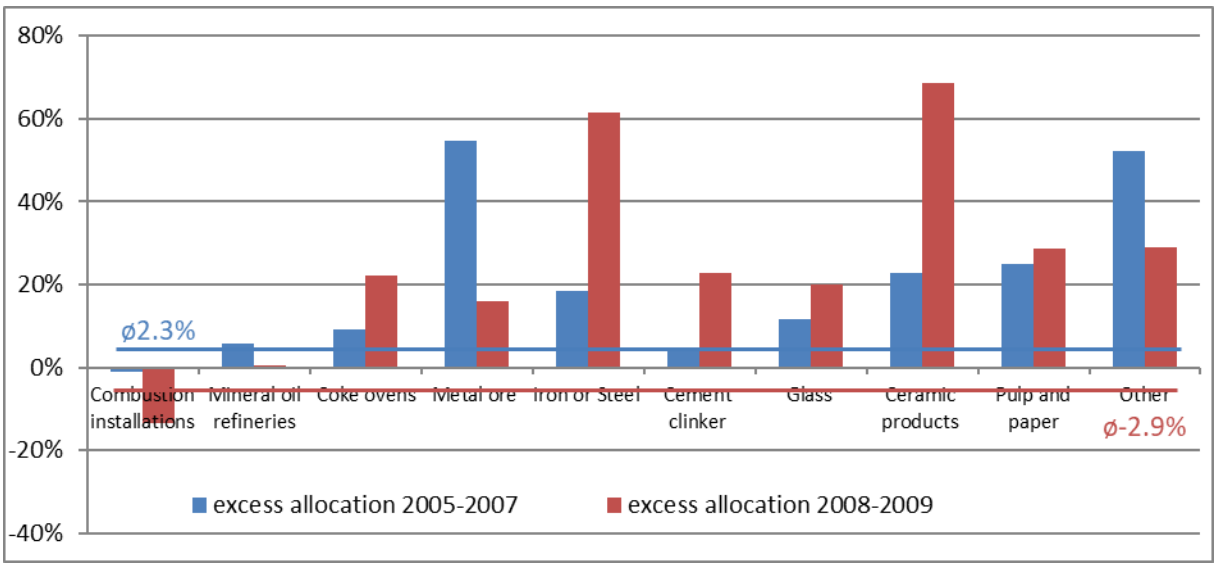


Figure 1.5: Excess Allocation by Sector



The CITL data suggests that emissions increased during all years of the first phase of the EU ETS while they decreased in the first two years of the second phase as illustrated Figure 1.2. This is also the case for our matched sample of AMADEUS firms. Based on this source of information, it is, however, impossible to judge whether the EU ETS led to a reduction of emissions compared to a hypothetical baseline, or whether the observed emission pattern just represents business as usual. We can, however, assess the abatement strategies of companies within the EU ETS to analyze if changes in the system induced additional reduction efforts. The following section thus offers a corresponding analysis based on firm-level data.

1.4 Did the ETS Lead to Emissions Reductions?

1.4.1 Methodology

The appeal of the EU ETS is that it provides certainty about the environmental outcome, by design. Therefore, the key challenge when evaluating whether the ETS leads to emission reductions is to estimate what emissions would have been in the absence of the ETS. This is a counterfactual situation that we cannot observe. However, several techniques have been developed to proxy this counterfactual.[12] There is no consensus on the success of the ETS in abating CO_2 emissions in the first phase. Indeed, according to Anderson and Di Maria (2011), some companies did abate their emissions during the first phase, while others inflated them. This study contributes to this debate by estimating the reduction in firm-level CO_2 emissions. More specifically, it studies the behavior of firms at the crossover point from the first to the second phase of the ETS. That is, it evaluates the effectiveness of the ETS by comparing the development within the first phase to the shift from the first to the second phase. The goal is thus to analyze if firms changed their emission reduction strategies from 2005-2006 to 2007-2008. This is instructive, as the first period saw fairly constant carbon prices (the EUA price dropped from €23 in 2005 to €17 in 2006), while emission prices rose in the second phase from €1 in 2007 to €22 in 2008. This suggests that companies increased their emission-reduction efforts in 2007-2008 due to the shift in phases and the increasing EUA prices compared to 2005-2006.

This study controls for other plausible factors that may have induced a reduction in emissions; for instance, the economic environment could have led some companies to diminish

[12] See Anderson and Di Maria (2011) for more details on the different methods.

their production and thus reduce emissions. The data collected here provides information on European firms' emissions (2005-2008) and economic activity (2003-2008). The dynamic panel approach allows us to overcome the absence of consistent data on CO_2 emissions of the firms before the start of the EU ETS. Furthermore, it avoids the endogeneity and inconsistencies[13] that occur when regressing emission volumes on emission prices. Finally, it allows to control for both unobserved and observed heterogeneity of firms with respect to the host countries, turnover rates, employment, profits, margin, sectors, and initial allocation. Thus, we can identify some stylized facts on the influence of these characteristics on firm abatement decisions.

The following equation tests if there has been an acceleration in emission reductions in the second phase:

$$y_{it} = \alpha_0 + \alpha_1 d_{it} + \alpha_2 cv_{it}^1 + \alpha_3 cv_{it}^2 + \varepsilon_{it}\,, \qquad (1.1)$$

where:

- i and t are respectively the company and year index, t= 2005, 2006, 2007, 2008
- y_{it} is the log value of verified emissions
- d_t is a time dummy
- cv_{it}^1 is a set of control variables: turnover and labor in log values
- cv_{it}^2 is a second set of control variables: sectoral and country dummies
- ε_{it} is the error term, which can be decomposed into a time variant u_{it} and a firm-specific effect η_i

[13] In the first phase, the spot price was a pure short-term signal, whereas in the second phase it is a long-term signal.

Taking the third difference of the first equation gives us the following equation:

$$\Delta^3 y_i = \alpha_1 + \alpha_2 \Delta^3 cv_i^1 + \alpha_3 \Delta^3 cv_i^2 + \Delta u_i \,, \tag{1.2}$$

Here, Δ is the difference operator and Δ^3 is the third difference. The interesting parameter is α_1 and captures the change of behavior in emissions by the firm from the first to the second phase. The presence of outliers in the dataset can strongly distort the classic least-squares estimator and lead to unreliable results. Consequently, we perform a robust regression analysis. Robust regression is an alternative to least squares regression when data is contaminated with outliers. Details of the weighting algorithm are available in Appendix B.

1.4.2 Results

Table 1.4 reports a strong positive relationship between changes in turnover and changes in emissions. That is, the emissions of a company's installations are likely to decrease if turnover declines. This predictable interaction between the turnover data from AMADEUS and the emission data from CITL indicates that our matching of CITL-installations to AMADEUS companies has been effective. The causality of this interaction can, however, not be addressed by our analysis. In other words, it is unclear to what degree the higher cost of emissions allowances induced reductions in production, and to what degree an exogenous reduction in production led to decreasing emissions.

Significant Mitigation Due to the Second Phase

As indicated by the raw CITL data, companies increased their emissions between 2005 and 2006 by about 1% while they reduced emissions between 2007 and 2008 by about 2%. The total differential in emission growth rates was therefore about -3.2 percentage points. For our subsample, emissions between 2005 and 2006 increased by 0.82% and decreased by 5.51% between 2007 and 2008. Thus, the differential between growth rates was 6.33 percentage points.

When controlling for company turnover, the number of employees, sector, and home country, the differential in emission growth rates for our subsample is significantly lower (-3.6 percentage points) but is still significant. That is, given their economic activity, we would have expected companies to emit more than they actually did.

Because the reduction is still significant even after we control for economic activity, we can conclude that the emissions reductions were not only caused by the conditions of the economic environment. It is thus likely that the reductions between 2007 and 2008 were also due to the shift from the first to the second phase of the EU ETS.

The fact that emissions reductions between 2007 and 2008 were significantly greater than between 2005 and 2006 – even when controlling for company output changes – also indicates that increased emissions reductions did not imply a proportionate loss in the output of the firms in the sample. This suggests that emissions reductions were not (only) achieved by reductions in the economic activity of firms.

Table 1.4: *Differential in Emissions Growth Rate 2005/2006 vs. 2007/2008*

Dependent variable	**Growth rate of emissions differentiated over three years**				
	(1)	(2)	(3)	(4)	(5)
Sample	All companies	Initially under-allocated companies AF_i 2005 <1.15	Initially over-allocated companies AF_i 2005 >1.15	Firms with strongest decrease in allocation ΔAF_i 07-08 <-.08	Firms with least strong decrease in allocation ΔAF_i 07-08 >-.08
$\widehat{\alpha_1}$	-0.036**(0.02)	-0.034*** (0.01)	0.002 (0.03)	-0.063** (0.02)	-0.02 (0.02)
Changes in turnover	0.19*** (0.03)	0.19*** (0.04)	0.21*** (0.04)	0.14** (0.04)	0.35*** (0.04)
Changes in labor size	0.00 (0.03)	-0.03 (0.02)	0.07 (0.05)	0.07 (0.06)	-0.03 (0.02)
Adj R-squared	0.17	0.21	0.23	0.20	0.40
Significance: * at 10%, ** at 5%, and *** at 1%. Standard errors are reported in brackets.					

Initial Allocation is Important for Mitigation Efforts

Companies that obtained more allowances relative to their actual emissions showed different mitigation behaviors than companies that received relatively less. We can classify companies as "initially under-allocated" or "initially over-allocated" based on whether they had a higher individual allocation factor in 2005 than the medium company (1.15). According to column (2) of Table 1.4, under-allocated companies increased their reduction efforts between the first and the second phases. In contrast, according to column (3), companies that received an above-average initial allocation in the first phase did not increase their reduction efforts between the phases. This indicates that firms that were short of allowances in the first phase reduced their emissions most between 2007 and 2008.

Furthermore, firms whose initial allocation was reduced by an above-average amount between 2007 and 2008 (column (4)) significantly reduced their emissions, even when controlling for changes in turnover and employment. On the other hand, firms whose allocation decreased less (column (5)) did not increase their reduction effort between the first and second phases. That is, tighter initial allocation correlates to emissions reductions.

The causality of these results is difficult to establish. In general, four options are plausible:

(i) Companies received initial allocations based on some sort of emissions benchmark for their sector (e.g., 1 EUA per ton of steel). Thus, companies with the lowest emission performance (2 tons of carbon per ton of steel) initially received the lowest allocation factor. Those companies were best able to reduce emissions and thus showed the highest emissions reductions. Our findings are unlikely to explain this, as

the initial allowances in the first phase were almost entirely grandfathered (i.e., based on historic emissions).

(ii) Those sectors that were able to reduce emissions the most obtained the tightest allocations. This effect is unlikely to explain our findings as we control for sectoral differences.

(iii) Those companies that announced reduced production between 2007 and 2008 received fewer allowances and emitted less in 2008. This is unlikely to explain our findings, as we (1) control for changes in the economic activity of companies, and (2) ignore installations that were absent in any year.

(iv) Due to various inefficiencies in the carbon market (e.g., market power, limited liquidity, transaction costs, the conditionality of future allocation on past emissions), the mitigation strategies of companies are contingent on their initial allocation.[14]

Consequently, these findings challenge the view that initial allocation does not drive emissions reduction.

Major Sectoral Differences

The response to the shift from the first to the second phase differed between sectors. While some sectors, such as basic metals and non-metallic minerals, significantly increased their reduction efforts between 2005/2006 and 2007/2008 (Table 1.5), other sectors, like electricity

[14] Hinterman (2010) shows that market power on both the product market and the permit market can create inefficiencies in the carbon market. He found that German and United Kingdom power generator firms with market power could have found it profitable to manipulate the permit price upwards, despite being net permit buyers. Wirl (2009) proposed a model that allows for non-competitive behavior in the permit market and found that the implication of such strategic market interactions is a low volume of trade and prices below or above the first best level.

and heat, did not. The reason for these sectoral differences might be the different profiles of the sectoral abatement cost curves (the cost profile of emissions reductions in the sector). In other words, some industries may have already carried out most of the cheap emissions reduction efforts as they were already economically viable at the low carbon prices of the first phase. In addition, the fact that allocation plays a role in emissions reduction might also explain these differences, since allocation is decided at a sectoral level.

Table 1.5: *Differential in Emission Growth Rate 2005/2006 vs. 2007/2008*

	Paper and Paper Products	**Non-Metallic Minerals**	**Basic Metals**	**Electricity Heat**
$\widehat{\alpha_1}$	-0.029(0.027)	-0.087***(0.025)	-0.095*(0.049)	-0.001(0 .038)
changes in turnover	0.154**(0.077)	0.299***(0.058)	0.089(0.126)	0.136**(0.06)
changes in labor size	-0.062(0.093)	-0.046(0.044)	0.099(0.208)	0.012(0.042)
Adj R-squared	0.13	0.27	0.71	0.21
Sample	416 firms	806 firms	159 firms	660 firms
Significance: * at 10%, ** at 5%, and *** at 1%. Standard errors are reported in brackets. Countries dummies are not reported.				

1.5 Did the EU ETS Affect Company Performance?

1.5.1 Methodology

There are already several studies on the direct impact of the EU ETS on the participating companies. An *ex ante* report by Carbon Trust (2004) listed three determinants of the impact of ETS on competitiveness at the firm, sector, and country level: energy intensity, the ability to pass on higher costs via prices, and the ability to avoid CO_2 consumption during the process of production or to replace CO_2 intensive inputs. The report concluded overall that companies under regulation will be subject to greater burdens, although the ETS does offer competitive

advantages compared to alternative regulatory scenarios (the ETS with grandfathering has comparatively lower costs imposed by the system).

Ex post studies are rather rare. Demailly and Quirion (2008) studied the impact of the ETS on production and profitability for the iron and steel sector. They found that modest competitiveness losses were partly explained by pass-through rates and the rule on the updating of allocations. Golombek and Raknerud (1997) investigated the effects on employment of environmental standards imposed on polluting firms. Using data from Norway, they found that firms working under strict environmental regulations tend to increase employment in two out of three manufacturing sectors. Perhaps the closest study to this one is Anger and Oberndorfer (2008), who examined the impacts of the relative allocation of EU emissions allowances on competitiveness and employment in a sample of German firms for 2005-2006. They found that the allocation mechanism within the ETS framework did not have a significant impact on revenues and the employment of the firms under regulation using a simple ordinary least squares (OLS) regression.

The present methodology is also based on an econometric analysis but uses a different model from that of Anger and Oberndorfer (2008). It studies the effects of the ETS on the added value, the profit margin, and employment of participating firms over a longer phase using a panel of European firms.[15] Indeed, to evaluate the impact of the ETS on the firms' performance, we

[15] There are macroeconomic simulations of the effects of the ETS on the entire economy: COWI (2004) uses GTAP-ECAT (European Carbon Allowance Trading) to assess the impacts of the EU ETS on competitiveness. With two different ETS scenarios (long-term and sluggish shorter-term adaptation) and BAU as a reference scenario, it suggests that competitiveness will be impacted in Europe due to the introduction of the ETS. The SIMET energy system model (Matthes et al., 2003) analyzes the impact of emissions trading on Germany. With 25 different variations of emissions trading systems, the main finding is that an allocation on the basis of selected basis years has a huge impact on the level of additional costs and gains. The DART model (Klepper & Peterson, 2004) analyzes

measure the difference between the state of the firms after being subject to the ETS and the hypothetical state (i.e., the counterfactual) of their performance if they had not been under regulation. The counterfactual is not observable but can be estimated (e.g., Heckman et al., 1999) by means of comparison to a control group (non-participating firms). Furthermore, to reduce the selection bias created by assigning a non-participating firm to each participating firm, we use propensity score matching. This is a common way to "correct" the estimation of participation effects while controlling for other factors that might have an influence. The basic idea is that this bias is reduced when participating and control subjects are as similar as possible. The next section explains the matching procedure.

The following equation estimates the impact of the ETS across the two phases:

$$y_{it} = \alpha_0 + \alpha_1 d_{1,it} + \alpha_2 d_{2,it} + \alpha_3 x_{it} + \alpha_4 cv_{it} + \varepsilon_{it}, t = 2004,2005 \; or \; 2008 \quad (1.3)$$

where:

- y_{it} is the outcome variable in log value, to which the value, profit margin, or employment can be added
- $d_{1,it}$ is a dummy variable which equals 1 after the launching of the ETS (2005 or 2008) and 0 otherwise (2004)
- $d_{2,it}$ is a dummy variable which equals 1 if the firm i in phase t is under EU ETS (2005 or 2008)

---

competitiveness on the basis of a computable general equilibrium (CGE) model. Covering 16 regions, including nine EU countries or groups of countries in 2012, and with BAU as the reference scenario, it shows significant reductions in production and hence a loss of competitiveness if the EU ETS as compared with the BAU. However, if one applies the Kyoto measures, ETS is the most competitive scheme even in sectors that do not take part in emissions trading.

- x_{it} is a set of dependent variables for each outcome variable: labor and fixed capital for added value, lagged value of employment value for employment, and lagged value of turnover and employment for profit margin
- cv_{it} is a set of sectoral and country dummies
- ε_{it} is the error term decomposed into a firm specific effect η_i and a time variant effect u_{it}.

By taking the first difference of equation (1.3), we have:

$$\Delta y_i = \alpha_1 + \alpha_2 \Delta d_{2,i} + \alpha_3 \Delta x_i + \alpha_4 \Delta cv_i + \Delta u_i \,, \quad (1.4)$$

The relative allocation of emissions may have an impact on a firm's behavior, and the results can be different from one sector to another, as we have seen. We must therefore perform additional regressions on subsamples.

1.5.2 Matching Procedures

Our one-to-one matching is performed based on a propensity score $p(X) = \Pr(D = 1|X)$, where X is the set of pre-treatment characteristics (working capital, number of employees, fixed capital, intermediate consumptions, remuneration of employees) and D is an indicator of the treatment actually received by firms. Using X is crucial to satisfy the conditional independence assumption (CIA) which states that different firms with identical realizations of X_i will be different in their outcome Y_i only through the effect of participating in the ETS. Since it is virtually impossible to find exact twins, functions such as the propensity score are used to find the closest match for participating firms. The control group was selected from the following sectors:

Table 1.6: *Sector Names for the Control Group*

	Sector Name
1	Other mining and quarrying
2	Mining support service activities
3	Food products
4	Beverage products
5	Tobacco products
6	Textiles
7	Wearing apparel
8	Wood and related products
9	Leather and related products

We then find the sample of non-participating firms (control group) for each of the participating firms that is most similar in terms of the propensity score $p(X)$. The participating unit i is matched to the non-participating unit j, such that:

$$p_i - p_j = \min_{k\epsilon\{D=0\}}\{abs(p_i - p_k)\} \tag{1.5}$$

Once the matching partners are found, we can then estimate the average effect of participation by assessing the impact of the ETS on the dependent variable:

$$\hat{\alpha}_2 = \Delta\bar{Y}_T - \Delta\bar{Y}_C \tag{1.6}$$

where $\bar{Y}_T$ is the average for the participant group and $\bar{Y}_C$ i is the average for the control group. Alternative matching procedures – such as Nearest Neighbour Matching, Radius Matching, Kernel Matching and Stratification Matching – have been proposed in the literature. To assess the robustness of our estimates, we also perform these matching procedures using Stata Psmatch2 command (Leuven & Sianesi, 2003). We assess the quality of the matches by comparing the situation before and after matching and check if any differences remain after the conditioning on the propensity score. A suitable indicator for this quality assessment is the bias reduction, which is derived before and after matching the standardized bias. In most empirical studies, a bias reduction of under 3% or 5% is considered sufficient. In our case, for each

covariate *X* we have a bias reduction under 5%. Additionally, Sianesi (2004) suggested that we assess the quality of the matching via the re-estimation of the propensity score on the matched sample, that is, only on participating firms and matched non-participating firms, and comparing the pseudo-*R*2 before and after matching. The pseudo-*R*2 is an indicator of how well the covariates *X* explain the "treatment" probability. After matching there should be no systematic differences in the distribution of covariates between both groups, and the pseudo-*R*2 should thus be fairly low. In our case, we find a pseudo-R2 of 0.012.

1.5.3 Results

According to Table 1.7, being subject to the ETS had no impact on a company's value added, employment, and profit margin in 2005 or 2008. This is slightly counterintuitive, as obtaining the right to either use or sell free allowances should increase the degree of freedom of a company's profit maximization strategy and thus potentially increase profits. Goulder et al. (2010) studied the impact of alternative emissions allowance systems on profits and found that freely allocating allowances overcompensates firms under cap-and-trade programs. Furthermore, allowing the opportunity for cost of emission allowances should increase the prices of carbon-intensive products. Thus, participating companies could expect higher profits (so-called "windfall profits;" Sijm et al., 2006). We also perform different analyses on the subsamples of under- and over-allocated firms, but there is still no significance overall for the parameter that estimates the impact of the ETS (see Appendix C for the regressions within sectors, which do not lead to overall significant results). At the 10% level, however, some interesting results can be reported. First, over-allocated firms obviously benefited from their participation in the ETS by increasing their profit margins in the first and the second phases. Second, the profit margins of under-allocated firms decreased between 2004 and 2008. Third, certain sectors (e.g., non-

metallic minerals; see Appendix C) were disproportionately affected. However, the overall conclusion is that participating companies did not experience any significant loss of competitiveness.

Table 1.7: *Effect of the ETS on Companies' Performance*

Dependent variable	Added value		Employment		Profit margin	
Period	(1)	(2)	(1)	(2)	(1)	(2)
$\widehat{\alpha}_2$	-0 .09 (0.08)	-0.11 (0.08)	- 0.002 (0.002)	-0 .009 **(0.004)	-0.53 (0.45)	-0.51 (0.37)
Changes in fixed capital	0.08*** (0.01)	0.06*** (0.01)				
Changes in employment	0.11*** (0.01)	0.10*** (0.02)	0.50*** (0.002)	0.52***(0.02)	-0.59* (0.32)	-0.52 (0.32)
Changes in turnover			0.04*** (0.02)	0.05*** (0.02)	3.91*** (0.21)	3.67*** (0.21)
Adj R-squared	0.78	0.83	0.75	0.73	0.58	0.62
Sample	4,202 firms	4,202 firms	4,202 firms	4,202 firms	4,202 firms	4,202 firms

(1)= 2004-2005, 2=2004=2008

Under-Allocated Firms (AF<1)						
Dependent variable	Added value		Employment		Profit margin	
	(1)	(2)	(1)	(2)	(1)	(2)
$\widehat{\alpha}_2$	-0.04 (0.04)	-0.05 (0.06)	-0.003 (0.003)	-0.013 (0.095)	-0.22 (0.31)	-1.95 *(1.11)
Changes in fixed capital	0.08*** (0.01)	0.11*** (0.01)				
Changes in employment	0.16*** (0.02)	0.17*** (0.02)	0.49*** (0.002)	0.50***(0.002)	-0.42(0.43)	-0.34 (0.43)
Changes in turnover			0.04*** (0.003)	0.03*** (0.003)	2.61*** (0.27)	2.54 (0.27)
Adj R-squared	0.75	0.77	0.69	0.67	0.51	0.52
Sample	1,436 firms	1,538 firms	1,538 firms	1,538 firms	1,538 firms	1,538 firms
Overallocated firms (AF>1)						
Dependent variable	Added value		Employment		Profit margin	
	(1)	(2)	(1)	(2)	(1)	(2)
$\widehat{\alpha}_2$	-0.07 (0.07)	-0.12(0.10)	0.008 **(0.004)	-0.004 (0.002)	2.14* (1.25)	2.32 *(1.29)
Changes in fixed capital	0.05** (0.02)	0.07*** (0.02)				
Changes in employment	0.08*** (0.02)	0.09*** (0.02)	0.52*** (0.002)	0.51***(0.003)	-0.95** (0.50)	-0.87* (0.49)
Changes in turnover			0.05*** (0.004)	0.06***(0.005)	5.29*** (0.35)	5.07*** (0.34)
Adj R-squared	0.85	0.77	0.89	0.57	0.58	0.64
Sample	2,766 firms	2,664 firms	2,766 firms	2,664 firms	2,766 firms	2,664 firms
Significance: * at 10%, ** at 5%, and *** at 1%. Standard errors are reported in brackets. Sectoral and countries dummies parameters are not reported.						

1.6 Conclusion

The purpose of this study was to shed light on the effect of the EU ETS at the firm level. We have used a sample of 2,101 European firms covered by the ETS to study the effectiveness of the ETS during its first phase and the beginning of its second phase, and its impact on company performance. We found that the ETS in the second phase led to a reduction in emissions. We also

demonstrate that two sectors (non-metallic minerals and basic metals) contributed most to the reductions, while the electricity and heat sectors did not at all.

Furthermore, we have found that initial allocations and *ex-post* emissions are correlated. The most plausible explanation for this is that carbon markets deviate from the idealized market conditions assumed in the Coase theorem. Limited market liquidity and the high concentration of initial allocation might be two of the deviations from Coase's assumptions that are responsible for the effects we have found of allocations on emissions.

Like previous studies on the competitiveness effects of the EU ETS (Anger & Oberndorfer, 2008; Demailly & Quirion, 2008), we found that being subject to the ETS did not significantly affect profits, employment, or added value during the first phase and the beginning of the second phase. When we conducted analyses on different groups (under- versus over-allocated firms, sectoral analysis) we found that certain sectors (e.g., non-metallic minerals) were disproportionately affected. These results must be interpreted with caution as our counterfactual (similar companies from non-regulated sectors) is far from perfect. Also, we must note that this analysis only deals with the effect on companies under regulation and thus completely ignores the effects on indirectly affected industries (e.g., electricity-intensive companies).

Various refinements and extensions can be made. Including more years of the ETS could increase confidence in the results and help capture longer-term effects (such as investments). Analyzing the endogeneity of allocation in the second phase could also help disentangle the strategic mitigation behaviors of firms in the first phase.

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Appendix A

Table A.1: *Distribution of Emissions and Allowances in Thousand EUAs: Matched Sample and Raw CITL Data*

	Verified emissions 2005		**Allocated Allowances 2005**		**Verified Emissions 2008**		**Allocated allowances 2008**	
	(Sample)	**(CITL)**	**(Sample)**	**(CITL)**	**(Sample)**	**(CITL)**	**(Sample)**	**(CITL)**
Total								
Mean	336	160	337	166	468	168	407	155
Median	16	10	20	12	20	11	24	14
Max	32000	32000	30800	30800	72800	30900	46900	26900
Q3	84	39	103	48	114	43	120	51
Q1	2	0	4	0	4	1	6	2
Q3-Q1	81	38	99	47	110	42	114	49
Std	1479	881	1421	862	2389	865	1873	718
German								
Mean	471	241	484	250	618	240	491	197
Median	22	15	27	19	28	13	31	17
Max	29700	29700	28700	28700	72800	24900	46900	19600
Q3	121	56	164	68	170	55	188	62
Q1	5	5	6	6	5	2	7	3
Q3-Q1	116	51	158	62	165	53	180	59
Std	2227	1359	2220	1353	3460	1311	2283	937
Poland								
Mean	572	218	613	255	716	219	685	216
Median	26	21	32	27	25	19	28	21
Max	32000	32000	30800	30800	30900	30900	26900	26900
Q3	101	50	157	65	110	48	112	57
Q1	12	8	14	11	9	6	11	8
Q3-Q1	89	43	143	54	100	42	101	49
Std	2638	1332	2592	1375	2902	1311	2637	1177
France								
mean	235	117	261	135	342	111	354	116
Median	38	19	55	26	42	16	55	20
Max	11500	11500	12200	12200	15500	15500	15800	15800
Q3	118	51	147	66	141	45	162	52
Q1	14	8	19	12	14	5	16	8
Q3-Q1	104	43	128	54	128	39	146	44
Std	921	547	984	601	1380	513	1386	522

Table *A.2*: *Descriptive Statistics by Sector*

Paper	**Added Value**	**Employees**	**Fixed Capital**	**Profit Margin**
Median	9418	208	14958	1.7
Mean	52720	578	105853	1.2
Std	297281	2815	614557	12.4
Coke and refined				
Median	62409	435	103922	2.7
Mean	468360	1478	526076	3.7
Std	1077743	2348	1020245	8.3
Other non-metallic				
Median	5179	98	5749	5.8
Mean	44797	466	53982	6.0
Std	256510	2550	430804	16.2
Basic metals				
Median	47839	730	53175	3.8
Mean	152100	1700	152627	4.5
Std	295276	2757	281187	10.0
Electricity and heat				
Median	7349	90	16480	4.8
Mean	117623	627	286498	5.1
Std	456086	2285	1413993	14.2

Table *A.3*: *Descriptive Statistics by Region*

Spain	**Added Value**	**Employees**	**Fixed Capital**	**Profit Margin**
Median	3016	45	4582	4.5
Mean	57465	366	132424	4.6
Std	273521	1956	775999	16.4
Bel-Lux				
Median	33747	272	19397	3.6
Mean	222391	982	193984	5.4
Std	747286	2608	665943	13.9
France				
Median	17071	280	14118	3.6
Mean	70777	704	67721	4.0
Std	197116	1410	218339	10.0
Austria				
Median	53899	250	27609	3.4
Mean	100040	544	92519	1.8
Std	120406	931	213101	13.5
Germany				
Median	21794	257	39866	6.2
Mean	93836	932	171835	6.7
Std	356256	3860	641047	9.6
Netherlands				
Median	52810	351	19368	4.8
Mean	714841	1511	515075	4.6
Std	1289691	3048	1459945	10.5

Table A.3: *Descriptive Statistics by Region (Continued)*

Italy	**Added Value**	**Employees**	**Fixed Capital**	**Profit Margin**
Median	5093	64	7676	2.3
Mean	83174	342	224217	2.8
Std	454308	1445	1370647	10.6
Sweden				
Median	9383	175	20892	7.6
Mean	133803	928	414016	8.6
Std	710499	4091	2628443	16.0
Finland				
Median	8385	83	26024	4.2
Mean	169592	1607	365394	5.0
Std	609475	6361	1383563	10.3
UK-Ireland				
Median	14324	158	24019	3.4
Mean	201657	889	307235	4.1
Std	541003	2624	1098426	20.1
Poland				
Median	3909	195	12468	5.5
Mean	18162	383	174061	5.9
Std	68145	696	724944	12.0

Table A.4: *Allocation Factor – Matched CITL-AMADEUS Sample Compared to the Raw CITL Data*

Germany	**2005**		**2006**		**2007**		**2008**	
	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL
25%	**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	0.9	0.93
Median	**1.10**	**1.10**	**1.11**	**1.11**	1.12	1.15	1.06	1.1
75%	1.34	1.39	1.36	1.41	1.49	1.53	1.29	1.38
Spain	**2005**		**2006**		**2007**		**2008**	
	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL
25%	**0.97**	**0.97**	0.94	0.97	0.91	0.92	0.99	1
Median	**1.07**	**1.07**	1.07	1.11	1.06	1.1	1.21	1.23
75%	1.22	1.25	1.29	1.41	1.28	1.39	1.61	1.66
France	**2005**		**2006**		**2007**		**2008**	
	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL
25%	1.05	1.06	1.01	1.06	1	1.08	0.98	0.93
Median	1.22	1.26	1.22	1.29	1.21	1.35	1.1	1.09
75%	1.41	1.47	1.47	1.55	1.51	1.64	1.33	1.36
UK	**2005**		**2006**		**2007**		**2008**	
	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL
25%	0.77	0.83	0.64	0.83	0.67	0.81	0.59	0.92
Median	0.99	1	1	1.02	0.96	1.06	1.1	1.15
75%	1.36	1.32	1.32	1.34	1.31	1.41	1.4	1.58
Poland	**2005**		**2006**		**2007**		**2008**	
	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL	Amadeus	CITL
25%	1.07	1.08	**1.08**	**1.08**	1.08	1.07	0.98	0.97
Median	1.20	1.21	1.24	1.22	1.25	1.24	**1.08**	**1.08**
75%	1.43	1.47	1.45	1.5	**1.56**	1.51	**1.25**	**1.25**

Appendix B: Robust Regression

This appendix presents the methods developed by Huber (1964) and implemented in Stata by Verardi and Croux (2009)

Let us consider the following regression in matrix notation:

$$Y = X\theta + \varepsilon \quad (1)$$

where Y is the (nx1) vector, X is a (nxp) matrix of independent variables, θ is the (px1) vector of parameter estimates, and ε is the (nx1) vector of error terms.

On the basis of estimation of θ, we can obtain the vector of residuals $r = Y - \hat{Y}$. The typical least-squares estimate is obtained through the following minimization:

$$\hat{\theta}_{LS} = arg\min_{\theta} \sum_{i=1}^{n} r_i^2(\theta) \quad (2)$$

The clear drawback of such estimation is that it gives too much importance to observations with very large residuals, namely outliers. Huber (1964) proposed a class of estimators known as M-estimators in order to preserve robustness with respect to vertical outliers (outlying values for the corresponding error term but not outlying in the space of explanatory variables) and increase Gaussian efficiency. An M-estimator is expressed in the following way:

$$\hat{\theta}_{M} = arg\min_{\theta} \sum_{i=1}^{n} \rho\left(\frac{r_i(\theta)}{\sigma}\right) \quad (3)$$

where $\rho()$ is the convex loss function and σ is the measure of dispersion. To implement this estimation, we use an iterative reweighted least-squares algorithm with weights $w_i = \rho\left(\frac{\frac{r_i}{\theta}}{}\right)/r_i^2$, such that we now have:

$$\hat{\theta}_{M} = arg\min_{\theta} \sum_{i=1}^{n} w_i r_i^2\,(\theta) \quad (4)$$

With this weighted least-squares estimator, the weights w_i are unknown because they are a function of θ. The starting weights are obtained using the initial OLS estimate $\tilde{\theta}$ for θ. The loss function $\rho()$ is a Tukey biweight function:

$$\rho(u) = \begin{cases} 1 - \left[1 - \left(\frac{u}{k}\right)^2\right]^3 \; if \;\; |u| \leq k \\ 1 \; if \;\; |u| > k \end{cases}_1, \tag{5}$$

where *k* is commonly set at 1.547 for the starting value of the algorithm, and then *k* is commonly set at 4.685 for the other steps. To increase both the robustness and the efficiency of the estimation, it is better to have a measure of dispersion of the residuals that is less sensitive to extreme values than σ. A robust dispersion σ_s is chosen, such that:

$$\frac{1}{\mathrm{n}} \sum_{i=1}^{n} \rho\left(\frac{r_i(\theta)}{\sigma_s}\right) = \mathrm{b} \tag{6}$$

where $b = E[\rho(Z)]$ and $Z \sim N(0,1)$ and

$$\hat{\theta}_s = arg \min_{\theta} \hat{\sigma}_s \left(r_1(\theta), \ldots, r_n(\theta)\right) \tag{7}$$

where $r_i(\theta)$ is the robust estimator of scale as defined in (6)

This robust dispersion estimator is then used to obtain the final $\hat{\theta}_{MM}$ estimator:

$$\hat{\theta}_{MM} = arg \min_{\theta} \sum_{i=1}^{n} \rho\left(\frac{r_i(\theta)}{\hat{\sigma}_s}\right). \tag{8}$$

Appendix C: Additional Regressions

Table C.1: *Efficiency of EU ETS: Intra-Sectoral Analysis*

Dependent variable	**Added value**							
	Paper and paper products		Non-metallic minerals		Basic metals		Electricity and heat	
Period	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Impact of EU ETS	-0.03 (0.03)	-0.09** (0.04)	-0.05** (0.02)	-0.2 *** (0.02)	-0.17 (0.16)	-0.14 (0.19)	-0.003 (0.02)	-0.016 (0.016)
Changes in fixed capital	0.03 (0.02)	0.06** (0.02)	0.06** (0.02)	0.06** (0.02)	0.05 (0.05)	0.08 (0.05)	0.16*** (0.02)	0.18*** (0.01)
Changes in employment	0.02 (0.03)	0.019 (0.04)	0.26*** (0.02)	0.28 (0.03)	0.19** (0.06)	0.19*** (0.05)	0.01 (0.02)	0.022 (0.025)
Adj R-squared	0.45	0.41	0.65	0.79	0.43	0.45	0.52	0.55
Dependent variable	**Profit margin**							
	Paper and paper products		Non-metallic minerals		Basic metals		Electricity and heat	
Period	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Impact of EU ETS	1.13 (1.94)	-0.32 (0.51)	-3.05 *** (0.84)	-5.04*** (0.51)	-4.3 (3.28)	-4.88 (5.47)	0.04 (0.42)	1.07** (0.45)
Changes in turnover	7.94*** (0 .42)	7.55*** (0.53)	5.51*** (0.51)	5.53*** (0.51)	2.09*** (0.43)	1.93*** (0.42)	1.31*** (0.45)	1.77*** (0.46)
Changes in employment	-0.48 (0.75)	-0.40 (0.75)	-0.32 (0.69)	-0.47 (0.69)	-1.18 (1.001)	-1.03 (0.95)	-0.7 (0.49)	-0.66 (0.49)
Adj R-squared	0.36	0.38	0.42	0.41	0.33	0.29	0.62	0.7

Dependent variable	**Employment**							
	Paper and paper products		Non-metallic minerals		Basic metals		Electricity and heat	
Period	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Impact of EU ETS	-0.0002 (0.003)	0.006* (0.004)	-0.01** (0.005)	0.005 (0.003)	.00005 (0.007)	0.01** (0.008)	-0.01** (0.004)	-0.002 (0.003)

Changes in employment	0.50*** (0.003)	0.49** * (0.004)	0.5*** (0.003)	0.51*** (0.003)	0.16** * (0.005)	0.18*** (0.007)	0.5***(0.003)	0.51*** (0.004)
Changes in turnover	0.05*** (0.004)	0.06*** (0.006)	0.07*** (0.004)	0.06*** (0.004)	0.008 (0.006)	0.003 (0.007)	0.03*** (0.005)	0.02** (0.005)
Adj R-squared	0.73	0.82	0.52	0.54	0.32	0.29	0.37	0.32
Significance: * at 10%, ** at 5%, and *** at 1%. Standard errors are reported in brackets. Country dummies parameters are not reported. (1)= 2004-2005, 2=2004=2008								

Chapter 2

Unlocking Access to Finance for Small and Medium-Sized Enterprises: A Cross-Country Analysis[16]

2.1 Introduction

The MENAP (Middle East, North Africa, Afghanistan, and Pakistan) and CCA (Caucasus and Central Asia) regions need higher and more inclusive growth to boost incomes and create jobs.[17] The MENAP region has high unemployment, a large expected pool of labor market entrants, and growth has been uneven since the global financial crisis. The CCA region needs to raise medium-term growth rates, which are currently set to drop to less than half of the average growth rate experienced in the early 2000s (IMF, 2018).

An enhanced, private sector-driven growth engine is needed to achieve better outcomes. Small and medium-size enterprises (SMEs) in the MENAP and CCA regions contribute relatively little in terms of output and employment compared to those in other regions. A vibrant SME sector could be a major source of employment and innovation, helping boost productivity, growth, and economic diversification. But, for this to happen, a broad array of structural and

[16] Updated version of co-authored paper with Armand Fouejieu and Tatyana Sydorenko and published as an IMF Working Paper. Presented at a 2019 Bruegel Policy Conference and 2018 Annual Meetings of the World Bank and the IMF. A toolkit was developed on the IMF website based on this paper to allow researchers and policymakers to compare SME financial inclusion across the work and understand the drivers.

[17] The MENAP and CCA regions refer to 31 countries in the Middle East, North Africa, Afghanistan, and Pakistan (MENAP) and in the Caucasus and Central Asia (CCA).

institutional challenges needs to be addressed, including access to finance, which is a major constraint for private sector development in both regions (IMF, 2018; Purfield et al., 2018).

The MENAP and CCA regions lag behind most other regions in terms of the access SMEs have to bank finance.[18] The average share of loans to SMEs in total bank lending in the MENAP and CCA regions is about 7% as of 2018. According to the World Bank Enterprise Survey, a comparatively high percentage of firms in the MENAP region (about 32%) report access to credit as a major constraint (against a world average of 26%). The percentage is lower in the CCA region (18%).

A large body of literature has looked at the role of legal and institutional constraints on bank credit, especially for smaller firms. Beck et al. (2005) and Kuntchev et al. (2014) found that small firms are consistently the most impacted by shortcomings in collateral regimes, red tape, connected lending practices, and high interest rates. Similarly, Beck et al. (2008) pointed to a differentiated impact of property right improvements between firms of different sizes. Cross-country studies such as that by Djankov et al. (2007) have shown that creditor protection and credit registries are important determinants of private credit. Insolvency regimes are often too costly, time-consuming, and inefficient in middle-income countries. Finally, Love et al. (2016) found that introducing collateral registries for movable assets can increase the likelihood that firms will have access to bank financing by 10 percentage points, while also reducing lending rates and increasing loan maturities.

[18] See also "Financial Inclusion of Small and Medium-Sized Enterprises in the Middle East and Central Asia" for a broader discussion (https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2019/02/11/Financial-Inclusion-of-Small-and-Medium-Sized-Enterprises-in-the-Middle-East-and-Central-Asia-46335).

Studies have also shown that economic fundamentals matter for financial inclusion, including for SMEs. Higher incomes and better physical infrastructure increase savings, the pool of funds in the economy, and access to finance (Dabla-Norris et al., 2015a). Allen et al. (2012) showed that education level is also a significant determinant of populations' ownership and usage of accounts in the formal financial system. Macroeconomic instability and financial crises can drastically affect credit and other financial services to SMEs, as banks restore their regulatory capital ratios by curtailing credit, especially to riskier borrowers like SMEs (Rojas-Suarez, 2016). Better governance can help enforce financial contracts for SMEs, which facilitates their access to finance (Rojas-Suarez & Amado, 2014). Informality can also play a role, as Farazi (2014) noted, observing that registered firms are 54% more likely to have a bank account and 32% more likely to have loans.

The structure of the financial sector and level of bank competition also matter for SME access to finance. Love and Martinez-Peria (2015) found a positive impact of increased bank competition on firms' access to credit, and that the impact depends on the coverage of credit bureaus. Beck et al. (2013) studied the impact of the weight of non-banking institutions in the financial system on the usage of financial services by firms of different sizes, focusing in particular on the role of specialized lenders, such as leasing and factoring companies and low-end financial institutions like cooperatives, credit unions, and microfinancial institutions. Their findings indicate that a higher weight of specialized lenders is associated with a higher likelihood of obtaining overdraft facilities or loans for SMEs.

This chapter seeks to inform policymakers by identifying the major constraints to SME financial inclusion using various macroeconomic databases and firm-level data. It takes a comprehensive approach, looking not only at legal and institutional constraints, but also at the

impact of macroeconomic and financial sector indicators, as well the role of the business environment on SME access to finance. The contribution to the literature is two-fold: we compute a novel index of SME access to finance and identify the macroeconomic and institutional constraints that are likely to influence SME access to finance.

Our analysis shows that economic fundamentals and financial sector characteristics, such as macroeconomic stability, limited public sector size (to avoid crowding out SME access to credit), financial sector soundness, a competitive banking system, and, more broadly, a competitive and open economy, are important factors to boost SME access to finance. Other key drivers of SME bank credit include institutional factors, including strong governance and financial regulatory and supervisory capacity; credit information availability; and a supportive business environment, with modern collateral and insolvency frameworks, and legal systems that allow an adequate enforcement of property rights and contracts.

The chapter has three parts. The first presents stylized facts on SME access to finance in the MENAP and CCA regions. The discussion then turns to an analysis of the drivers of SME access to finance, while stressing their comparative relevance for MENAP and CCA countries. The final part then concludes.

2.2 Stylized Facts

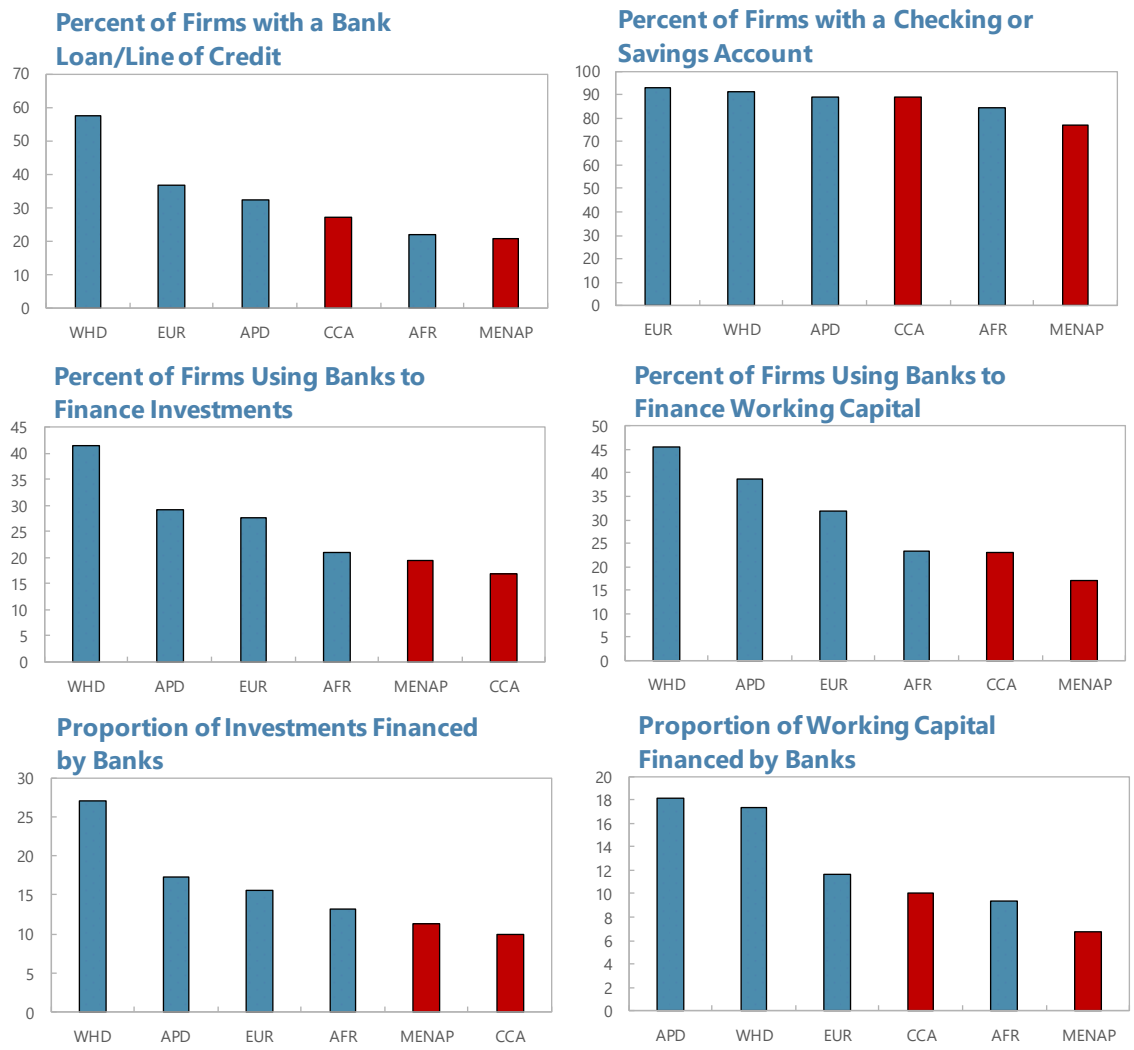
2.2.1 Data

The World Bank Enterprise Survey (WBES) and IMF Financial Access Survey (FAS) are key sources of data on SME financial inclusion. The WBES is a firm-level dataset that covers a range of business environment topics, including access to finance. Coverage is available for both large firms and SMEs and the survey is done about once every four years per country. Firm-level surveys have been conducted since the 1990 by different units within the World Bank and it now

covers 174000 firms for 151 countries. The IMF FAS, launched in 2009, is a supply-side country-level dataset on access and use of financial services by firms and individuals and is updated annually. The dataset covers 189 countries, spanning more than 15 years. However, the FAS has limited data on SME bank lending and only covers seven of the MENAP and CCA countries.

According to the WBES, the MENAP and CCA regions lag behind most other regions in terms of both access and usage of financial services. MENAP and CCA countries score the lowest in the number of firms that use banks to finance investments (16% against a world average of 30%). The MENAP region also has the lowest share of firms with a bank loan and a checking or savings account. The CCA region performs slightly better on these measures, but still lags behind Asia, Europe, and Latin America (Figure 2.1). Both CCA and MENAP countries have the lowest percentage of firms that finance their investment and working capital using banks. Almost 80% of firms in MENAP and CCA use internal funds instead of banks.

Figure 2.1: Access and Usage of Financial Services by Firms



Source: World Bank Enterprise Surveys, 2018 or latest available data.

Note: Regional averages are calculated for all firms in every region (not average of country averages).

WHD= Western Hemisphere Department, APD=Asia and Pacific Department, EUR=Europe, AFR=Africa,

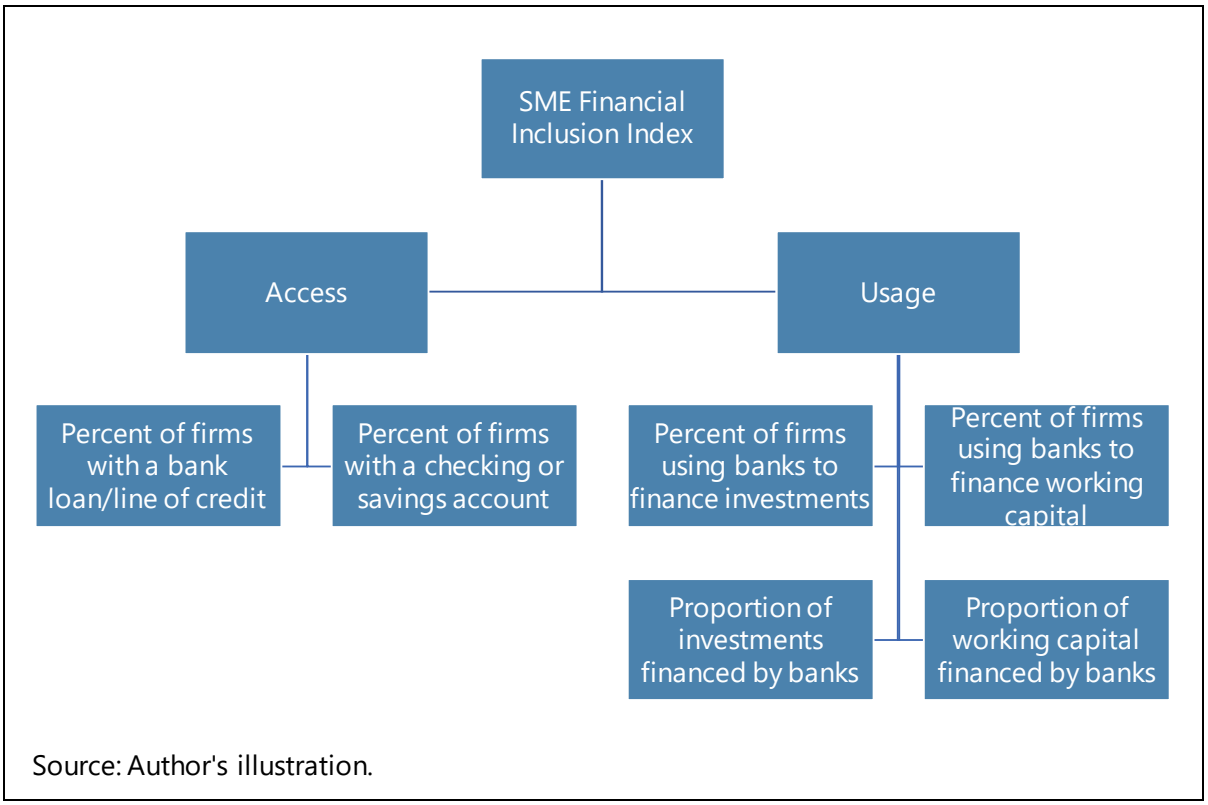
MENAP= Middle East, North Africa, Afghanistan, and Pakistan, CCA=Caucasus and Central Asia

2.2.2 Methodology for the SME Financial Inclusion Index

The SME Financial Inclusion Index is constructed following the methodology of Svirydzenka (2016) and with data from 2006 to 2017. Multidimensional data from the WBES is

reduced into a summary index using the following steps: (i) a normalization of variables; (ii) the aggregation of normalized variables into sub-indices by principal component analysis (PCA), using the first component; and (iii) an aggregation of the sub-indices into the final index. Several choices need to be made in constructing the index. In the WBES, several questions are designed to evaluate financial conditions for firms. From these, the variables most relevant to bank finance conditions were chosen (listed below) and divided into categories of access and usage.

Figure 2.2: SME Financial Inclusion Index



Source: Author's illustration.

Normalization

To normalize the variables, each series is winsorized to prevent extreme values from distorting the 0-1 indicators. Winsorized indicators are then normalized between 0 and 1, using the min-max procedures to facilitate aggregation over variables expressed in different measurement units:

$$I_x = \frac{x - x_{min}}{x_{max} - x_{min}} \quad (2.1)$$

$$I_{xn} = 1 - \frac{x - x_{min}}{x_{max} - x_{min}} \quad (2.2)$$

where x is the underlying raw data and I_{xn} is the transformed continuous 0-1 indicator. The procedure normalizes indicators to have an identical range [0, 1] by subtracting the minimum value and dividing by the range of the indicator values. It relates country performance on an indicator to the global minimum and maximum across all countries and years. Thus, the highest (lowest) value of a given variable across time and countries is equal to 1 (0) and all other values are measured relative to these maximum (minimum) values.

Principal Component Analysis

For the SME financial inclusion index, a principal component analysis (PCA) is used so as not to prejudge the importance of particular indicators in measuring financial inclusion.[19] Sub-indices are constructed as weighted averages of the normalized series, where the weights are squared factor loadings (such that their sum adds up to 1) from a principal component analysis of the underlying series.[20]

The factor loadings on the first principal component are chosen as weights. Given the wide-ranging nature of the exercise, the first principal component can be interpreted to

[19] Principal component analysis groups together individual indicators that are collinear to form a composite indicator that captures as much of the information common to individual indicators as possible. The idea is to account for the highest possible variation in the indicator set using the smallest possible number of factors. As a result, the composite index no longer depends upon the dimensionality of the data set but is rather based on the statistical dimensions of the data.

[20] Factor loadings are coefficients that relate the observed variables to the principal components, or factors. The factor loadings represent the proportion of the total variance of the indicator which is explained by the factor. The series that contributes more to the direction of common variation in the data gets a higher weight. Weighting intervenes only to correct for overlapping information between two or more correlated indicators and is not a measure of the theoretical importance of the associated indicator.

summarize the latent information on the degree of financial inclusion. The first principal component accounts for around 70% of the variance in data.

Aggregation

The aggregation is a weighted sum of the underlying series, where the weights are obtained from the principal component analysis, reflecting the contribution of each underlying series to the variation in the specific sub-index. All of the sub-indices are then re-normalized using equation (2.1) so that the range is between 0 and 1.

$$FI_{(A|U)it} = \sum_{j=1}^{n} w_j I_{ijt} \tag{2.3}$$

where *FI* represents financial access or usage, *I* denotes one of the six indicators that measures financial inclusion (see Figure 2.2), and *w* is the weight associated with *I*. Meanwhile, *i*, *j*, and *t* are country, indicator, and time specific indices, respectively.

Sub-indices are aggregated into higher-level indices.

$$FI = w_A FI_A + w_U FI_U \tag{2.4}$$

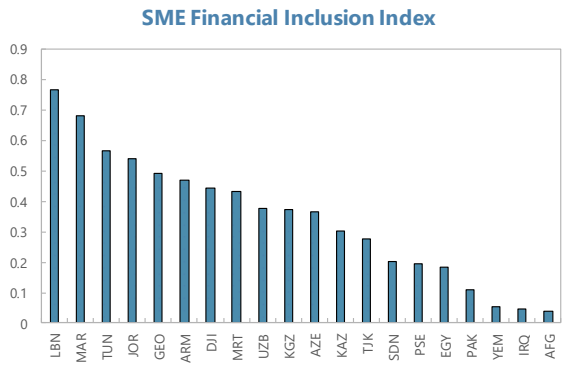
The linear functional form of the aggregator is best suited for data with a significant share of zero or close to zero observations. Linear aggregation assumes full compensability, such that poor performance in some indicators can be compensated for by sufficiently high values in other indicators. In other words, it assumes that the indicators are perfect substitutes.

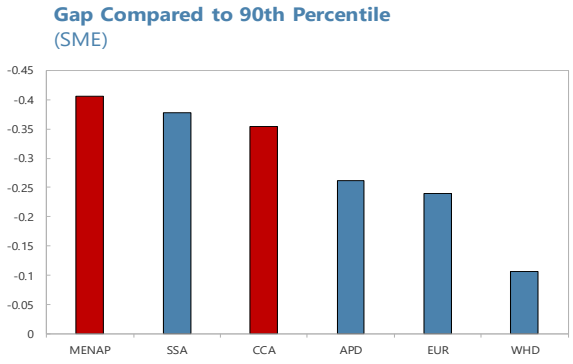
Results

This index is available for 119 countries worldwide, of which 20 are in the MENAP and CCA regions. At the country level, the results suggest that Lebanon, Morocco, and Tunisia have the highest level of SME financial inclusion in the region, while fragile countries like Afghanistan, Iraq, and Yemen have the lowest level of SME financial inclusion. At the regional

level, results suggest that the MENAP region has the lowest level of SME financial inclusion, while the CCA region has the third lowest.

Figure 2.3: The SME Financial Inclusion Index





Source: IMF staff calculations, latest available.

SSA= Sub-Saharan Africa WHD= Western Hemisphere Department, APD=Asia and Pacific Department, EUR=Europe, MENAP= Middle East, North Africa, Afghanistan, and Pakistan, CCA=Caucasus and Central Asia

2.3 Drivers of SME Financial Inclusion

This section discusses and tests the empirical relevance of key determinants of SME financial inclusion in the MENAP and CCA regions. Data limitations constrain this exercise, especially its ability to identify causality. The empirical analysis therefore aims to provide some indication on the correlations between a set of fundamentals and SME financial inclusion.

2.3.1 Empirical Framework

The analysis identifies the main drivers of SME access to formal finance for a sample of around 123 countries (Table 2.9) as described above, and highlights their relevance to MENAP and CCA countries in particular. The estimated equations take the form of:[21]

$$FI_{it} = \alpha + BX_{it} + \lambda regional_{dummy} + \varepsilon_{it} \ , \quad (2.5)$$

$$FI_{it} = \alpha + BX_{it} + \lambda regional_{dummy} + \rho regional_{dummy} * z_{it} + \varphi z_{it} + \varepsilon_{it} \ , \quad (2.6)$$

where the dependent variable *FI* is the SME financial inclusion index defined in the previous section. The baseline specification controls for a set of variables (vector *X*) aims to capture macroeconomic fundamentals relevant to the SME sector. Meanwhile, *i*, and *t* are country and time specific indices, respectively and ε_{it} is the error term. *X* includes:

Total investment (in percentage of GDP) – Increased investment could reflect positive economic perspectives, including for the SME sector, which could increase demand for financing. Investment is expected to be positively correlated with the financial inclusion index.

Inflation rate – High inflation is a key signal of macroeconomic instability, which is associated with higher risk perceptions, lower private sector confidence, and lower credit supply, especially for SMEs (which are generally riskier borrowers than larger firms).

SME share of employment (in total employment) – Measures the size of the SME sector in the economy, capturing to some extent the credit demand from SMEs. The expected effect of this variable on SME financial inclusion is difficult to determine *a priori*. A large and dynamic

[21] The empirical analysis makes use of several third-party indicators that should be considered carefully, including, for example, because they are derived from perception-based data.

SME sector can help diversify banks' assets and therefore attract bank lending. However, the SME sector tends to be larger in developing countries with limited access to finance.

Income-level dummies – These capture various countries' levels of economic development. SME financial inclusion is expected to improve as countries develop further.[22]

Region_dummy – a dummy variable for MENAP or CCA countries. As discussed above, both regions are below the average for emerging and developing countries in terms of SME access to credit.

The baseline specification is expanded to explore the impact of a broader range of macro-financial and institutional factors on SME access to finance (*z*). Furthermore, as described in equation (2.6), an interaction term with the regional dummies is included to assess the relatively importance of these factors for MENAP and CCA countries compared to the full sample average.

The additional variables (z) are classified into four groups: the macroeconomic environment, quality of institutions, financial sector characteristics and regulations, and the business environment.[23]

2.3.2 The Macroeconomic Environment

Diversification – A diversified economy would be favorable to SME development and growth via more investment opportunities, which also imply more risk diversification and potentially improved access to financing. Diversification is proxied by the OECD complexity index. This index is based on how diversified and complex countries' export basket is. Countries

[22] We do not include GDP per capita to reduce risks of collinearity with the other variables in the model.

[23] A larger set of controls were tested. The paper only discusses those found to be the most statistically relevant.

that are home to a great diversity of productive know-how, particularly complex specialized know-how, are able to produce a great diversity of sophisticated products. The economic complexity of a country is calculated based on the diversity of exports a country produces and their ubiquity, or the number of the countries able to produce them (and those countries' complexity). Countries that are able to sustain a diverse range of productive know-how, including sophisticated, unique know-how, are found to be able to produce a wide diversity of goods, including complex products that few other countries can make.

Competition – Competition within and across sectors increases productivity and the efficient allocation of resources, including in the SME sector. Competition is measured by the domestic competition index of the World Economic Forum.

Informality – Economies with large informal sectors tend to face tighter constraints on SME access to formal financial services, due to the lack of traceability of their activities. Informality is proxied by the size of the "shadow economy" (in percentage of GDP). The shadow economy includes all economic activities which are hidden from official authorities for monetary, regulatory, and institutional reasons. The shadow economy indicator is estimated by Medina and Schneider (2018) for 158 countries over the period 1991 to 2015 using the Predictive Mean Matching method, developed by Rubin (1987) and survey-based estimates on the size of the informal economy.

Infrastructure – Availability and quality of infrastructure are key determinants of private investment and development, including for SMEs. The number of fixed telephone lines per 100 inhabitants is used as a proxy for infrastructure.[24]

Public investment (percent of total investment) – This variable is a proxy for the size of the public sector in the economy, which can affect SME access to credit. A large public sector can crowd out private sector activity, including by limiting access to financing. For example, State Owned Enterprises (SOEs) can benefit from regulatory and other competitive advantages, which tend to ease access to bank lending. Large government and SOEs financing needs could therefore reduce the availability of bank credit, especially for SMEs, which are often perceived by banks as riskier. On the other hand, public investment may also be associated with better infrastructure and thus support private sector and SME development.[25]

Oil exporter dummy – The oil sector represents a large share of the economy in certain countries (especially in the MENAP region), which may thus be less diversified on average, with a relatively large public sector that centralizes and controls the natural resource. Bank lending may then be concentrated in the oil sectors and SOEs, leaving SMEs underserved.

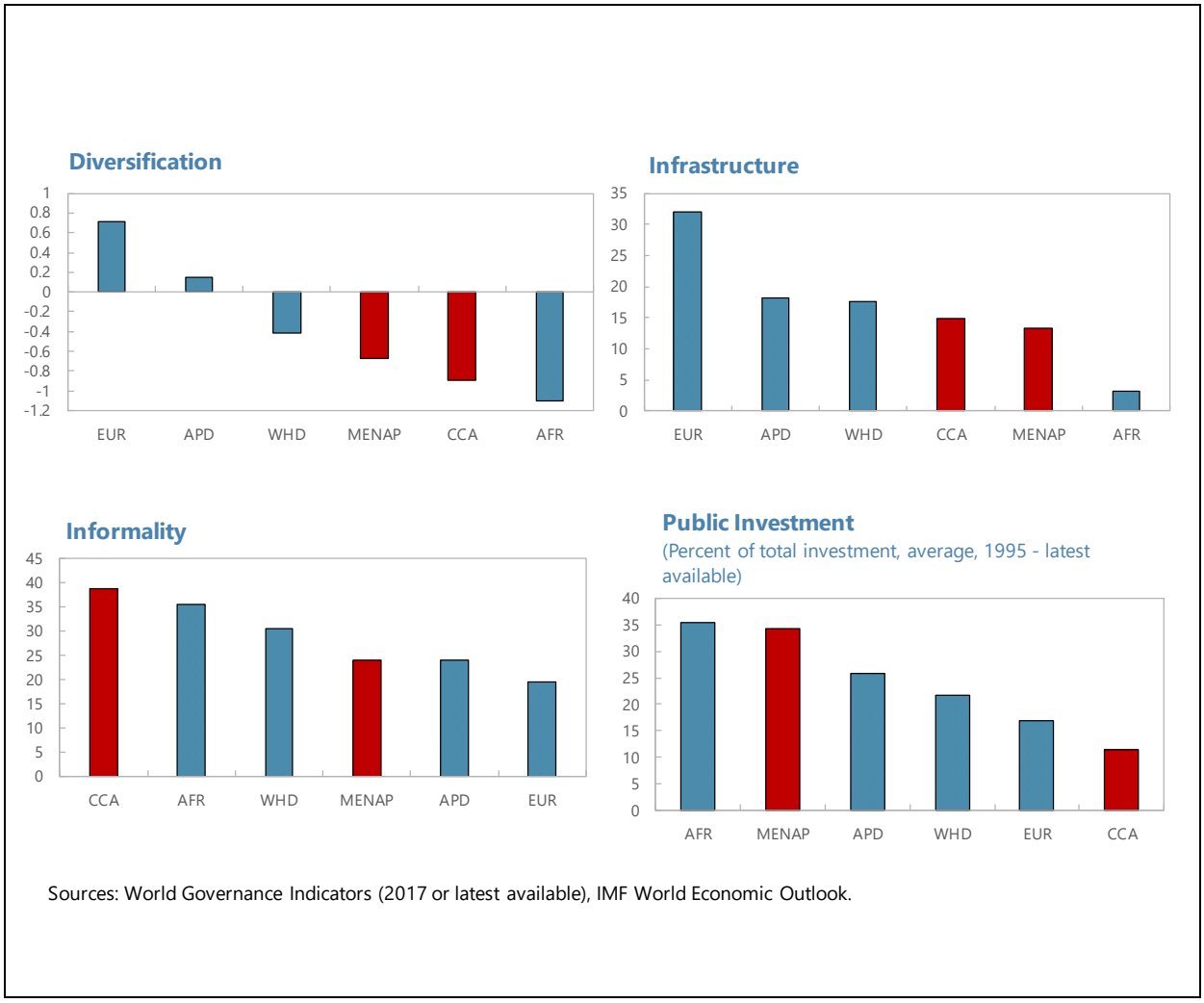
Figure 2.4 suggests that, on average, CCA countries have a larger informal sector compared to others region, while the quality of infrastructure and economic diversification are lower in both MENAP and CCA compared to other regions (except AFR). The size of the public sector is also larger in MENAP countries on average compared to the rest of the sample. Overall,

[24] Mobile phone coverage or degree of the digitalization could be alternative proxies. However, the sample coverage is much more limited.

[25] Other variables that measure the size of the public sector or crowding out, including fiscal balances, were tested but did not show a statistically significant relationship with SME financial inclusion.

we expect diversification, competition, and infrastructure to be positively correlated with SME financial inclusion, while the correlation with informality, public investment, and the oil exporter dummy should be negative.

Figure 2.4: Selected Macroeconomic Indicators



Sources: World Governance Indicators (2017 or latest available), IMF World Economic Outlook.

2.3.3 Quality of Institutions

Strong institutional quality, including good governance and political stability, is a key determinant of private sector development. Transparent institutions support equal treatment and access to services, including bank financing. Indeed, Faccio (2006) finds evidence that large firms tend to be more politically connected in countries with poor institutional quality (low

political regulation and high corruption), and thus benefit from better access to bank financing. Such preferential access to credit may crowd out smaller firms. We assess the relationship between institutions and SME financial inclusion via using data from the Worldwide Governance Indicators (WGI). The WGI is a research dataset summarizing the views on the quality of governance provided by a large number of enterprises, citizen and expert survey respondents in industrial and developing countries (over 200 countries and territories over the period 1996-2020). These data are gathered from a number of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms. The WGI are composite governance indicators based on over 30 underlying data sources. These data sources are rescaled and combined to create the six aggregate indicators, including the below variables, using a statistical methodology known as an unobserved components model.

Voice and accountability – Measures 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 free media.

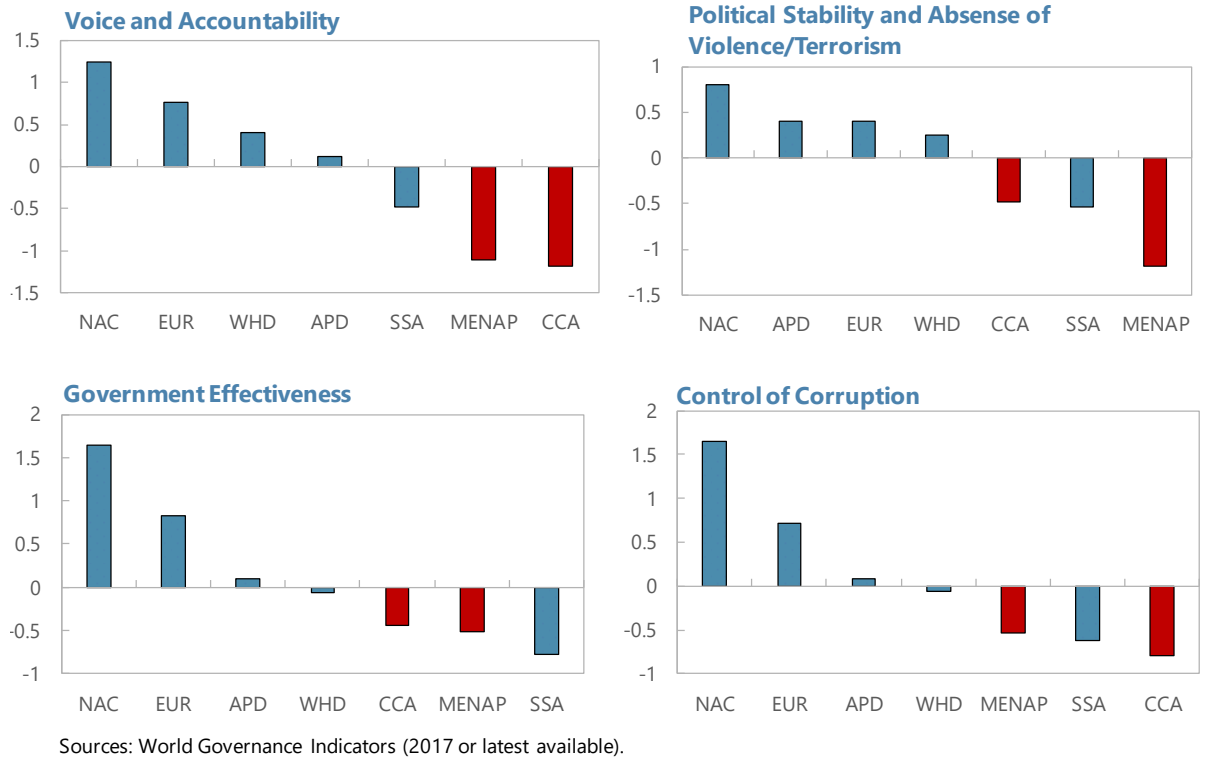
Political stability – Measures the perceived likelihood that a government will be destabilized or overthrown through unconstitutional means, including political violence or terrorism.

Government effectiveness – Measures the quality of public services, the quality of the civil service, and its independence from political pressure, along with the quality of policy formulation, implementation, and the credibility of government commitment to such policy.

Control of corruption – Measures the extent to which public power is exercised for private gain (including both petty and grand forms of corruption), and control of the state by elites and private interests.

While these variables should be positively correlated with SME financial inclusion, we would expect an even stronger correlation for MENAP and CCA. Indeed, countries in both regions lag behind their peers' average in terms of these institutional characteristics. Indeed, as can be seen in Figure 2.5, MENAP and CCA scores are consistently below that of EUR, WHD and APD for all indicators.

Figure 2.5: Selected Institutional Characteristics



Sources: World Governance Indicators (2017 or latest available).

2.3.4 Financial Sector Characteristics and Regulations

Banking sector characteristics and financial regulation can also play an important role for SME access to formal financial services, especially:

Bank profitability – Proxied by bank returns on equity. Increased bank profitability may reduce bank incentives to acquire new and riskier assets, such as SME loans.

Asset quality – Measured by the ratio of non-performing loans (NPLs) to total loans. High NPL ratios could reduce banks' willingness to lend to smaller and riskier borrowers like SMEs.

Bank deposits – Higher reliance on bank deposits provides more stable funding for banks and could facilitate lending to SMEs.

Banking sector stability – A more stable banking system increases confidence and could be associated with higher bank credit, including to SMEs. Banking sector stability is measured by bank Z-score. Bank Z-score, drawn from the Global Financial Development database. The Z-score measures the "distance-to-distress" for banks, reflecting the buffers against earnings shocks.

Bank concentration – Bank concentration could reduce SME access to credit, especially where banks are focused on some specific sectors or market segments.

Financial sector regulation – Banking sector regulation and supervision are critical to monitor and address potential emerging risks and to support financial deepening and inclusion programs. Effective regulation should therefore be associated with a safer financial system, which would benefit SME financial inclusion. The empirical analysis controls for the "capacity of the regulatory agency," the "regulatory and supervisory capacity of deposit-taking activities," and the "regulatory and supervisory capacity for financial inclusion."[26]

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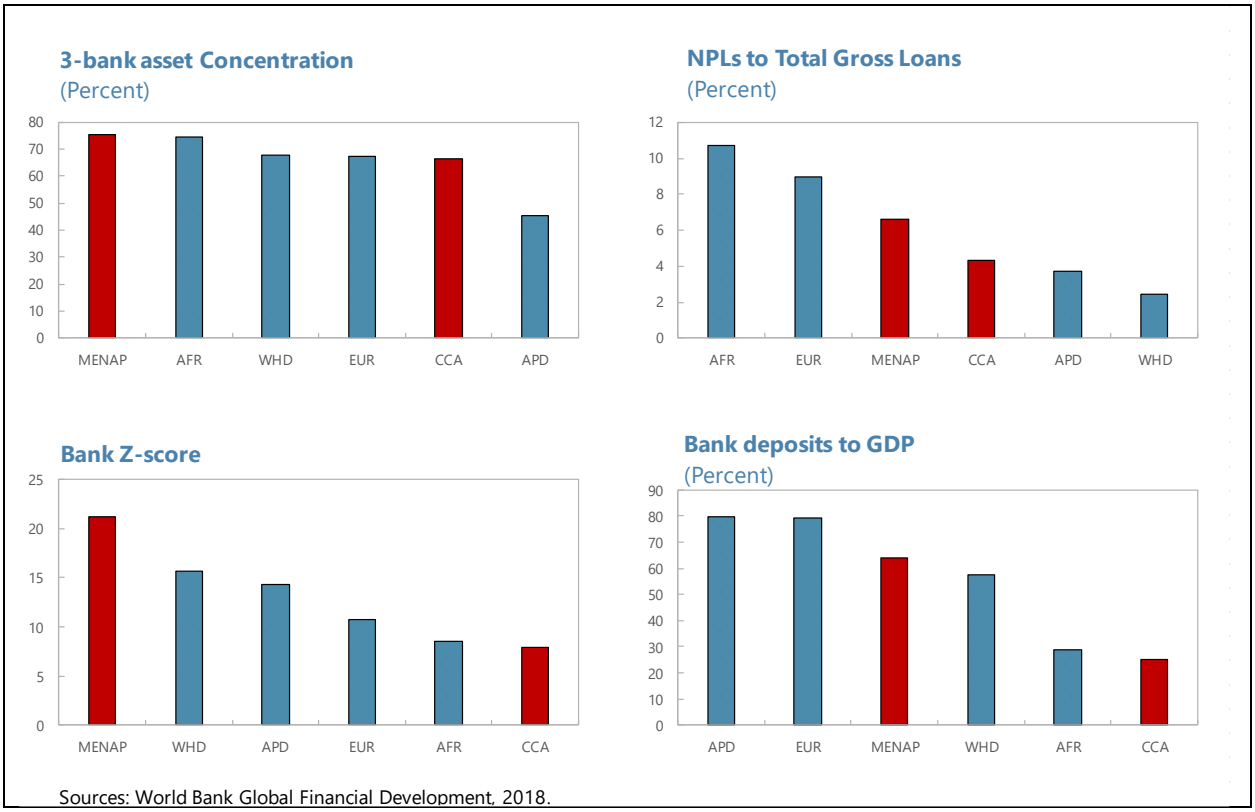
[26] These three indicators capture various aspects of the quality of financial sector regulation for each country. See the Economist Intelligence Unit Global Microscope for further details.

Figure 2.6 suggests that MENAP and CCA countries perform better on average than APD and WHD in terms of assets quality, but lag compared to AFR and EUR. CCA countries lag behind other regions in terms banking sector stability and deposit ratios, while MENAP countries have the most concentrated banking sectors on average.

Figure 2.6: Selected Banking Sector Characteristics



Sources: World Bank Global Financial Development, 2018.

2.3.5 Business Environment

A favorable business environment can contribute to SME growth, reduce incentives for SMEs to remain in the informal sector, and thereby improve SME access to financing. This happens especially through:

Tax burden and *Business start-up cost* – Could reduce investment incentives, hamper a firm's growth, and increase incentives for informality, with negative effect on access to formal

financial services. Tax payments in percentage of firm's profit is used as a proxy for tax burden Business start-up cost is proxied by the cost of business start-up procedures, in percentage of the GNI per capita. Both data are taken from the World Bank Doing Business Report. Taxes and contributions measured include the profit or corporate income tax, social contributions and labor taxes paid by the employer, property taxes, property transfer taxes, dividend tax, capital gains tax, financial transactions tax, waste collection taxes, vehicle and road taxes, and any other small taxes or fees

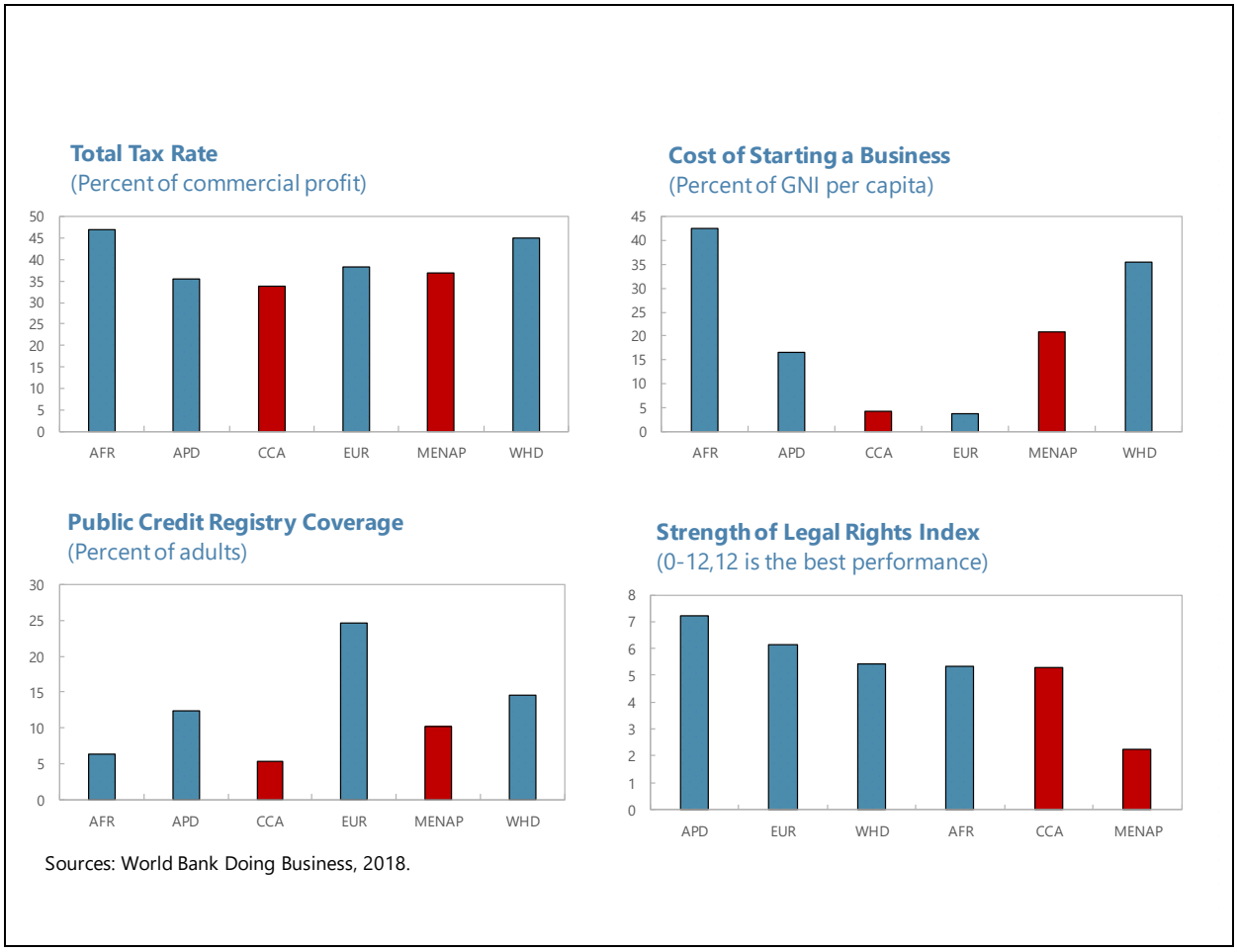
Contract enforcement and *Property rights* – Both allow a greater alienability of assets, which can be sold, transferred, or collateralized more easily. For smaller and riskier firms, this plays an even more important role. Contract enforcement is measured by the number of days required to enforce a contract. We use the property right index from the World Economic Forum.

Property registration cost – In line with the above, a high property registration cost would tend to be negatively correlated with SME access to bank credit, as it may impair collateral availability. The cost to register a property is measured in percentage of the property value.

Credit information – Good and readily available information on borrowers improves access to credit by mitigating moral hazard. It also supports SME financing by reducing collateral requirements and borrowing cost. Credit information is measured by the extent of the credit bureau coverage.

On average, MENA and CCA countries lag behind other regions in terms of the availability of credit information and the strength of legal rights. However, the two regions perform better than their peers in the sphere of business taxation, while MENAP countries on average have higher business start-up costs compared to EUR and APD (Figure 3.7).

Figure 2.7: Selected Business Environment Characteristics



2.4 Results

Equations 2.5 and 2.6 are estimated using OLS fixed effects. Starting with the baseline model (which includes the set of variables *X*), variables *z* and related interaction terms are added one at a time. We follow such a procedure to reduce the risk of multicollinearity, which can be particularly strong in this case, given the large number of control variables and the relatively small sample size. Addressing potential endogeneity bias in this empirical exercise can be difficult, due once again to the large number of controls and challenge of finding relevant instruments. The common GMM approach often used in such circumstances is not efficient here

either, since we have a limited time series (the financial inclusion index is based on the Enterprise Survey, which only covers a few non-consecutive years for each country). Therefore, our analysis should be viewed as an attempt to establish the direction and strength of the relationships between the control variables and SME financial inclusion, and not necessarily to identify causality.

Tables 2.1 through 2.9 provide the regression results and information on the sample.

Table 2.1: *SME Financial Inclusion and Macroeconomic Characteristics – MENA*

	Dependent variable: SME financial inclusion index											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)
Investment (%GDP)	0.005***	0.003	0.003	0.004*	0.002	0.002	0.005***	0.002	0.003	0.004*	0.002	0.004*
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Inflation	-0.007***	-0.004*	-0.006***	-0.003	-0.004	-0.004	-0.007***	-0.004*	-0.006***	-0.003	-0.004	-0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
SME share of employment	-0.001	-0.002	-0.002**	-0.002**	-0.001	-0.001	-0.001	-0.001	-0.002**	-0.002**	-0.001	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MENA	-0.167***	-0.115*	-0.184***	-0.106	-0.143**	-0.147**	-0.155***	-0.078	-0.039	-0.270**	-1.592***	-0.127
	(0.044)	(0.061)	(0.062)	(0.065)	(0.066)	(0.063)	(0.044)	(0.091)	(0.231)	(0.114)	(0.566)	(0.093)
Eco. Diversification		0.086***						0.084***				
		(0.023)						(0.024)				
Informality			-0.005***						-0.005***			
			(0.002)						(0.002)			
Infrastructure				0.007***						0.007***		
				(0.001)						(0.001)		
Eco. Competition					0.067*						0.053	
					(0.039)						(0.040)	
Public investment (% total)						-0.002**						-0.002
						(0.001)						(0.001)
Oil exporters							-0.085**					
							(0.037)					
MENA*Eco. Diversification								0.043				
								(0.076)				
MENA*Informality									-0.005			
									(0.009)			
MENA*Infrastruture										0.026		
										(0.018)		
MENA*Competition											0.351***	
											(0.133)	
MENA*Public investment												-0.002
												(0.002)
Constant	0.431***	0.509***	0.659***	0.388***	0.206	0.572***	0.439***	0.505***	0.657***	0.385***	0.257	0.567***
	(0.055)	(0.081)	(0.076)	(0.063)	(0.175)	(0.075)	(0.055)	(0.081)	(0.077)	(0.064)	(0.176)	(0.076)
Observations	190	121	148	124	124	122	190	121	148	124	124	122
R-squared	0.158	0.250	0.210	0.267	0.099	0.273	0.174	0.252	0.211	0.280	0.123	0.275
Adjusted R-squared	0.140	0.218	0.182	0.236	0.0608	0.242	0.151	0.212	0.178	0.243	0.0784	0.238

Robust standard errors in parentheses. Incone levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.2: *SME Financial Inclusion and Macroeconomic Characteristics – CCA*

	Dependent variable: SME financial inclusion index										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)
Investment (%GDP)	0.005***	0.003	0.004*	0.004**	0.003	0.005**	0.003	0.004*	0.004*	0.003	0.005**
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Inflation	-0.008***	-0.005**	-0.007***	-0.003	-0.005	-0.007***	-0.005**	-0.007***	-0.003	-0.005	-0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
SME share of employment	-0.001*	-0.002	-0.002**	-0.002*	-0.001	-0.003***	-0.002	-0.002**	-0.002*	-0.001	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CCA	-0.078**	0.002	-0.052	-0.128***	-0.071**	-0.014	0.022	-0.426***	-0.062	-0.734***	-0.014
	(0.031)	(0.043)	(0.046)	(0.038)	(0.034)	(0.031)	(0.065)	(0.092)	(0.066)	(0.266)	(0.031)
Eco. Diversification		0.093***					0.093***				
		(0.023)					(0.023)				
Informality			-0.004**					-0.004**			
			(0.002)					(0.002)			
Infrastructure				0.008***					0.008***		
				(0.001)					(0.001)		
Eco. Competition					0.069*					0.067*	
					(0.040)					(0.040)	
Public investment (% total)						-0.002*					-0.002*
						(0.001)					(0.001)
Oil exporters											
CCA*Eco. Diversification							0.022				
							(0.062)				
CCA*Informality								0.010***			
								(0.002)			
CCA*Infrastruture									-0.003		
									(0.004)		
CCA*Competition										0.153**	
										(0.063)	
CCA*Public investment											0.000
											(0.000)
Constant	0.422***	0.482***	0.604***	0.365***	0.174	0.539***	0.482***	0.617***	0.365***	0.182	0.539***
	(0.059)	(0.081)	(0.085)	(0.065)	(0.179)	(0.081)	(0.082)	(0.086)	(0.065)	(0.181)	(0.081)
Observations	190	121	148	124	124	122	121	148	124	124	122
R-squared	0.118	0.227	0.165	0.264	0.068	0.210	0.227	0.171	0.265	0.070	0.210
Adjusted R-squared	0.0989	0.194	0.135	0.233	0.0288	0.176	0.187	0.136	0.227	0.0220	0.176

Robust standard errors in parentheses. Income levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.3: *SME Financial Inclusion and the Financial Sector and Regulatory Characteristics – MENA*

	Dependent variable: SME financial inclusion index														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)	(14)	(15)	(16)
Investment (%GDP)	0.005***	0.005***	0.003	0.003	0.003*	0.007*	0.006*	0.005	0.005***	0.003	0.003	0.003*	0.004	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Inflation	-0.007***	-0.006**	-0.001	-0.010**	-0.007***	-0.003	-0.003	0.000	-0.006**	-0.001	-0.010**	-0.007***	0.003	0.004	0.006
	(0.002)	(0.002)	(0.003)	(0.005)	(0.002)	(0.009)	(0.009)	(0.009)	(0.002)	(0.003)	(0.005)	(0.002)	(0.008)	(0.008)	(0.007)
SME share of employment	-0.001	-0.001*	-0.002**	-0.001	-0.001	0.001	0.001	-0.000	-0.001*	-0.002**	-0.001	-0.001	0.000	0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
MENA	-0.167***	-0.191***	-0.222***	-0.137**	-0.226***	0.019	0.009	-0.064	-0.194*	-0.253***	-0.072	-0.404***	-1.318***	-2.873***	-1.222***
	(0.044)	(0.051)	(0.040)	(0.065)	(0.048)	(0.187)	(0.183)	(0.162)	(0.100)	(0.077)	(0.147)	(0.078)	(0.236)	(0.493)	(0.220)
Bank return on equity		-0.002*							-0.002						
		(0.001)							(0.001)						
Bank deposit (%GDP)			0.005***							0.004***					
			(0.001)							(0.001)					
NPLs (% gross loans)				-0.006*							-0.005				
				(0.003)							(0.003)				
Bank Z-score					0.005**							0.004*			
					(0.002)							(0.002)			
Capacity of regulatory agency						-0.001							-0.001		
						(0.001)							(0.001)		
Reg and Sup capacity for FI							-0.000							-0.000	
							(0.002)							(0.002)	
Reg and Sup capacity of deposit-taking act.								0.003**							0.003**
								(0.001)							(0.001)
MENA*Bank return on equity									0.000						
									(0.005)						
MENA*Bank deposit (%GDP)										0.001					
										(0.001)					
MENA*NPLs (% gross loans)											-0.005				
											(0.009)				
MENA*Bank Z-score												0.009***			
												(0.003)			
MENA*Capacity of regulatory agency													0.016***		
													(0.003)		
MENA*Reg and Sup capacity for FI														0.047***	
														(0.008)	
MENA*Reg and Sup capacity of deposit-taking activities															0.014***
															(0.002)
Constant	0.431***	0.480***	0.330***	0.541***	0.421***	0.428***	0.409***	0.206	0.480***	0.331***	0.532***	0.432***	0.506***	0.475***	0.275**
	(0.055)	(0.063)	(0.061)	(0.085)	(0.064)	(0.139)	(0.128)	(0.140)	(0.063)	(0.062)	(0.089)	(0.065)	(0.141)	(0.125)	(0.127)
Observations	190	159	161	112	160	32	32	32	159	161	112	160	32	32	32
R-squared	0.158	0.165	0.360	0.143	0.192	0.309	0.306	0.420	0.165	0.360	0.145	0.204	0.417	0.409	0.501
Adjusted R-squared	0.140	0.138	0.339	0.103	0.166	0.108	0.104	0.250	0.132	0.335	0.0957	0.173	0.214	0.203	0.327

Robust standard errors in parentheses. Incone levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.4: *SME Financial Inclusion and the Financial Sector and Regulatory Characteristics – CCA*

	Dependent variable: SME financial inclusion index														
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)	(14)	(15)	(16)
Investment (%GDP)	0.005***	0.005***	0.004**	0.003	0.004**	0.007*	0.006*	0.005	0.005***	0.004**	0.003	0.004**	0.007**	0.007*	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)
Inflation	-0.008***	-0.006**	-0.003	-0.011**	-0.008***	-0.004	-0.003	0.000	-0.006**	-0.003	-0.011**	-0.008***	-0.002	-0.002	0.002
	(0.002)	(0.003)	(0.002)	(0.005)	(0.002)	(0.009)	(0.009)	(0.009)	(0.003)	(0.002)	(0.005)	(0.002)	(0.008)	(0.009)	(0.009)
SME share of employment	-0.001*	-0.002*	-0.002**	-0.000	-0.001	0.001	0.001	0.000	-0.002*	-0.002**	-0.000	-0.001	0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
CCA	-0.078**	-0.087***	-0.003	-0.106***	-0.070**	-0.056	-0.039	-0.024	-0.113	-0.034	-0.102**	-0.012	0.158	0.321	0.282
	(0.031)	(0.033)	(0.035)	(0.029)	(0.035)	(0.077)	(0.077)	(0.072)	(0.094)	(0.070)	(0.046)	(0.053)	(0.131)	(0.250)	(0.195)
Bank return on equity		-0.001							-0.001						
		(0.001)							(0.001)						
Bank deposit (%GDP)			0.004***							0.004***					
			(0.001)							(0.001)					
NPLs (% gross loans)				-0.008***							-0.008***				
				(0.003)							(0.003)				
Bank Z-score					0.003							0.003			
					(0.002)							(0.002)			
Capacity of regulatory agency						-0.001							0.001		
						(0.001)							(0.002)		
Reg and Sup capacity for FI							-0.000							0.000	
							(0.002)							(0.002)	
Reg and Sup capacity of deposit-taking act.								0.003**							0.004**
								(0.001)							(0.002)
CCA*Bank return on equity									0.002						
									(0.006)						
CCA*Bank deposit (%GDP)										0.002					
										(0.004)					
CCA*NPLs (% gross loans)											-0.001				
											(0.004)				
CCA*Bank Z-score												0.0007			
												(0.004)			
CCA*Capacity of regulatory agency													0.0005		
													(0.003)		
CCA*Reg and Sup capacity for FI														-0.009	
														(0.007)	
CCA*Reg and Sup capacity of deposit-taking activities															-0.004
															(0.003)
Constant	0.422***	0.460***	0.317***	0.542***	0.420***	0.193	0.424***	0.212	0.460***	0.317***	0.542***	0.420***	0.363**	0.404***	0.175
	(0.059)	(0.068)	(0.066)	(0.086)	(0.067)	(0.136)	(0.131)	(0.138)	(0.068)	(0.066)	(0.086)	(0.067)	(0.175)	(0.134)	(0.144)
Observations	190	159	161	112	160	32	32	32	159	161	112	160	32	32	32
R-squared	0.118	0.111	0.285	0.128	0.117	0.319	0.311	0.416	0.112	0.285	0.128	0.118	0.382	0.341	0.457
Adjusted R-squared	0.0989	0.0824	0.262	0.0871	0.0881	0.120	0.111	0.246	0.0765	0.257	0.0784	0.0834	0.166	0.111	0.268

Robust standard errors in parentheses. Income levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.5: *SME Financial Inclusion and Quality of Institutions – MENA*

	Dependent variable: SME financial inclusion index								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Investment (%GDP)	0.004**	0.005***	0.003**	0.003**	0.003**	0.005***	0.003	0.003**	0.003*
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Inflation	-0.005***	-0.002	-0.003*	-0.003	-0.003*	-0.002	-0.003*	-0.002	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
SME share of employment	-0.001	-0.001*	-0.001	-0.000	-0.001	-0.001*	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MENA	-0.156***	-0.087**	-0.107**	-0.130***	-0.134***	-0.002	-0.001	-0.031	-0.048
	(0.039)	(0.040)	(0.042)	(0.038)	(0.037)	(0.095)	(0.061)	(0.062)	(0.063)
Voice & accountability		0.102***				0.101***			
		(0.020)				(0.020)			
Political stability			0.050**				0.041*		
			(0.021)				(0.022)		
Gov effectiveness				0.131***				0.126***	
				(0.029)				(0.029)	
Control of corruption					0.123***				0.119***
					(0.024)				(0.025)
MENA*Voice & accountability						0.087			
						(0.088)			
MENA*Political stability							0.081**		
							(0.036)		
MENA*Gov effectiveness								0.133*	
								(0.075)	
MENA*Control of corruption									0.120*
									(0.069)
Constant	0.503***	0.424***	0.496***	0.387***	0.458***	0.424***	0.510***	0.386***	0.460***
	(0.064)	(0.060)	(0.063)	(0.062)	(0.056)	(0.060)	(0.065)	(0.063)	(0.056)
Observations	189	184	184	184	184	184	184	184	184
R-squared	0.321	0.392	0.335	0.384	0.406	0.394	0.344	0.390	0.411
Adjusted R-squared	0.294	0.364	0.304	0.356	0.379	0.362	0.310	0.359	0.381

Robust standard errors in parentheses. Incone levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.6: *SME Financial Inclusion and Quality of Institutions – CCA*

	Dependent variable: SME financial inclusion index								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Investment (%GDP)	0.005**	0.005***	0.003*	0.004***	0.003**	0.005***	0.003*	0.004**	0.003**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Inflation	-0.006***	-0.002	-0.003*	-0.003	-0.004**	-0.002	-0.003*	-0.002	-0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
SME share of employment	-0.001	-0.001**	-0.001	-0.001	-0.001	-0.001**	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CCA	-0.081*	0.008	-0.068*	-0.064***	-0.027	-0.043	-0.077	-0.013	-0.058*
	(0.046)	(0.037)	(0.040)	(0.021)	(0.031)	(0.052)	(0.066)	(0.068)	(0.033)
Voice & accountability		0.114***				0.116***			
		(0.019)				(0.020)			
Political stability			0.064***				0.064***		
			(0.019)				(0.019)		
Gov effectiveness				0.152***				0.141***	
				(0.018)				(0.019)	
Control of corruption					0.127***				0.129***
					(0.025)				(0.026)
CCA*Voice & accountability						-0.051			
						(0.043)			
CCA*Political stability							-0.017		
							(0.070)		
CCA*Gov effectiveness								0.138*	
								(0.082)	
CCA*Control of corruption									-0.038
									(0.035)
Constant	0.503***	0.417***	0.496***	0.380***	0.457***	0.416***	0.496***	0.378***	0.457***
	(0.067)	(0.061)	(0.064)	(0.064)	(0.058)	(0.061)	(0.064)	(0.065)	(0.058)
Observations	189	184	184	184	184	184	184	184	184
R-squared	0.288	0.381	0.323	0.363	0.379	0.382	0.323	0.363	0.379
Adjusted R-squared	0.260	0.352	0.292	0.334	0.350	0.350	0.288	0.331	0.347

Robust standard errors in parentheses. Incone levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.7: *SME Financial Inclusion and Business Environment – MENA*

	Dependent variable: SME financial inclusion index												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)	(14)
Investment (%GDP)	0.005***	0.006***	0.005***	0.005***	0.006***	0.006***	0.002	0.005***	0.005***	0.004**	0.005***	0.006***	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Inflation	-0.007***	-0.007***	-0.005***	-0.008***	-0.008***	-0.007***	-0.004	-0.007***	-0.005***	-0.007***	-0.008***	-0.007***	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
SME share of employment	-0.001	-0.001	-0.001	-0.001	-0.002**	-0.001	-0.001	-0.001	-0.001	-0.000	-0.002**	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MENA	-0.167***	-0.163***	-0.176***	-0.190***	-0.148***	-0.152***	-0.147**	-0.259***	-0.177**	-0.365***	-0.047	-0.173***	-0.507
	(0.044)	(0.046)	(0.047)	(0.050)	(0.043)	(0.044)	(0.063)	(0.093)	(0.072)	(0.059)	(0.097)	(0.055)	(0.329)
Total tax rate (%profit)		-0.000*						-0.001**					
		(0.000)						(0.000)					
Cost of business start-up procedures			-0.001***						-0.001***				
			(0.000)						(0.000)				
Cost to register property				-0.011***						-0.013***			
				(0.003)						(0.003)			
Time required to enforce a contract					-0.000*						-0.000		
					(0.000)						(0.000)		
Public credit registry coverage						0.003**						0.003**	
						(0.001)						(0.001)	
Property rights							0.070***						0.062***
							(0.022)						(0.023)
MENA*Total tax rate								0.002					
								(0.002)					
MENA*Cost of business start-up procedures									0.000				
									(0.001)				
MENA*Cost to register property										0.036***			
										(0.011)			
MENA*Time required to enforce a contract											-0.000		
											(0.000)		
MENA*Public credit registry coverage												0.004	
												(0.004)	
MENA*Property rights													0.092
													(0.078)
Constant	0.431***	0.446***	0.444***	0.485***	0.503***	0.392***	0.215**	0.453***	0.444***	0.502***	0.498***	0.391***	0.240**
	(0.055)	(0.056)	(0.053)	(0.055)	(0.077)	(0.055)	(0.108)	(0.058)	(0.054)	(0.057)	(0.077)	(0.055)	(0.111)
Observations	190	182	182	187	182	182	124	182	182	187	182	182	124
R-squared	0.158	0.189	0.252	0.220	0.197	0.211	0.149	0.192	0.252	0.238	0.200	0.212	0.158
Adjusted R-squared	0.140	0.166	0.231	0.198	0.174	0.188	0.113	0.164	0.227	0.213	0.172	0.185	0.115

Robust standard errors in parentheses. Income levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.8: *SME Financial Inclusion and Business Environment – CCA*

	Dependent variable: SME financial inclusion index												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)	(14)
Investment (%GDP)	0.005***	0.006***	0.005***	0.005***	0.006***	0.006***	0.002	0.006***	0.005***	0.005***	0.006***	0.006***	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Inflation	-0.008***	-0.008***	-0.006***	-0.009***	-0.009***	-0.007***	-0.005	-0.008***	-0.006***	-0.009***	-0.009***	-0.007***	-0.005
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
SME share of employment	-0.001*	-0.001*	-0.001	-0.001	-0.002**	-0.001	-0.001	-0.001*	-0.001	-0.001	-0.002**	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CCA	-0.078**	-0.085***	-0.112***	-0.145***	-0.122***	-0.080***	-0.054	-0.084	-0.100***	-0.140***	-0.172*	-0.079**	0.166
	(0.031)	(0.031)	(0.032)	(0.035)	(0.036)	(0.030)	(0.040)	(0.063)	(0.038)	(0.044)	(0.104)	(0.037)	(0.206)
Total tax rate (%profit)		-0.000						-0.000					
		(0.000)						(0.000)					
Cost of business start-up procedures			-0.001***						-0.001***				
			(0.000)						(0.000)				
Cost to register property				-0.012***						-0.012***			
				(0.003)						(0.003)			
Time required to enforce a contract					-0.000**						-0.000**		
					(0.000)						(0.000)		
Public credit registry coverage						0.003**						0.003**	
						(0.001)						(0.001)	
Property rights							0.069***						0.071***
							(0.022)						(0.022)
CCA*Total tax rate								-0.000					
								(0.001)					
CCA*Cost of business start-up procedures									-0.002				
									(0.002)				
CCA*Cost to register property										-0.006			
										(0.012)			
CCA*Time required to enforce a contract											0.000		
											(0.000)		
CCA*Public credit registry coverage												-0.000	
												(0.003)	
CCA*Property rights													-0.058
													(0.054)
Constant	0.422***	0.437***	0.437***	0.476***	0.524***	0.385***	0.198*	0.437***	0.437***	0.476***	0.524***	0.385***	0.193*
	(0.059)	(0.061)	(0.057)	(0.060)	(0.082)	(0.058)	(0.111)	(0.061)	(0.058)	(0.061)	(0.082)	(0.058)	(0.112)
Observations	190	182	182	187	182	182	124	182	182	187	182	182	124
R-squared	0.118	0.153	0.214	0.178	0.174	0.179	0.114	0.153	0.214	0.178	0.174	0.179	0.115
Adjusted R-squared	0.0989	0.129	0.191	0.155	0.151	0.156	0.0762	0.124	0.187	0.151	0.146	0.151	0.0696

Robust standard errors in parentheses. Income levels dummies included but not reported. ***, **, * indicate statistical significance at 10, 5, and 1 percent levels, respectively.

Table 2.9: *Sample*

Afghanistan	Croatia	Lebanon	Sierra Leone
Albania	Czech Republic	Lesotho	Slovak Republic
Angola	Djibouti	Lithuania	Slovenia
Antigua and Barbuda	Dominica	Madagascar	Solomon Islands
Argentina	Dominican Republic	Malawi	South Africa
Armenia	Ecuador	Malaysia	Sri Lanka
Azerbaijan	Egypt, Arab Rep.	Mali	St. Kitts and Nevis
Bahamas, The	El Salvador	Mauritania	St. Lucia
Bangladesh	Eritrea	Mauritius	St. Vincent and the Grenadines
Barbados	Estonia	Mexico	Sudan
Belarus	Ethiopia	Moldova	Suriname
Belize	Fiji	Mongolia	Swaziland
Benin	Gabon	Montenegro	Tajikistan
Bhutan	Gambia, The	Morocco	Tanzania
Bolivia	Georgia	Mozambique	Thailand
Bosnia and Herzegovina	Ghana	Myanmar	Timor-Leste
Botswana	Grenada	Namibia	Togo
Brazil	Guatemala	Nepal	Tunisia
Bulgaria	Guinea	Nicaragua	Turkey
Burkina Faso	Guinea-Bissau	Niger	Turkmenistan
Burundi	Guyana	Nigeria	Uganda
Cambodia	Honduras	Pakistan	Ukraine
Cameroon	Hungary	Panama	Uruguay
Central African Republic	India	Paraguay	Uzbekistan
Chad	Indonesia	Peru	Vanuatu
Chile	Israel	Philippines	Venezuela, RB
China	Jamaica	Poland	Vietnam
Colombia	Jordan	Romania	West Bank and Gaza
Congo, Dem. Rep.	Kazakhstan	Russian Federation	Yemen, Rep.
Congo, Rep.	Kenya	Rwanda	Zambia
Costa Rica	Kyrgyz Republic	Senegal	Zimbabwe
Cote d'Ivoire	Latvia	Serbia	

In most specifications, coefficients associated to the variables in the baseline model are statistically significant with the expected sign. Public Investment is found to be positively correlated with SME financial inclusion, while negatively correlated with inflation. As discussed, increased investment could signal positive economic outlook, which may also benefit SMEs and thereby increase both demand and supply of credit, while higher inflation would have the opposite effect, as it signals increased macroeconomic instability. The latter relationship appears to be slightly stronger for CCA countries. The share of employment in the SME sector is negatively correlated with SME access to finance. This negative relationship likely reflects the fact that low-income countries often have a larger SME sector, which is also more financially constrained. The relationships between the MENAP and CCA dummies show negative correlations, suggesting that, on average, SMEs in both regions are more constrained in terms of access to formal financial services. This is in line with the discussion in section two, which provided some statistical evidence. Estimates on income-level dummies suggest that SMEs financial inclusion tends to increase with economic development.

The results point to a strong positive and statistically significant correlation between economic competition, diversification, and SME financial inclusion. Furthermore, the relationship with competition is significantly stronger for MENAP and CCA countries compared to the sample average, highlighting the key role of competition in both regions where a significant share of economic activity is often concentrated in the public sector and a limited number of large firms. The regression results also confirm the positive relationship between infrastructure and SME access to finance. Conversely, the negative coefficients associated with informality and the share of public investment suggest that in countries with large informal sector, SMEs tend to have less access to credit. We also find that a large public sector is

associated with lower SME financial inclusion. Elasticity estimates suggest that a 1% increase in public investment may lead to a 0.7% decline in SME financial inclusion (against a 0.2% decline for emerging markets and developing countries, on average). As discussed above, this could be due to a crowding out effect on the private sector. Oil exporting countries are found on average to have a lower degree of SME financial inclusion. This could be due to lower economic diversification and a larger public sector, among other factors.

We find that institutions play a key role in SME financial inclusion. The positive correlation between government effectiveness, control of corruption, and SME financial inclusion is stronger for the MENAP and CCA regions (the estimated coefficients are almost two times larger for MENAP relative to the sample average). The relationship between political stability and SME access to credit is also positive in general, but more relevant for MENAP countries and CCA. Finally, voice and accountability are positively correlated with SME financial inclusion, with a stronger relationship for CCA. Overall, the estimated coefficients associated to institutional variables are larger compared to those associated with most other variables in the model, suggesting that improvements to the quality of institutions can have a relatively large impact on SME access to finance.

Financial sector characteristics also affect access to finance for SMEs. We find a positive correlation between banking sector stability (bank *z*-score) and SME financial inclusion. A higher bank deposits ratio is associated with increased SME access to formal finance. This may be due to improved bank soundness (as banks rely more on core funding) but also to higher available resources for the lending activity. Conversely, we find that bank profitability tends to be associated with lower financing for SMEs. As discussed, this may be linked to banks' reluctance to lend to generally riskier SME borrowers if they are already highly profitable. The

NPL ratio is also negatively correlated with SME financial inclusion, suggesting that lower asset quality in banks would further restrict SME access to credit. Importantly, we show that an effective regulatory and supervisory framework can contribute to improve SME financial inclusion. Therefore, regulatory capacity is associated with improved SME access to finance.

Our results also highlight the importance of the business environment for SME financial inclusion. We show that a restrictive tax system, costs for contract enforcement, property registry costs, and cost of business start-up procedures, are negatively correlated with SME financial inclusion. Such negative relationships could emerge through lower investment incentives and higher incentives for small businesses to operate informally (if the cost of "formalizing" a business is too high). On the contrary, property rights and the availability of credit information would have a favorable effect on SME access to finance. Both help reduce uncertainties by easing the availability of collateral and access to information on the borrower.[27]

2.5 Conclusion

The MENAP and CCA countries are making efforts to support SME development. SMEs can play a significant role in delivering higher and more inclusive growth to meet the needs of a young and growing population. To achieve this outcome, increasing SME access to finance can be essential, as it is currently the lowest in the world in these two subregions, due largely to weak domestic fundamentals and the need to strengthen legal and credit infrastructures.

A comprehensive approach can catalyze SME access to finance in these countries. Reform strategies should be customized to each country's specific circumstances. However,

[27] The effects are not significant at standard statistical levels. This may be due to limited data availability.

based on the empirical analysis, some key principles can guide policymakers, including prioritizing the need for: (i) a sound macroeconomic environment, in particular economic competition and macroeconomic stability; (ii) better institutional quality, including improved governance; (iii) financial sector soundness, including through strong supervisory and regulatory frameworks and competition; and (iv) an enabling business environment that cuts across legal, regulatory, and tax issues.

Policymakers should also be aware that higher financial inclusion could be associated with lower safety buffers for banks. To counteract this, additional steps may be needed to guarantee financial stability, and future research should look more carefully into the tradeoff between financial stability and financial inclusion. Future research could also look at the role of demand versus supply factors in explaining the low levels of SME financial inclusion.

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Chapter 3

Financial Inclusion in the MENA (Middle East and North Africa) Region[28]

3.1 Introduction

Financial inclusion, defined as the access to and use of formal financial services, is taking higher policy priority in many countries across the MENA (Middle East and North Africa) region as countries face formidable challenges to stronger and more inclusive growth and a more vibrant private sector. Governments across MENA have placed financial inclusion at the center of growth and jobs strategies to meet the needs of their populations. Authorities have therefore initiated policy interventions and schemes to support financial inclusion.[29]

This chapter documents the level of financial inclusion of firms and households in MENA economies compared to peer economies and highlights the macroeconomic relevance of ensuring that households and businesses in MENA economies can access appropriate, affordable, and timely financial products and services. It also assesses the impact of fintech, macroeconomic and institutional developments in reaching layers of the population that are still marginalized. Finally, it reviews government public interventions—in particular, during the COVID-19 pandemic—and provides recommendations on how to accelerate progress on financial inclusion. Its focus is primarily on the macroeconomic and policy aspects of financial

[28] Updated version of a chapter in the following book by the IMF "Promoting Inclusive Growth in a Post-Pandemic World: Challenges and Opportunities for the Middle East and North Africa, co-authored with Adolfo Barajas, with a preface by Thomas Piketty and Kristalina Georgieva.

[29] MENA includes the following countries: Algeria, Bahrain, Djibouti, Egypt, Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Yemen, UAE.

inclusion, and not all issues relevant to financing are covered. Islamic finance, correspondent banking relationships (CBRs), leasing and factoring, microfinance, and informal finance are not addressed in depth, either because of data limitations (e.g, informal finance) or because their macroeconomic relevance is less pronounced, or they are separately subject to in-depth analytical and policy work (e.g Islamic finance).

This paper finds that the financial inclusion of households and SMEs (Small and medium-size enterprises) in the MENA (Middle East and North Africa) region lags behind that of other regions. The percentage of adults with an account in a formal financial institution –often referred to as the share of the "banked population" – is similar to that of the CCA (Caucasus and Central Asia) region but lower than in other regions, with the exception of SSA (Sub-Saharan Africa). The average share of SMEs in total bank lending in MENA countries is only about 9%, the lowest in the world.

This paper highlights the macroeconomic relevance of financial inclusion in the MENA region and offers policy recommendations to expand financial inclusion. The contribution to the literature is two-fold: we document the level of financial inclusion for households and SMEs in in the MENA region and offers a comprehensive review of policies that are most likely to influence access to finance for these two groups. Second, we provide a comprehensive review of government interventions to reduce the financial inclusion gap of SMEs and households, particularly in the aftermath of the Covid-19 crisis.

The chapter has five parts. The first section presents the state of financial inclusion for households and SMEs in the MENA region. The second section then discusses the macroeconomic benefits from increasing access to finance. The third section builds on empirical analyses (Barajas and others, 2020; Fouejieu and others, 2020) to identify key policies to

increase access to and use of finance, and it then reviews the role that fintech can play. The fourth section takes stock of existing efforts in the MENA region to support financial inclusion and the final section concludes.

3.2 The State of Financial Inclusion in the MENA Region

3.2.1 Lagging Overall Financial Inclusion, with Progress for Account Ownership

Households

Based on the most recent data from the Global Findex Survey, the percentage of adults in MENA countries with an account in a formal financial institution—commonly referred to as the share of the "banked population"—stood at 43 percent in 2017, compared with 52 percent for countries in Latin America and Caribbean (LAC), 53 percent for Emerging and Developing Asia countries (EDA), and 68 percent for Emerging and Developing Europe countries (EDE) (Figure 3.1, Panel 1). [30] On the other hand, this share is similar to that of Caucasus and Central Asia (CCA) countries, and substantially greater than the 30 percent level registered in Sub-Saharan Africa (SSA) countries.

A similar pattern is visible for the percentage of adults who have either borrowed from a formal financial institution or who have used a credit card: at 14 percent, this is also well below the levels of LAC, and EDE, while comparable to CCA and EDA and above that of SSA countries (Figure 3.1, panel 1). Furthermore, while about half of adult men are banked in MENA

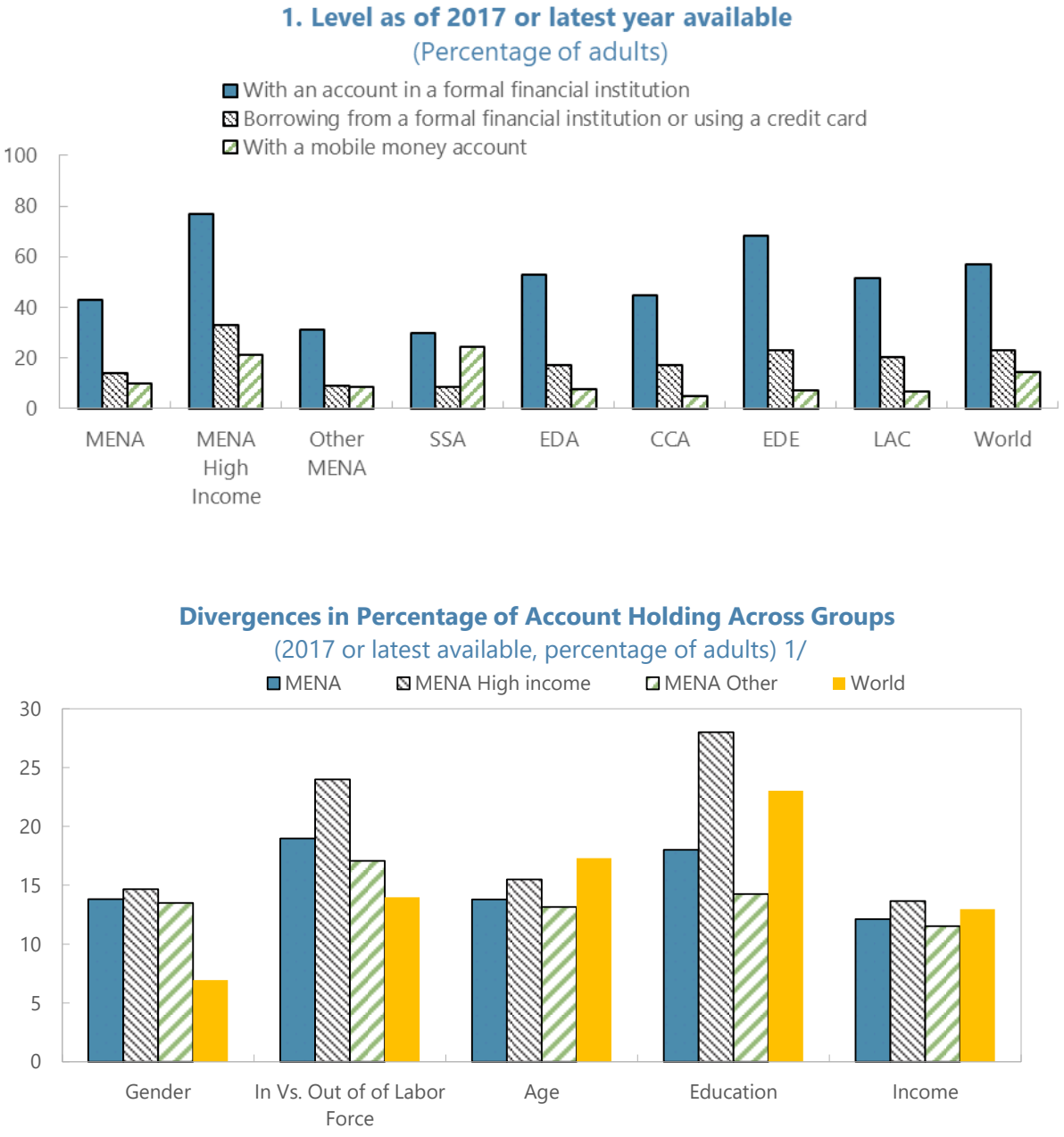
[30] The Global Findex is a worldwide survey of the use of financial services covering over 150,000 adults across more than 140 countries. So far, there have been three rounds of the survey: in 2011, 2014, and 2017. See Demirguc-Kunt et al. (2017) for details.

countries, only 37% of women are (Figure 3.1, panel 2). This divergence, of about 14 percentage points, is double the world average.

There are also stark differences between two groups of countries within MENA. The high-income MENA countries have levels of account ownership and borrowing—77 and 33 percent, respectively—that exceed those in EDE, while in the other MENA countries, account ownership and borrowing are lower than in all regions except SSA. However, it is the high-income group that tends to display greater divergences in account holding according to age, income, work force participation and, particularly, to level of education. In high-income MENA countries, an adult with at least a secondary education is 28 percentage points more likely to be banked than one with at most a primary education, compared to a 14-percentage point divergence in other MENA countries, and 23 points for the world as a whole, (Figure 3.1, Panel 2).

In recent years, MENA countries have shown progress in boosting account ownership but not so in use of credit by households. Between 2011 and 2017, account ownership increased by an average of 9 percentage points for MENA countries, while credit by households only increased in the high-income MENA countries (Figure 3.2, Panel 1). The reasons for being "unbanked" largely mirror those in the rest of the world: the most common responses in the Global Findex Survey referred to not having sufficient funds (65 percent), to services being too expensive (28 percent) and to other family members having an account (26 percent), as in the rest of the world (Figure 3.2, Panel 2).

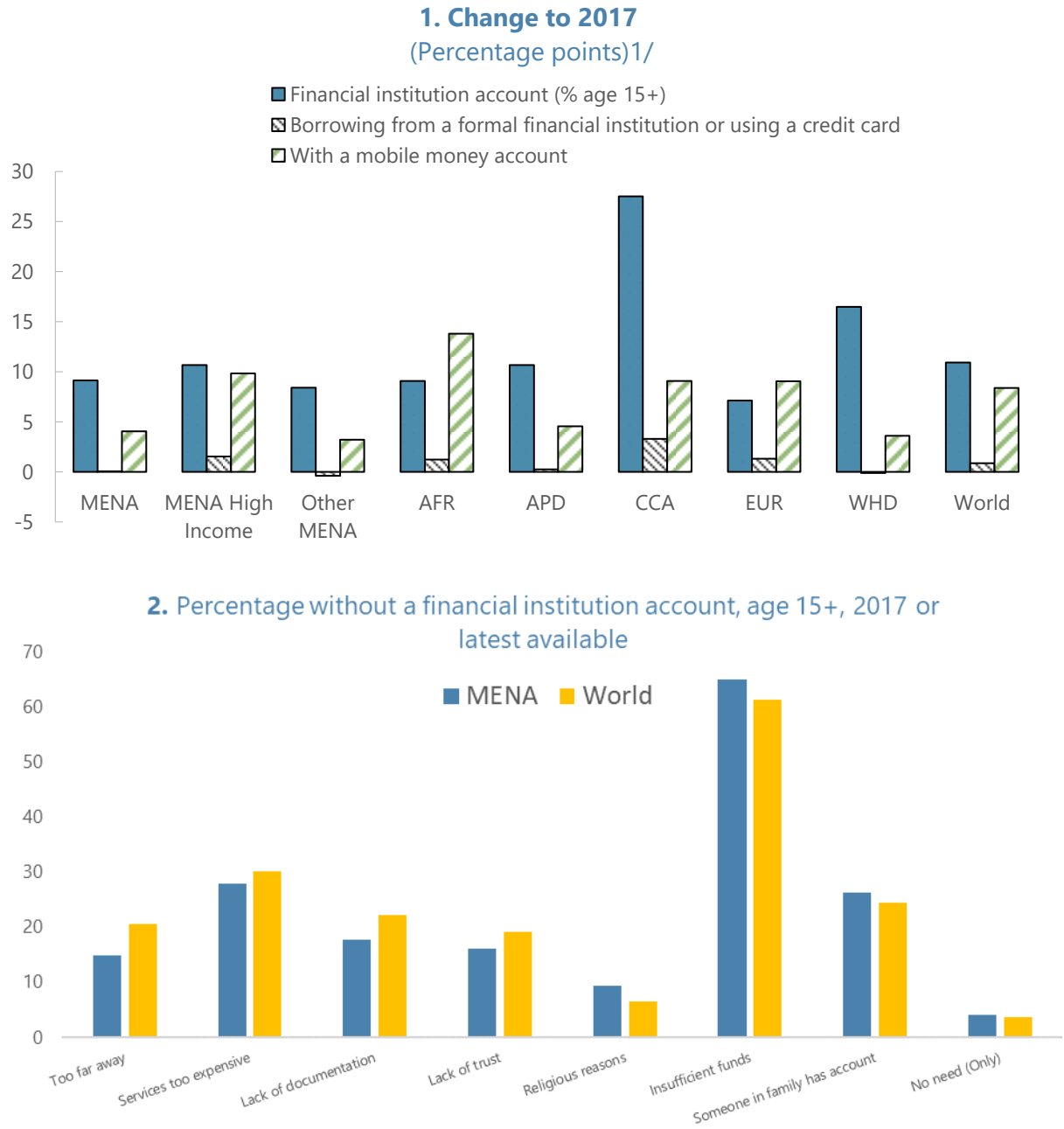
Figure 3.1: Financial Inclusion of Households



Source: Global Findex and authors' calculations

Note: MENA High Income refers to GCC countries, while MENA Other refers to MENA countries that are not part of the GCC. 1/ The figure shows the differences in financial inclusion of adults between: (i) males and females; (ii) those in vs. outside the work force; (iii) old vs. young; (iv) those with at least a secondary education vs. those with at most a primary education; and (v) the richest 60% vs. the poorest 40%.

Figure 3.2: Household Financial Inclusion



Source: Global Findex and authors' calculations.

Note: MENA High Income refers to GCC countries, while Other MENA refers to MENA countries that are not part of the GCC.

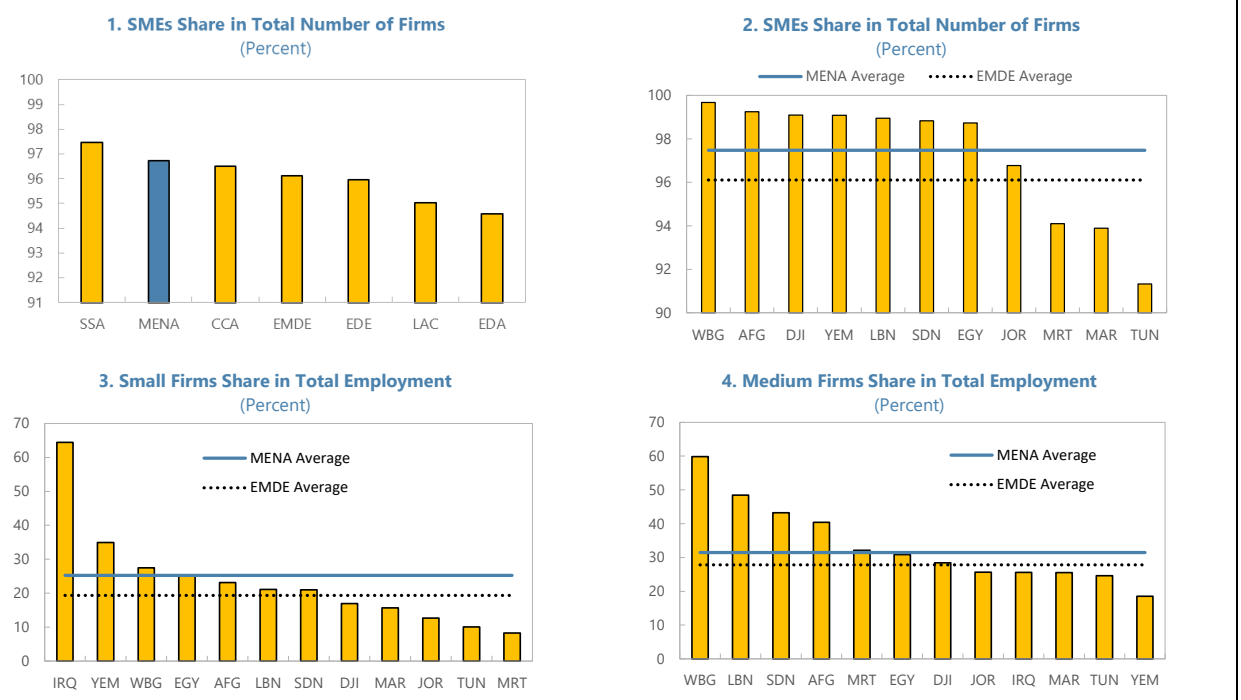
1/ The change from 2011 to 2017 is shown for the percentage of adults with an account in a formal financial institution. For the other two indicators, the change from 2014 to 2017 is shown.

SMEs

SMEs (firms with fewer than 100 employees) represent about 97 percent of all registered companies in MENA and employ more than half of the total labor force, broadly in line with the world averages as illustrated in the four charts of Figure 4.3. These charts show the share of SMEs in total number of firms and in total employment in the MENA region and individual countries compared to other regions, using the World Bank Enterprise Survey (WBES). The WBES is a firm-level dataset of a representative sample of an economy's private sector. The surveys cover a broad range of business environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures.[31] A relatively large share of SMEs in the region are active in the informal sector, meaning that they do not report their earnings to tax administrations, register with statistical offices, produce financial statements, and/or affiliate to social security.

[31] Coverage is available for both large firms and SMEs, and the survey is done about every four years in each country. Firm-level surveys have been conducted since the 1990 by different units within the World Bank.

Figure 3.3: Importance of SMEs



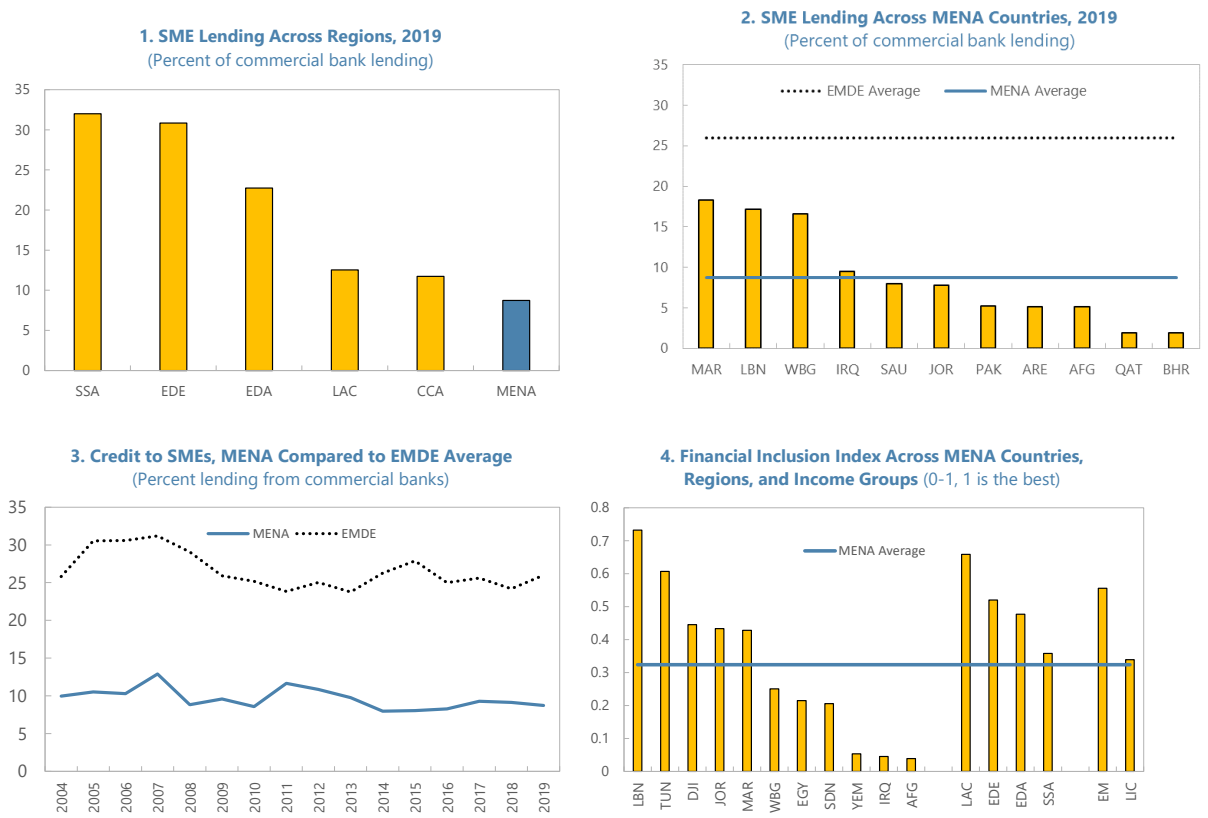
Sources: World Bank Enterprise Surveys, latest available data.
SME = small and medium-sized enterprises.

The MENA region lags behind other regions in terms of SME access to financing through the banking system. According to the IMF Financial Access Survey (FAS), the average share of SME bank lending relative to total bank lending in the MENA region is only about 9%, the lowest in the world (Figure 4.4, panel 1).[32] However, there are some differences between the countries in the region. The share of SME bank lending is as low as 1.9% in Bahrain compared

[32] The FAS is a survey of providers of formal financial services spanning member countries of the IMF.

to 18% in Morocco (Figure 3.4, panel 2). The average share of SME bank lending has also stagnated over the last 15 years in the MENA region (Figure 3.4, panel 3).

Figure 3.4: SME Financial Inclusion in the MENA Region



Sources: IMF Financial Access Survey, World Bank Enterprise Surveys, National Authorities, and IMF staff estimates.

Note: The average for EMDEs rather than that of the World is used due to lack of country coverage on advanced economies for the financial inclusion index.

Similarly, we use firm-level data from the World Bank Enterprise Survey (WBES; Fouejieu et al., 2020) to construct a composite index that captures both the access to and usage of financial services by SMEs. The SME financial inclusion index is constructed with principal component analysis and data on: (i) access to finance, including percentage of SMEs with a bank loan/line of credit and percentage of SMEs with a checking/savings account; (ii) usage of

finance, meaning the percent of SMEs using banks to finance their investments, the percent of SMEs using banks to finance working capital, the proportion of SME investments financed by banks, and the proportion of SME working capital financed by banks.

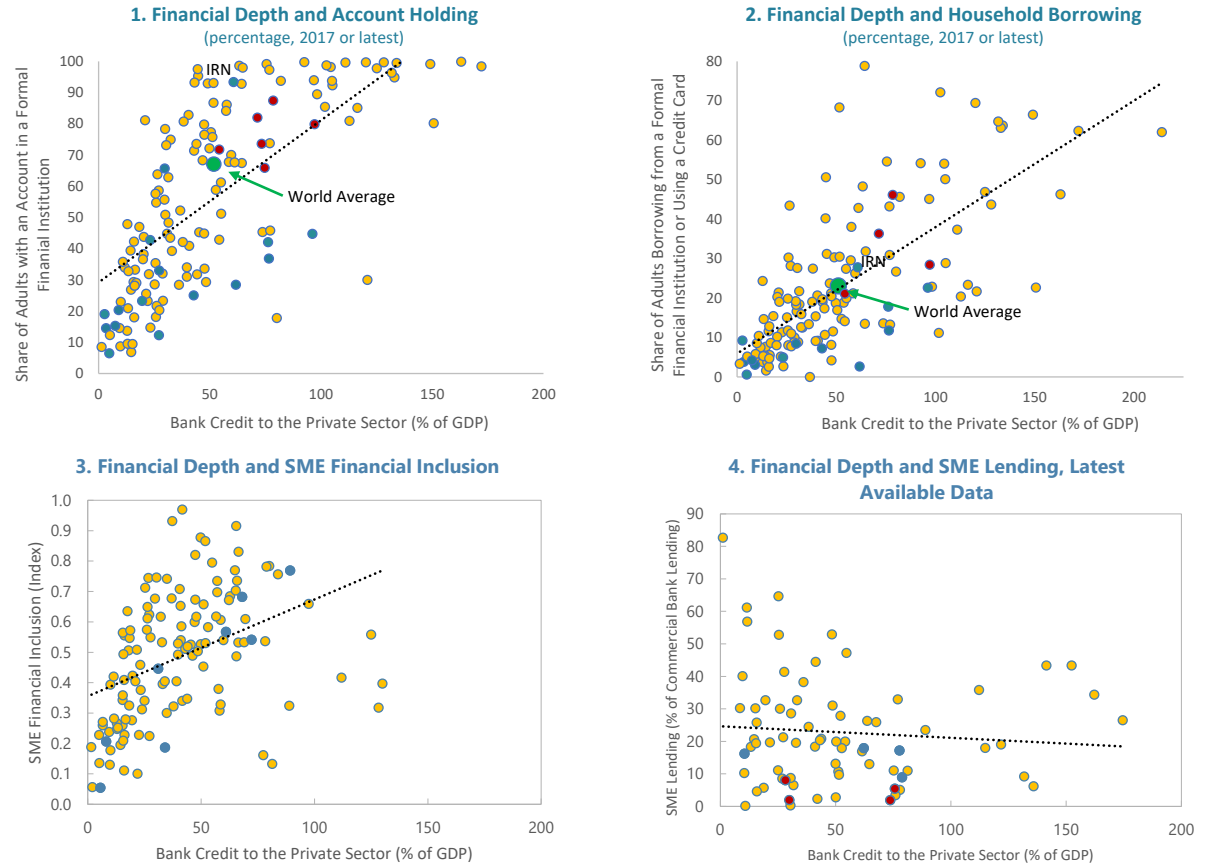
We find that the MENA countries lag behind the rest of the world in terms of SME financial inclusion (Figure 3.4, panel 4). Within MENA, fragile states like Afghanistan, Yemen, and Iraq have the lowest level of SME financial inclusion, while emerging market countries such as Tunisian and Lebanon have the highest levels of SME financial inclusion.

Lastly, it is important to point out that, unlike for household financial inclusion, there is no clear divide between high-income countries and other countries for SME financial inclusion. In fact, GCC countries that have the highest income have the lowest share of SME bank lending relative to total bank lending in the MENA region. Several institutional constraints may help explain low access to finance for SMEs in the GCC region. GCC Nationals are less willing to join SMEs where wages are less certain than government jobs. Furthermore, stringent regulations (criminalization of loan defaults) have led some expatriate SME owners to flee the region rather than resolve their debts. GCC banks—many of which are state-owned and serve large companies—enjoy stable interest margins thanks to their good ratings and largely stable and cheap deposits. As a result, banks are less interested in SME lending. While most GCC countries now have bankruptcy laws, these are either recent (the UAE adopted its law in 2017 and Saudi Arabia in 2018) or have not been tested in courts, which has prevented loan workouts, with banks recovering only 30 to 40 percent on defaulted loans compared to an average of 72 percent for advanced economies (World Bank Doing Business Guide, 2018).

3.2.2 Weaker Relationship Between Financial Depth and Financial Inclusion in MENA Countries

There is an expected positive relationship between financial depth – the amount of funds mobilized and intermediated by the domestic financial system – and financial inclusion. Clearly, one would expect that countries whose financial systems are deeper would also be more likely to reach broader segments of the population with financial services, such as bank accounts for transacting and saving and loans to finance consumption and investment. This relationship is exhibited in Figure 4.5, where a commonly used financial depth measure – the ratio of banking system credit to the private sector to GDP – is shown on the horizontal axis, while the vertical axis shows a household financial inclusion measure – either the share of adults with an account in a formal financial institution (panel 1), the share of adults borrowing from a formal financial institution or using a credit card (panel 2), the SME financial inclusion index (panel 3), or the share of SME bank lending as a percentage of total lending (panel 4).

Figure 3.5: Financial Depth and Financial Inclusion



Source: World Bank Enterprise Survey, IMF Financial Access Survey, World Bank Global Financial Development Database, Global Findex, and authors' calculations.

Notes: The horizontal axis in all panels show a financial depth measure, the ratio of bank credit to the private sector to GDP, and the vertical axis shows the percentage of adults who have an account in a formal financial institution (panel 1) or who have borrowed from a formal financial institution or used a credit card in the last year (panel 2,) an SME financial inclusion index (panel 3), or outstanding loans to SMEs as a share of total outstanding commercial bank loans (panel 4). MENA high-income countries are displayed as red dots, other MENA countries as blue dots, the rest of the world as orange dots, and world averages as a green dot in each panel. The trend lines show the relationship between the financial depth and financial inclusion measure across all countries.

As one might also expect, the relationship is not perfect; in some countries, the financial system mobilizes large amounts of funds relative to the size of the economy but does not distribute them as broadly to the population or to SMEs as in countries with more shallow systems. Conversely, other countries overperform, providing broader financial inclusion than would be expected from their level of financial depth (Figure 3.5).

For households, there is again stark contrast between the MENA high-income countries (shown as red dots), who have both deeper financial systems and a greater share of account holders, and the rest of the region (blue dots), where depth and account holding are below world averages and where account holding is below that of countries outside the region with similar levels of depth (panel 1). A similar pattern is visible for household borrowing, although there are fewer high-income MENA countries represented in the sample (panel 2).

For SMEs, most countries have levels of financial inclusion below those predicted by their financial depth. In fact, for the share of SME bank lending relative to total bank lending, there does not seem to be any clear relationship with financial depth.

3.3.3 Household Financial Inclusion Gaps and Structural Benchmarks

As summarized in Barajas et al. (2013), certain structural, non-policy factors such as income level, geographical size, population and its density, and age dependency ratios, play a role in determining how costly it is for a banking system to provide services to the economy. For example, in a high-income, geographically small country with high population density and a relatively young population, the financial sector will find it less costly to mobilize and intermediate funds to the economy and reach a larger share of the population with its services than in a low-income, geographically large and disperse country with an aging population. One would then expect the first country to have higher financial depth and inclusion than the second

one.[33] Thus, a "structural benchmark line" can be defined conceptually, which would indicate the level of financial inclusion or development expected for a country at a given time for its observed structural characteristics. Comparing its observed level with its structural benchmark level would then show whether the country is under- or over-performing its structural peers, thereby reflecting the relative pro-inclusion success of its policies. Finally, we should note that there is also a maximum socially optimal level of financial inclusion – the "financial possibilities frontier," which lies above the structural benchmark line – beyond which additional financial inclusion or depth would entail allocative inefficiencies or excessive risk-taking.

Feyen et al. (2019) have operationalized the structural benchmark concept, using quantile regression techniques to estimate the expected level of a certain depth or inclusion indicator given a country's structural characteristics. [34]Their results can easily be observed using the World Bank Finstats tool, which provides ready-made figures for over 40 indicators of financial depth, inclusion, and banking and financial market performance for more than 120 countries with pre-set charting capacity for the last 10 years. Statistical benchmarks are estimated based on structural and economic non-policy fundamentals. By excluding policy-driven factors, the

[33] Of course, structural characteristics are not the only factors that affect financial depth and inclusion. Policy-related factors play a crucial role as well, the degree to which a country might over and underperform relative to its structural benchmark. Thus, the second country in the example may indeed have greater financial inclusion than the first, owing to policies more conducive to financial inclusion.

[34] Quantile regressions are used as opposed to ordinary least square (OLS) for the following reasons to allow the statistical benchmark to reflect the "true" underlying financial development process, the impact of outliers needs to be reduced as much as possible. Since OLS is sensitive to outliers, median regressions, a particular instance of quantile regressions, are used instead. Quantile regressions also produce different expected values to gauge the range of financial sector performance. An additional benefit of quantile regressions is that they allow for factors' different marginal effects for different percentiles of the distribution of the financial indicator. As a result, they not only produce expected medians but can also produce expected values for other percentiles. FinStats uses the expected 25th and 75th percentiles.

benchmarks determine the level at which a country would be expected to be in a policy-neutral environment. The controls include a set of factors that can be viewed as external to policy, at least in the short run. The factors fall under these five types:

Economic development factors

Economic development, as measured by GDP per capita, affects financial development, due both to demand effects (the volume and sophistication of financial activity increases with income) and to supply effects (larger, richer economies can achieve economies of scale and benefit from more competition and better infrastructure). To account for potential heterogeneity linking economic and financial development, the square of GDP per capita is also included.

Population factors

Countries with larger populations tend to have deeper and more efficient financial systems (a scale effect). Financial services can also be provided at a lower cost in countries that have a higher population density (a network effect).

Demographic factors

Age dependency ratios, that is, the non-working young and old populations, respectively, as fractions of the labor force, are likely to affect savings and lending patterns.

Special circumstances

Oil exporters may have smaller financial sectors than other countries at similar levels of income. This is likely to reflect the fact that oil revenues can boost GDP out of proportion with the country's overall level of economic and financial development. Offshore financial centers with intensive cross-border operations can also have disproportionately large financial sectors. Landlocked countries encounter structural challenges in accessing

international markets, which will impact the composition and performance of the real economy, and, as a result, financial development.

Time: global cycle

All available country-year observations are pooled.

The main advantages of statistical benchmarking are the following:

Avoiding comparison of "apples with oranges"

By controlling for the level of economic development and other key structural, country-specific factors (e.g., variables that are exogenous to the policy process), the approach makes inter-country comparisons more meaningful.

Allowing for "through-the-cycle" analysis

The methodology allows the user to see "through-the-cycle" since it typically incorporates many years of data. Although the Dashboard displays the latest 10 years of information, the benchmarking methodology uses data starting in 1996 (where available).

Producing a more revealing measure of the quality of financial sector policy

Deviations from the statistical benchmark can be interpreted as a measure of the quality of policy, which is directly comparable across countries.

The main caveats are the following:

Not all structural factors might be accounted for.

While a comprehensive set of factors that work well for all FinStats indicators overall is used, in some cases additional important unaccounted structural factors may be missing, leading to an overstatement about the role of policy.

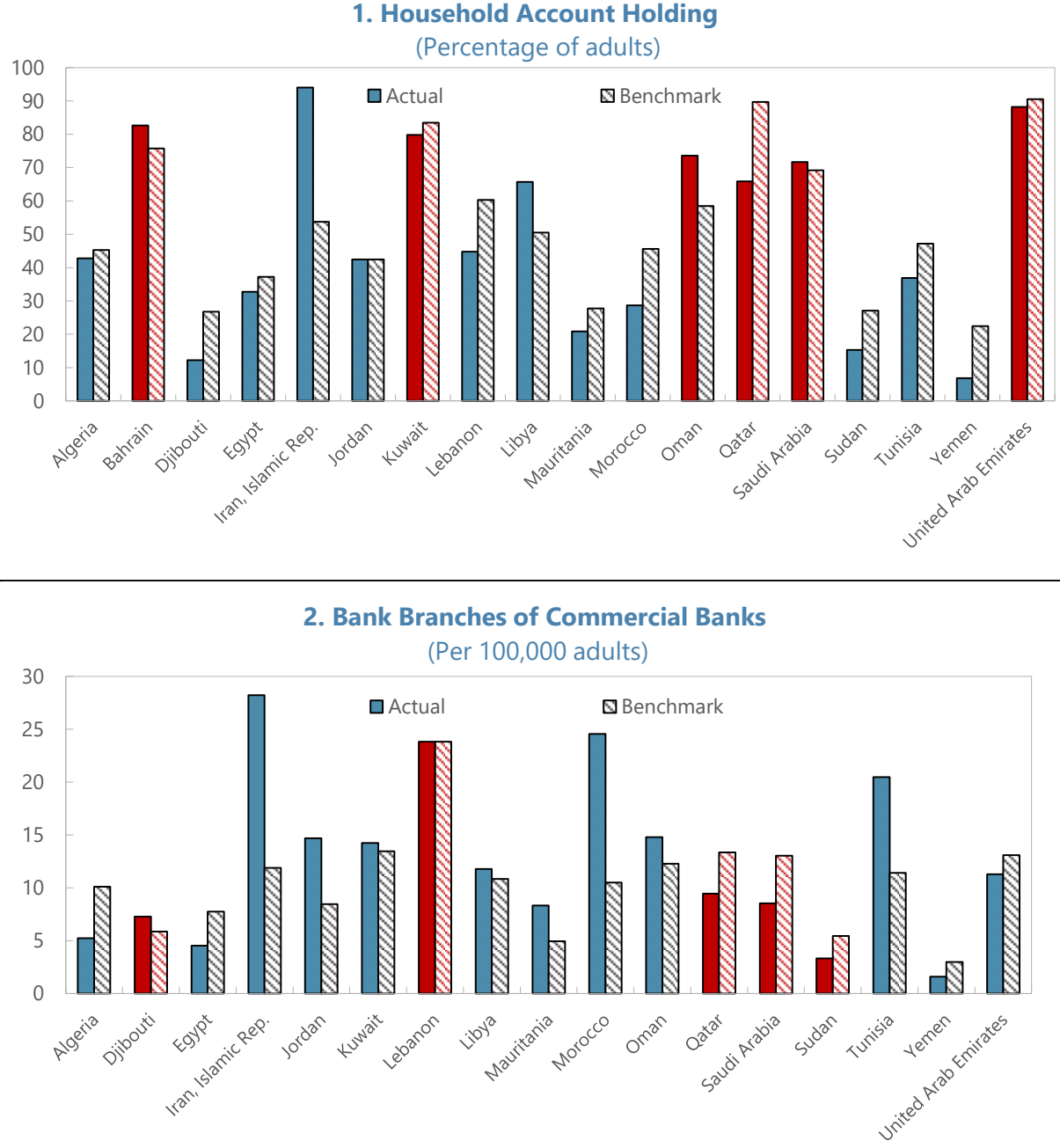
Differences in financial development paths are not accounted for.

The approach used implicitly assumes that all countries follow the same path. That is, countries that currently have identical structural factors will have identical statistical benchmark values.

Shorter time series will have weaker indicators.

Some indicators lack long time series, potentially affecting the quality of the benchmark.

Figure 3.6: Financial Inclusion in MENA: Actual vs. Structural Benchmarks



Source: Finstats and authors' calculations.

Notes: The figure shows the share of adults with an account (panel 1) and the number of commercial bank branches per 100,000 adults (panel 2). In each panel the solid bar represents the actual level and the shaded bar represents the level predicted by the country's structural characteristics, as estimated in the Finstats tool. High-income MENA countries are indicated by red bars and the rest of the region is represented by blue bars.

Figure 3.6 summarizes the actual vs. benchmark comparison for the share of account holders (panel 1) and a measure of access to financial services, the number of bank branches per 100,000 adults (panel 2).[35] Of the 18 MENA countries represented, 12 are underperforming relative to their structural benchmarks; in other words, the account holding or share of the banked population is below what would be expected for a typical country that shares their structural characteristics. Certain low-income countries like Djibouti, Sudan, and Yemen underperform substantially even with respect to their relatively low structural benchmarks. For example, in Sudan, 15% of adults are banked, compared with a 26% level that the analysis predicts a typical country with Sudan's structural characteristics would have. Some middle-income countries like Lebanon, Morocco, and Tunisia also underperform, and some high-income countries with relatively high levels of inclusion, like Kuwait and Qatar, also underperform when compared to their structural benchmarks.

On the other hand, Iran again stands out as an overperformer, with a 94% account-holding share, almost double its structural benchmark. The benchmarking results also indicate that MENA countries have been comparatively more successful in providing access to services via commercial bank branches, as there is less underperformance than for account holding. Iran, Morocco, and Tunisia appear to be particularly successful in providing an extensive branch network. However, for the latter two countries, this has not translated into corresponding success in promoting the use of accounts in the financial system.

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[35] The share of account holding is the only household-related financial inclusion indicator that has been benchmarked in Finstats. Bank branches per 100,000 adults is obtained from the FAS.

Overall, the estimated gaps relative to benchmarks suggest that in many MENA countries there is ample room for improvement in policies to facilitate household financial inclusion to catch up to or even surpass the levels observed in countries with similar structural characteristics.

3.3 Macroeconomic Benefits from Increasing Financial Inclusion

3.3.1 Evidence that Financial Inclusion Contributes to Key Macroeconomic Outcomes

There is an extensive literature examining the nexus between financial depth and long-term growth, as well the beneficial economywide impacts of financial deepening for capital accumulation, productivity, poverty reduction, and lower income inequality.[36] However, studies of the macroeconomic implications of financial inclusion are more recent and limited, in part because of the data limitations.

Sahay et al. (2015) showed that financial inclusion, as measured by the coverage of ATMs per 100,000 adults or the percentage of firms identifying finance as a major constraint, has a measurable impact on medium-run economic growth above and beyond the effect of financial depth. That is, if we compare two countries with equal private credit-GDP ratios, the one that has a more extensive ATM network or has lower perceived financing constraints for firms will produce higher growth over a 10-year period. In addition, Cihák et al. (2020) and Loukoianova and Yang (2018) found similar beneficial impacts of financial inclusion measures with income equality and poverty reduction.[37]

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[36] See Levine (2005), Popov (2015), Beck et al. (2007), and Zhang and Ben Naceur (2019) for reviews of this literature.

[37] Noha and El Said (2019) and Noha and Mohieldin (2020) focus on a sample of EMs and MENA countries and obtain similar results for economic growth and poverty reduction from increases in coverage of bank branches, ATMs, and the number of bank accounts per population.

The main challenge in establishing a relationship between long-run growth and financial inclusion is lack of sufficiently long time series of financial inclusion (FI) data. For example, number of ATMs—obtained from the IMF's Financial Access Survey (FAS), start in 2004 at the earliest. This proves insufficient to provide robust and usable results in a standard GMM growth regression with a sample period of 1980–2010 and using five-year averages of all variables to smooth out cyclical variations. For this reason, GMM regressions of this type cannot test for the impact of financial inclusion indicators as the regressions would not pass the standard diagnostic tests. One of the alternative taken by Sahay et al (2015) is to do a GMM estimation with interactions, using a primary finance variable (FIN, private credit-to-GDP) but then include an interaction with a financial inclusion variable as well. Given the data limitations, the financial inclusion variable is time-invariant, measured as either a period average or a single time observation depending on whether it is from FAS, Global Findex, or from the Enterprise Surveys). Thus, the GMM estimation can be done using the following specification:

$$\dot{y}_{i,t} = \beta_0 + \beta_{11} FIN_{i,t} + \beta_{12} FIN_{i,t}.FI_i + \beta_2 X_{i,t} + \varepsilon_{i,t}, \quad (3.1)$$

in which *i* denotes country, *t* denotes time, *X* denotes controls, *FIN*, a financial depth variable (private credit-to-GDP), *FI* is a financial inclusion variable, and *y* measures growth over a period of time and$\varepsilon_{i,t}$ is the error term.

Applying the coefficients estimated by Sahay et al. (2015), one can compute an estimated growth loss from subpar financial depth (estimated by private credit to GDP) and from insufficient financial inclusion (estimated by the number of ATMs). Table 3.1 summarizes the results of this exercise for MENA countries. Specifically, for each country it calculates the gap in estimated per capita real GDP growth rates explained by: (i) the difference between the observed value of financial depth and the country's structural benchmark in the previous section and (ii)

the difference between number of ATMs per 100,000 adults and the global median. For high-income MENA countries, the growth costs are mostly negative, as the financial depth is either very close to or above the structural benchmark, and the measure of financial inclusion is above the global median, with the exception of Oman. For the rest of MENA countries, growth costs range from negative values (Iran and Lebanon), to small (Jordan, Morocco, and Tunisia), to as large as 1.4%-1.6% per year (Algeria, Djibouti, Mauritania, and Sudan), which over a ten-year period can accumulate to losses of up to 18% in per capita real GDP.[38]

[38] A word of caution: these estimates rely on one measure of access to financial services – partly due to the time series requirements of the regressions – which may not adequately reflect the full picture of financial inclusion in a given country. Thus, while the precise estimated values should not be taken literally, this exercise reveals that deficiencies in financial inclusion in MENA could be a substantial factor limiting long-run economic growth.

Table 3.1: *Estimated Growth Costs of Financial Underdevelopment (Private Credit-GDP) and Low Financial Inclusion (ATM per 100,000 adults)*

Estimated Growth Costs of Financial Underdevelopment (Private Credit-GDP) and Low Financial Inclusion (ATMs per 100,000 adults):								
		Private credit-GDP		ATMs per 100,000 adults	Estimated Growth Costs From:			
		Observed	Benchmark	Observed	Financial Depth Below Benchmark	Financial Inclusion Below World Median	Interaction	Total
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Benchmarked MENA Countries	**Year**							
High-Income								
Bahrain	2015	0.714	0.740		0.000			0.000
Kuwait	2017	0.971	0.532	81.07	-0.002	-0.020	-0.004	-0.025
Oman	2017	0.734	0.470	35.13	-0.001	0.003	0.000	0.002
Qatar	2017	0.747	0.752	54.84	0.000	-0.007	0.000	-0.007
Saudi Arabia	2017	0.543	0.474	73.34	0.000	-0.016	0.000	-0.017
United Arab Emirates	2017	0.785	0.740	60.91	0.000	-0.010	0.000	-0.010
Other								
Algeria	2017	0.232	0.358	9.64	0.001	0.015	-0.001	0.015
Djibouti	2017	0.271	0.287	12.33	0.000	0.014	0.000	0.014
Egypt, Arab Rep.	2017	0.287	0.285	20.07	0.000	0.010	0.000	0.010
Iran, Islamic Rep.	2016	0.608	0.482	88.65	-0.001	-0.023	-0.001	-0.025
Jordan	2017	0.762	0.750	26.13	0.000	0.007	0.000	0.007
Lebanon	2017	0.961	0.091	39.25	-0.003	0.001	0.000	-0.002
Libya	2017	0.297	0.355	3.59	0.000	0.018	0.000	0.018
Mauritania	2017	0.027	0.215	10.40	0.001	0.015	-0.001	0.014
Morocco	2017	0.618	0.477	28.58	-0.001	0.006	0.000	0.006
Sudan	2017	0.075	0.193	6.42	0.000	0.017	-0.001	0.016
Tunisia	2017	0.766	0.426	30.72	-0.001	0.005	0.001	0.004
Non-Benchmarked MENA Countries								
Afghanistan		0.034		1.64	0.002	0.019	-0.003	0.017
Iraq	2017	0.090		4.16	0.001	0.018	-0.003	0.017
Syrian Arab Republic	2010	0.197		48.72	0.001	-0.004	0.000	-0.003
World median	2017	0.43		40.73				

Source: Finstats 2019, Global Financial Development Database, and authors' calculations.

Notes: Regression coefficients taken from Sahay and others (2015), corresponding to the third column of the Generalized Method of Moments (GMM) panel data regressions reported in Annex II, which are used to illustrate the effect of financial depth and financial inclusion on long-term growth in the first panel of their Figure 5.

MENA refers to Middle East and North Africa.

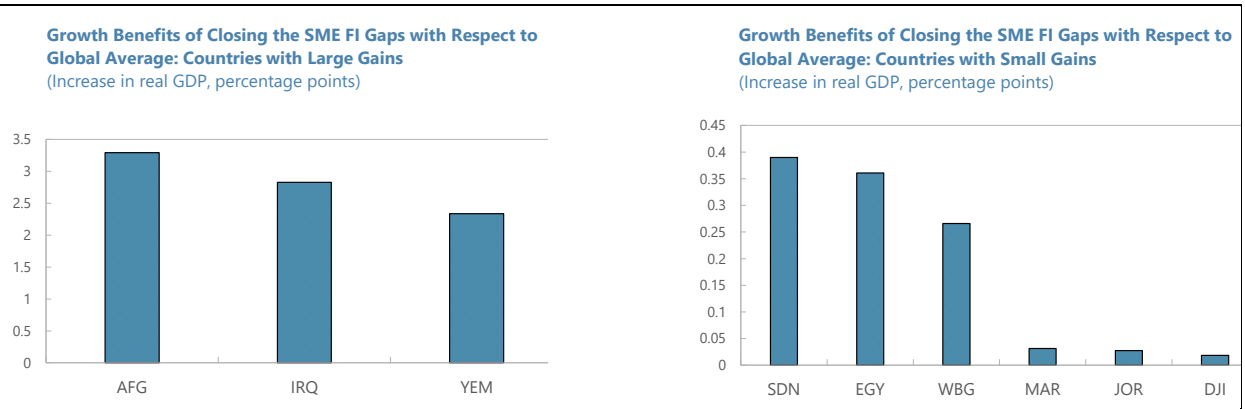
ATM = Automated Teller Machine.

This table shows the growth costs of MENA countries arising from the gap between observed financial depth (the private credit-GDP ratio, Column 1) and the structural benchmark as estimated by Feyen and others (2019) (Column 2), the gap between observed financial inclusion (ATMs per 100,000 adults, Column 3) and the world median, and the interaction between the two. Growth costs are expressed in terms of per capita annual real GDP growth.

For SMEs, Blancher et al. (2019) show that closing the financial inclusion gap with respect to the average for emerging market and developing economies (EMDEs) would help increase economic growth. Applying the coefficients, they estimated through static and dynamic panel data regressions, we compute country-level estimates of growth costs in MENA countries from SME access to finance falling below the EMDE average (Figure 3.7). Growth costs range

from close to zero (Morocco, Jordan, and Djibouti), to small (Lebanon, West Bank and Gaza, and Sudan), to as large as 2-3 percentage points (Afghanistan, Yemen, and Iraq).

Figure 3.7: SME Financial Inclusion and Growth



Sources: World Bank Enterprise Surveys and IMF staff calculations.

SMEs also have a key role in driving employment, especially in developing economies, as they are large contributors to employment growth (Kumar, 2017). Ayyagari et al. (2014) found that SMEs account for nearly half of the workforce in the average country and that small firms (fewer than 20 employees) are the highest contributors to employment growth. They also found that the youngest firms have the highest employment growth. In the MENA region, Ghassibe et al. (2019) empirically assess the potential employment and labor productivity growth gains from greater financial inclusion in the Middle East and Central Asia regions, using firm-level data from the World Bank Enterprise Surveys (2008-2016), covering firms from the following countries in different years: Azerbaijan, Armenia, Djibouti, Georgia, Iraq, Kazakhstan, Jordan, Kyrgyzstan, Lebanon, Morocco, Tajikistan, Tunisia, Egypt, Uzbekistan and Yemen. They found that greater SME financial inclusion boosts employment and labor productivity growth. Holding other things equal, access to formal finance leads to a 2.07 percentage points increase in the rate of employment growth for an average firm in the sample. However, once they estimate the effect separately for large firms and SMEs, they show that most of these gains come from SMEs.

3.3.2 Literature on the Links Between Financial Inclusion and Financial Stability

In recent years, there has been empirical work exploring the relationship between financial inclusion and financial stability. This is motivated partly by the observation that certain episodes of financial distress have been preceded by what may be termed "excessive" financial inclusion. It is also related to the "too much finance" hypothesis, which shows that the finance-growth relationship exhibits a hump shape and is stronger at low levels of financial depth and weakens as the system deepens. One reason cited for this is behavior is that very large and rapidly growing financial systems tend to become more prone to instability and crises (Arcand et al., 2015; Schularick & Taylor, 2012).

As shown in Sahay et al. (2015), the positive relationship between financial inclusion and growth also weakens with financial inclusion. The question is therefore whether there is a tradeoff between financial inclusion and financial stability.

Two studies have uncovered a stabilizing effect of inclusion through bank deposits. Han and Melecky (2013) found that countries in which a larger share of the population had access to deposits prior to the 2008 global financial crisis suffered significantly smaller withdrawals when the crisis hit. Mehrotra and Yetman (2015) found that consumption volatility tends to be lower in countries where there is a larger percentage of adults that have banks accounts and save in formal financial institutions. Other studies have found more mixed results. In a panel data setting including a sample of 150 countries, Cihák et al. (2016) examined the inclusion-stability relationship more broadly, using measures of account ownership, payments, savings, credit, and insurance services, which they then related to different indicators of financial stability. They found that the relationship is complex, with instances of tradeoffs between the two – in particular, with regard to expansions in credit access – but also instances of synergies between

some aspects of financial inclusion and stability, primarily during non-crisis times. They also found that the relationship was also affected by country characteristics, such as financial openness, tax rates, education, and credit information depth.

Sahay et al. (2015) and Cihák et al. (2020) focused on credit inclusion and found that the relationship with financial stability depends crucially on the quality of bank regulation and supervision. If it is high, then bank credit can be expanded to a greater share of the population without endangering financial stability. However, if regulatory and supervisory quality is low, then a tradeoff emerges, and credit inclusion will come at a cost of lower financial stability. More encouragingly, Ahamed and Mallick (2019) studied an international sample of 2,635 banks in 86 countries and found that financial inclusion contributes to a more stable banking system, an effect that is more pronounced when banks are mostly funded by deposits, display low marginal costs, and operate within a strong institutional environment. Their results also show that, if the quality of supervision is sufficiently high, increased financial inclusion (measured by the FAS indicator of number of borrowers per 1,000 adults) is associated with greater bank resilience and lower macroeconomic volatility.

Conversely, there is evidence that financial stability can have a beneficial impact on financial inclusion. Fouejieu et al. (2020) found that bank resilience, as measured through bank z-scores and reliance on core funding (bank deposits), supports SME access to financing as measured by the SME financial inclusion index, whereas weak asset quality undermines it.[39]

[39] Bank Z-score are drawn from the Global Financial Development database. The Z-score measures the "distance-to-distress" for banks, reflecting the buffers against earnings shocks.

Furthermore, they found that the effect of these factors on SME financial inclusion appears stronger in the MENA region than in other emerging market and developing economies.

3.4. Policies to Expand Access to Finance for Households and Firms

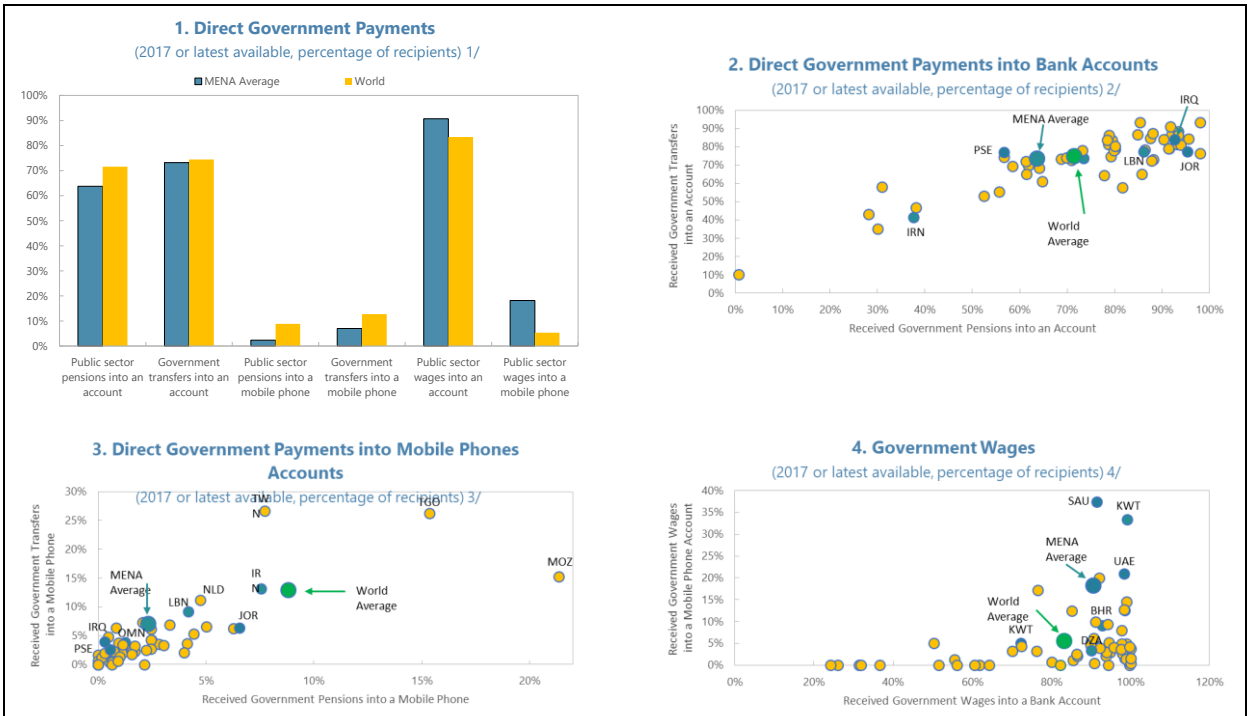
3.4.1 Macroeconomic and institutional drivers

As reviewed in Barajas and others (2020), empirical studies have shown that certain policies at the economy or financial regulatory level can increase financial inclusion of households. These include relaxing restrictions on banking activities, requiring greater transparency of financial institutions, reducing government ownership of banks, and encouraging the entry of foreign institutions. To address the issue of high cost and/or perceived income insufficiency to open formal accounts—cited in particular by MENA respondents to the Findex survey—actions to provide free or low-cost basic accounts without minimum balance requirements. Although MENA countries on average appear to be relatively successful in providing networks of bank branches, and MENA respondents in general do not cite distance to financial services as a main impediment, there may be scope in some countries to increase this infrastructure, which studies have shown to help increase account ownership. Actions to increase trust in financial institutions, including the establishment of explicit deposit insurance schemes and targeted education efforts, can also help overcome obstacles to household financial institution.

In addition, the channeling of government payments to employees, pensioners, or beneficiaries of government programs directly into a bank account rather than in cash. Although coverage is relatively limited, Findex data indicate that some MENA countries have shown noticeable progress in transferring government payments directly into accounts and, to a lesser extent, into mobile phones (Figure 3.8). The averages for the region are comparable to world

levels (panel 1), with governments in some countries making over 80% of transfer payments directly into accounts (panel 2), although still very little is transferred into mobile phones (panel 3). Some non-MENA jurisdictions stand out as using this channel particularly intensively, such as Togo and Mozambique, where over 15% of government pensions and transfers are made directly into mobile phones. In several high-income MENA countries, governments also use direct transfers of wages into accounts and mobile phones (panel 4). For example, in Saudi Arabia and Kuwait, close to 90% of public sector wages are paid directly into accounts and 40% into mobile phones.

Figure 3.8: Government Payments into Accounts or Mobile Phones



Source: Global Findex and authors' calculations

1/ The figure shows the adults receiving government pensions into a mobile phone on the horizontal axis and the adults receiving government transfers into a mobile phone on the vertical axis, both expressed as a percentage of total recipients. MENA countries and averages are shown in blue, other jurisdictions in orange, and the world averages in green.

2/ The figure shows the adults receiving government wages into an account on the horizontal axis and the adults receiving government wages into a mobile phone on the vertical axis, both expressed as a percentage of total recipients. MENA countries and averages are shown in blue, other jurisdictions in orange, and the world averages in green.

3/ The figure shows the adults receiving government pensions into a mobile phone on the horizontal axis and the adults receiving government transfers into a mobile phone on the vertical axis, both expressed as a percentage of total recipients. MENA countries and averages are shown in blue, other jurisdictions in orange, and the world averages in green.

4/ The figure shows the adults receiving government wages into an account on the horizontal axis and the adults receiving government wages into a mobile phone on the vertical axis, both expressed as a percentage of total recipients. MENA countries and averages are shown in blue, other jurisdictions in orange, and the world averages in green.

There is evidence that financial literacy is positively correlated with individuals' use of financial services and is also correlated with income and education levels (Lusardi & Mitchell, 2011). For MENA countries, a recent study by Lyon and Kass-Hanna (2019) shows that, in

addition to the effects of other socio-economic factors, such as better financial and technological infrastructure, greater political stability, and stronger legal rights, countries with higher financial literacy tended to be more financially inclusive. That is, individuals were more likely to hold an account, save, borrow from a formal financial institution, and were able to come up with emergency funds and less likely to borrow informally. The study also found that the more vulnerable groups – youth, women, and the poor – were significantly more responsive to the factors identified as boosting financial inclusion, including financial education.

As documented by Fouejieu et al. (2020) and highlighted extensively in chapter 2, a broad range of macro-financial and institutional factors are found to play a significant role in facilitating or constraining access to credit by SMEs. These include:

- Greater government effectiveness is associated with improved SME access to finance.[40] Large public sector financing needs can crowd out credit to the private sector, including SMEs, especially where state-owned enterprises (SOEs) benefit from preferential tax or regulatory treatment and easier access to bank credit. More broadly, a large role of the state in the economy often creates an uneven playing field for SMEs, exposing them to tougher competition or making it harder for them to attract workers.

[40] Government effectiveness measures the quality of public services, the quality of the civil service and its independence from political pressure; the quality of policy formulation and implementation, and the credibility of government commitment to such policy (World Governance Indicator). The Worldwide Governance Indicators are a composite third party indicator that rely on a variety of inputs from other sources, including the Transparency International Global Corruption Barometer Survey, the Political Risk Services International Country Risk Guide, and the Varieties of Democracy Project. Use of these indicators should be considered carefully, as they are derived from perceptions-based data.

- Price stability has a positive impact on SME access to financing. Low inflation is a key signal of macroeconomic stability, associated with lower risk perception, stronger private sector confidence, and demand for deposits and credit from formal financial institutions.

- Competition among banks is found to increase access to financing for SMEs. Thus, facilitating market entry could improve access to credit for SMEs. The MENA region tends to have relatively high levels of banking concentration (Figure 3.9), which are related to weak competition and often associated with higher interest rate margins and bank profitability, which may discourage lending to smaller firms.[41]

[41] Anzoategui et al. (2010) estimate two measures of banking competition across the world and over the 1994-2008 period, and find that MENA countries exhibit low levels of competition in comparison to other regions. They identified two major factors that contribute to this lack of competition: a deficient environment regarding credit information, and relatively strict obstacles to entry into the banking market.

Figure 3.9: Banking Sector Characteristics

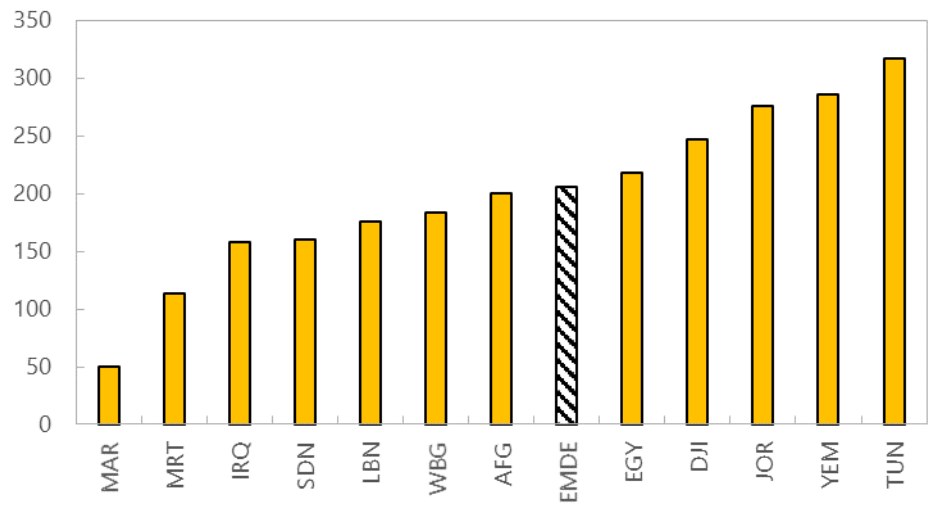
Source: World Bank Global Financial Development dataset, latest available data, and IMF staff calculations.

- Some aspects of poor institutional quality tend to benefit large firms that are better connected than SMEs. Empirical analysis from Fouejieu et al. (2020) shows that improvements in the control of corruption, voice, accountability, and political stability are positively correlated

with SME financial inclusion.[42] The importance of corruption and political risks is particularly strong for MENA countries.

- Improved quality and availability of credit information can lead to large benefits in terms of financial inclusion, particularly for SMEs. In countries where collateral requirements are very high, such as Tunisia, better credit information could help relax such constraints and unlock SME access to financing (Figure 3.10). Improving credit information systems, such as establishing a credit bureau, has also proved effective in increasing willingness of banks to lend to previously unserved households.

Figure *3*.10: MENA Countries: Value of Collateral Needed for a Loan, Latest Available data (Percent of loan amount)



Source: World Bank Enterprise Surveys

[42] Accountability refers to citizens' perception of participation in selecting their government, freedom of expression and association, and free media (World Governance indicators). Use of these indicators should be considered carefully, as they are derived from perception-based data.

- Constraints on contract enforcement and property rights and registration, as well as high business start-up costs and ineffective insolvency regimes, are negatively correlated with SME financial inclusion (Fouejieu et al., 2020). Indeed, modern cadasters and strong property rights allow assets to be transferred, sold, and collateralized more easily, facilitating access to finance. Together with higher tax rates for SMEs, shortcomings in these areas motivate SMEs to remain in the informal sector, thereby limiting their access to credit. These constraints are particularly binding in MENA countries (Fouejieu et al., 2020).
- Sound financial regulatory and supervisory frameworks are critical in order to monitor and address potential emerging risks and support financial deepening and inclusion. Fouejieu et al. (2020) found that financial supervisory capacity effectively contributes to SME financial inclusion, especially in the MENA region. In addition, financial inclusion and anti-money laundering and combating the financing of terrorism (AML/CFT) can be mutually supportive, in part because the use of formal financial services improves the traceability of financial transactions.[43]

3.4.2 Fintech Activities Accelerated to Address the COVID-19 Shock

Fintech is nascent in the MENA region, and its development has accelerated in recent years (Lukonga, 2018). The UAE, Lebanon, Jordan, and Egypt host the majority of the MENA fintech startups and have established large fintech accelerators.[44] There are encouraging signs on

[43] Lyman and Noor (2014).

[44] A fintech accelerator is a program that aims to support startups that are focused on building products and services for the digital payments industry. Examples include Bahrain-based PayTabs and Jordan-based ProgressSoft and eFAWATEERcom, which provide digital payment solutions for banks and SMEs. United Arab Emirates (UAE)-based Beehive and Eureeca, Lebanon-based Zoomaal, and Jordan-based Liwwa provide crowdfunding and peer-to-peer lending in the region.

the proliferation of digital payments, as measured by the populations' use of mobile money accounts. At 9% on average, it is further along in the MENA region than the 5–8 percent observed in LAC, EDA, CCA, and EDE. However, it is well below the level of SSA countries, which have been worldwide leaders in this area, with an average of 25 percent of adults using these accounts.[45] The COVID-19 pandemic led policymakers in many countries to make supplemental transfers to individuals to compensate them for a loss of income due to mandated lockdowns and other negative shocks to economic activity. The World Bank estimates that across 156 countries, 340 such measures were taken up to September 2020, involving both digital and nondigital means (Michaels, 2020). Digital means were pursued to avoid the physical handling of cash, reduce the risk of theft and fraud, and to speed up the distribution of transfers.

Some of these efforts were undertaken in MENA countries, with potential longer-term impacts on financial inclusion. As part of a cash transfer program for informal workers, the Central Bank of Jordan relaxed requirements and facilitated online opening of e-wallet accounts with payment service providers, through which transfers could be received. Similarly, in Egypt, the central bank facilitated the electronic opening of bank accounts without having to visit a bank branch or speak to an agent, and ID verification was conducted by a telecommunications authority. In Morocco, the central bank allowed the opening of a basic bank account without going to a branch, deferring the Know Your Customer (KYC) procedures that are typically used. Recipients of governmental grants were encouraged by major bank subsidiaries to open mobile

[45] See Suri (2017) for an overview of the global rise of mobile money.

payment accounts and thus receive their payments electronically rather than in cash. MENA governments and private financial institutions will increasingly grasp the potential benefits of setting up these payment channels, in terms of helping households directly and serving as a catalyst for further financial inclusion.

New technologies can also help overcome several constraints of access to credit identified in the previous section: the lack of credit information, weak bank competition, and, more generally, the relatively high cost of servicing the financing needs of SMEs and households. Big data analytics and cloud computation facilitate the gathering and processing of large amounts of consumer credit performance and behavioral data. Registration and accounting information can be combined with geographical and socio-economic information to generate real-time credit scores. Competition can also be enhanced by fintech innovation. In the United Arab Emirates, a new platform (Souqalmal) allows borrowers to compare credit cards, insurance, leasing, and other banking products. Another promising area is the development of open banking platforms, where third-party providers access bank customer data to offer products with their consent. Examples include online platforms that: (i) collect contributions from investors towards a loan to business (Beehive, USA); (ii) allow institutional investors to purchase equity issued by investors (Eureeca, UAE); (iii) allow individuals or institutional investors to provide funds in exchange for non-monetary rewards/products/philanthropic motives (Zoomal, Lebanon); (iv) lend directly to the business from its balance sheet (OnDeck, USA); (v) provide liquidity to businesses in the form of (discounted) payments for outstanding customer invoices (MarketInvoice, UK).

Furthermore, new technologies can help lower regulatory compliance costs, which can inhibit access to credit. Many banks in the MENA region need to perform AML/CFT due

diligence for new accounts, which makes servicing SME and households accounts costlier. Fintech solutions offered by companies like Suede and BearingPoint (Abacus) can reduce these and other compliance costs by embedding regulatory requirements into IT protocols and allowing for real-time compliance monitoring.[46] KYC and AML/CFT procedures can also be made more efficient by analyzing digitalized client and partner transaction data and writing contracts on distributed ledgers.

Some countries in the MENA region have also enacted laws to spur the development of fintech activities. In Egypt, a new law passed in September 2020 to allow the central bank to issue banking licenses to fintech firms. In Jordan, the central bank launched official guidelines for a fintech regulatory sandbox to promote innovation and financial inclusion in 2018. The Central Bank of Tunisia introduced a bill on crowdfunding that was voted on in 2019.

Fintech introduces new risks into credit activities. For example, online platforms collect large quantities of data, creating risks for both data privacy and cybersecurity. Concerns about consumer protection and fraud are elevated and many lending platforms rely on short-term funding, which may create financial stability issues. Regulatory responses have ranged from the same standards as for other financial institutions to sector-specific regulation; many countries have not yet adopted a specific regulatory framework. Several jurisdictions (Singapore, United Arab Emirates, United Kingdom, among others) have introduced incubators – regulatory sandboxes, innovation hubs, and business accelerators – where fintech companies can test their models on a small scale. Many of these experiences are recent and still under way.

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[46] Toronto Centre (2017).

3.5 A Review of Government Interventions in MENA Countries to Boost Financial Inclusion

3.5.1 Increasing Reliance on Direct Public Intervention for SME Access to Finance

Partial Credit Guarantee

A Partial Credit Guarantee (PCG) is an instrument designed to increase financing for certain riskier segments of the economy, most notably for SMEs. By providing a guarantee for SME loans, the lack of collateral and opacity of these firms can presumably be overcome, and lenders will be more willing to lend to them. In the MENA region, Lebanon's Kafalat scheme is among the largest PCGs. PCGs can be funded by public institutions, including state banks or foreign donors (Algeria, Jordan, West Bank and Gaza) or by public and private institutions (Morocco, Egypt, Lebanon, Tunisia).

During the coronavirus crisis, several countries in the region relied on PCGs to support SMEs. In the West Bank and Gaza, an SME COVID-19 fund was launched in 2020 for US $300 million (including US $210 million collateral funding from the Palestinian Monetary Authority or PMA), made available to banks and specialized institutions to extend loans of US $250,000 or less to micro, small and medium-sized enterprises (MSMEs) affected by COVID-19 and in urgent need of financing. In Tunisia, special guarantee lending schemes were put in place through the SOTUGAR (Tunisian Guarantee Company) to support bank lending to SMEs during the COVID-19 crisis. In Kuwait, the government and parliament endorsed a bill supporting and guaranteeing local bank loans for SMEs affected by the pandemic. Morocco significantly increased its subsidized lending with public credit guarantees in response to COVID-19. Loans were provided to very small and medium-sized enterprises-(V)SMEs at subsidized interest rates and with a guarantee of 95% from the Central Guarantee Fund. Since most of these measures

have been introduced very recently, it is too early to assess their efficiency, especially as we are still very much into a crisis mode.

However, as reviewed in Barajas et al. (2020), the worldwide experience with PCGs in supporting SME financial inclusion has been mixed. While one main objective is additionality – to address various market failures and broaden lending to firms who were previously excluded, especially during economic and financial crises – PCGs also increase risk-taking by lenders, a risk that must be managed adequately. However, they entail appreciable contingent liabilities that are difficult to quantify *ex ante* and often require emergency government support, should economic difficulties or even financial crisis emerge. They also contain substantial subsidies, thereby potentially leading to a misallocation of resources, when guaranteed loans are extended to financially unconstrained firms and therefore crowd out unsecured loans (e.g., Zia, 2008). In short, while PCGs can help mobilize funds to SMEs, there is a risk of unintended consequences, so it is a significant challenge to design them in such a way as to minimize these risks. As the World Bank (2015) argued, the success of a PCG scheme depends on the existence of a number of preconditions in the legal, accounting, and judicial environments of the country, and even requires a minimum degree of financial development. Once these preconditions are in place, the scheme design should incorporate elements in four key areas: legal and regulatory framework; corporate governance and risk management; operational framework; and monitoring and evaluation.

Public Development Banks

Research suggests that development banks (DBs) could be a countercyclical credit provider to SMEs that are temporarily unable to access market financing, due to a market failure. There are two types of market failures that are usually invoked to justify the existence of

development banks: (i) financial market distortions constraining the supply of credit in the market, such as those originated in the borrower's inability to commit to making good on future financial promises (time inconsistency) and the corresponding need for elaborate contract enforcement and collateral guarantees, especially in the face of information asymmetries and the resulting problems of moral hazard and adverse selection (Stiglitz, 1994); and (ii) positive externalities to certain investments that may render socially profitable projects unattractive from the point of view of individual investors. (Fernandez et al, 2019)

There are DBs in practically all countries, regardless of the country's stage of economic or financial sector development. They typically support such areas as agriculture, international trade, infrastructure, tourism, housing, and SMEs (World Bank, 2017).

Traditionally, the literature on DBs (and generally on state-owned financial institutions) has found that, while active government participation in the provision of financial services can potentially help correct market distortions in the provision of financial services, it can create distortions of its own that run the risk of undermining its objectives.

Much of the literature on state-owned financial institutions has focused on examining their financial performance. A study of state-owned banks in the MENA region by Farazi et al., (2011) found that they underperform private sector institutions (), mainly because they have larger holdings of government securities, an employment mandate that drives higher costs because of larger staffing numbers, and larger loan loss provisions because of their weaker asset quality. There are also concerns about the efficiency of, and risks from, DBs. DBs may allocate credit inefficiently and are often associated with concentration risk, poor asset quality, and regulatory forbearance. Some DBs generate a high amount of NPLs that undermine their solvency and profitability (World Bank, 2017).

However, specialized DBs can also play a key role in developing tools to address problems of access to finance and gaining expertise on the specific needs of SMEs. From this point of view, DBs are well suited to detect un- or under-served market niches and fill gaps, provided they are professionally managed and independent (World Bank, 2017).

Interest Rate Limits

Interest rate caps (IRCs) have been widely used to lower the cost of credit and limit predatory lending. Seventy-six countries across all regions/categories (more than 80% of global GDP and financial assets) impose some IRCs in various forms, especially in L-MICs and including Algeria, Lebanon, Morocco, Libya, and Tunisia in the MENA region (World Bank, 2018). However, there is evidence that IRCs may lead to lower bank profitability and credit supply (e.g., Ferrari et al., 2018), especially for small and riskier borrowers.

Macroprudential Measures

Relaxing prudential requirements to encourage SME credit has been considered in certain jurisdictions. Risk weights for capital adequacy purposes were recently reduced for SME lending from 75% to 25% and from 100% to 85% respectively in Bahrain and Saudi Arabia. However, these measures are not recommended as their effectiveness is not established and they may introduce potential risks to financial stability, including due to governance issues (e.g., politicization). There is very little evidence, if any, that regulatory framework affects SME credit (FSB, 2019). The first best policy to ensure that banks lend to SMEs, including in economic downturns, is that they be strongly capitalized and in a position to manage SME-related risks adequately.

3.5.2 Financial Inclusion Strategies

Financial sector strategies enable financial policy makers and stakeholders to take a holistic view of the financial development needs in their country and formulate balanced financial policies. They help policymakers consider the systemic risk that different development policies involve and choose an informed way forward. In the MENA region, examples include Jordan, Morocco, and Djibouti.

Jordan was the first country in the region to launch a financial inclusion strategy. The National Financial Inclusion Strategy 2018-2020 aimed to enhance financial inclusion, including for SMEs and through microfinance and digital financial services, as well as to promote financial literacy and strengthen financial consumer protection. Reforms focused on improving the legal regulatory framework to expand access to financial services and increasing active usage, ensuring the presence of an effective financial consumer protection system, and establishing the first private credit bureau in Jordan, as well as promoting financial literacy. At the end of 2020, account holding jumped to 50% of the population from 33.1% in 2017, with the gender gap reduced to 29% from 53% in 2017. Jordan ranked 4th in the World Bank's 2020 Doing Business Report "getting credit" index, up from 134th in 2019.[47]

Morocco launched its national Strategy for Financial Inclusion in 2019. It aimed to further improve access to financial services and raise the financial account penetration rate from 34% to 47% of the adult population within five years. The strategy centers on eight strategic levers: rolling out of mobile payments, microfinance, inclusive insurance, facilitation of

[47] This index covers two aspects of access to finance—the strength of credit reporting systems and the effectiveness of collateral and bankruptcy laws in facilitating lending.

innovative financing tools, digitization of government to person payments, bank downscaling to accelerate financial inclusion of the MSME market, financial education, and overall governance of financial inclusion initiatives across the country.[48]

Djibouti launched its national financial inclusion strategy in 2021, with the aim to increase the current percentage of people benefiting from financial services from 26% to double in two years. The National Strategy for Financial Inclusion 2021-2026 aims to offer permanent access and effective use, by population, of a diversified range of financial products and services adapted to their needs and at affordable costs.

Melecky and Podpiera (2018) used a dataset to assess historical financial sector strategies covering 150 countries over 1985-2014 and did so using a rating criterion proposed by Maimbo and Melecky (2014). The quality of financial sector strategies can be assessed on the basis of four categories of strategic objectives: financial development, systemic risk management, implementation arrangements, and policy trade-offs. Key evaluation criteria for the financial development objective are whether a strategy has clear and well-quantified objectives and whether it identifies tools to support its development goals. Elements of an effective strategy to address systemic risk include: (a) the identification of potential risks, such as a significant increase in private sector indebtedness or imprudent behavior of financial institutions that could lay the foundations for instability; and (b) specification of an adequate set of measures or tools for mitigating and managing such risks. The quality of a strategy is also assessed on the basis of its plan for implementing the strategy and the coordination mechanism to be used, and whether

[48] Bank downscaling is the process through which banks target clients at the bottom of the pyramid through modifying products and outreach strategies.

the strategy assigns responsibilities and has a clear timeframe for implementing both the development goals and systemic risk management. Finally, an effective strategy should acknowledge, and have plans to address, the trade-off between development goals and systemic risks.

Melecky and Podpiera also investigated how the quality of the strategies can affect financial sector outcomes, such as financial depth, inclusion, efficiency, and stability. They found that the quality of strategies needed to improve across all countries, as the average rating of the quality of strategies is low. Only a few high-quality strategies, such as those for Malaysia and Switzerland, can serve as role models for other countries in their efforts to deploy financial solutions effectively. They also found that these approaches can support financial sector deepening, inclusion, and stability, especially if the strategies are of a good quality.

Policymakers should also exercise caution in choosing the targets of their financial inclusion strategies. They should not assume for example, that a rapid expansion of branches or ATMs or even accounts can automatically produce the desired macroeconomic benefits. Similarly, drives to open accounts can be successful in achieving this limited objective, but with questionable economic benefits. For example, experiments in Chile, Malawi, and Uganda led to rapid opening of accounts but little usage (Dupas et al., 2018), and the massive campaign in India produced 222 million new accounts, but the majority of them remain inactive (Agarwal et al., 2018).

Lastly, international experience (Melecky & Podpiera, 2018) shows that key factors for the success of financial sector strategies include adequate coordination across government agencies, efforts by the leading governmental agency (in many cases, the central bank) to consult

with the private sector, and regulatory reforms to promote better information sharing, contract enforcement, and insolvency regimes.[49]

3.6 Conclusion

The chapter documented key stylized facts and trends regarding financial inclusion in the MENA region. Despite some progress over time, both households and SMEs continue to lag in their use of financial services relative to other regions. Even though some financial systems mobilize an amount of funds that is large, relative to the size of the economy, broader access to and usage of financial services is often lagging, suggesting a weak relationship between financial depth and financial inclusion in the region, and raising questions about the nature and efficiency of capital allocation in MENA countries, in line with the lack of private sector development and economic diversification in many of these economies. The chapter also used an existing benchmarking framework to establish to what extent the observed household financial inclusion levels in the region indicate an over- or underperformance relative to countries sharing similar structural characteristics. Except for high income countries, most countries in the region exhibit significant gaps with respect to the structural benchmarks. This is a signal that policies would need to be improved to bring financial inclusion more in line with that of similar countries. Using the results of existing regression analyses relating medium-term growth to financial depth and financial inclusion, the chapter found that increasing financial inclusion for households and firms is associated with higher economic growth and greater job creation. In the MENA region, the potential benefits of increasing access to finance for households and SMEs are substantial:

[49] Malaysia is an example where an SME agency was given strong coordination powers and was able to reach across jurisdictions to gain consensus on policy priorities.

closing financial depth and household inclusion gaps could raise per capita real GDP by up to 18 percent over a decade and increasing SME financial inclusion for the MENA countries to the global average could boost annual economic growth and create about 6 million additional jobs by 2025.

This also suggests that MENA countries with large gaps—with respect to other regions or to structural benchmarks—could obtain substantial benefits from increasing financial inclusion. The key question then, is what is the best policy approach to achieve meaningful increases in financial inclusion?

The empirical results suggest that a holistic approach is needed to address the main market friction and other obstacles holding back financial inclusion. This approach would encompass a broad range of areas, such as institutional quality, macroeconomic stability, and adequate financial policy frameworks, as well as legal and regulatory conditions. In particular, policymakers should consider enhancing financial sector competition, credit information, and encourage the development of fintech activities. For increasing household financial inclusion, efforts at facilitating opening of basic accounts, channeling government payments directly into bank accounts, and enhancing trust in the financial system—including through targeted financial education programs—have proved effective. Broad strategies for financial development and inclusion can have an important impact as well, provided they are well-designed and are not limited to the achievement of a rigid and narrow numerical target for financial inclusion.

These policies are also likely to trigger a virtuous circle of greater financial inclusion and reduced informality, bringing about broader benefits to the economy. In contrast, partial policy approaches, such as strategies focusing solely on direct government interventions through state-

owned financial institutions or, credit guarantees, or interest rate caps, are unlikely to yield substantial benefits.

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Chapter 4

Implication of Gender Inequality on Growth: A cross-country analysis

4.1 Introduction

Notwithstanding the robust growth achieved over the past two decades in low-income countries, gender inequality continues to remain high. As shown by a number of studies (Cuberes & Teignier, 2015a; Elborgh-Woytek et al., 2013; Gonzales et al., 2015b; IMF, 2015a; WEF, 2014), greater gender equality boosts economic growth and leads to better development and social outcomes. There are several channels through which there is relationship between gender gaps and growth. For example, having more women in the labor force increases the pool of talent that employers can hire from, as well as the number of potential entrepreneurs. This can lead to a more efficient allocation of resources, and hence higher productivity and growth (Cuberes & Teignier, 2015a). Women are more likely to invest a larger share of their household income in the education of their children (Elborgh-Woytek et al., 2013). Finally, gender inequality is related to income inequality at the macroeconomic level, which in itself has been shown to slow economic growth (Ostry et al., 2014).

This growing empirical evidence regarding the adverse effects of gender inequalities on economic growth raises questions regarding its impact and persistence in low-income countries. Thus, the objective of this chapter is to investigate the impact high gender inequality has had on growth, particularly in low-income countries. Such results can better inform policy making to foster inclusive growth and progress towards the Sustainable Development Goals (SDGs) developed by the United Nations, which include the objectives of reducing gender inequalities. By making use of panel data of around 100 countries of regions including the Middle East and North Africa (MENA), Latin American and Caribbean (LAC), Sub-Saharan Africa (SSA), Asia

over the period 1990 to 2014, this chapter differs from other papers by testing for the effects of gender inequality on growth at different stages of development while accounting for the impact on income inequality on growth. Recent empirical work has mainly focused on the effect of either gender or income inequality (Ostry et al., 2014; Gonzales and others 2015b) on growth. To account for possible heterogeneity, we allow for the relationship to be different between low-income countries and the other countries in the sample. Our analysis thus allows to test whether the growth- gender inequality relationship varies between low-income and other countries in general. Using system-GMM estimations, the paper finds that income and gender inequality are found to jointly impede growth mostly in the initial stages of development. These findings are robust to alternative measures of income inequality.

This chapter is structured as follows. The next section presents the literature review on gender inequality and economic growth. The third section highlights some stylized facts about gender inequality in the various regions included in the sample for the analysis. The fourth section examines the empirical relationship between gender and income inequalities and growth. The last section concludes and offers a number of policy recommendations to reduce gender inequality, especially in the MENA and SSA regions where gender gaps and gender inequality are the highest.

4.2 Literature Review

Kim et al. (2016) developed a model to analyze the role of gender inequality on long-term economic growth. The model is based on Agénor (2012) but differs in some dimensions.[50] The computable Overlapping Generations (OLG) model is calibrated using microlevel data of Asian economies, and numerous policy experiments are conducted to investigate how various aspects of gender inequality are related to the growth performance of the economy. Simulations were conducted to quantitatively measure the opportunity cost of gender inequality in terms of output foregone and the long-term productivity gains and income growth that can be obtained by removing the barriers that prevent women from having equal access to education and employment opportunities. Results indicate that by eliminating gender inequality, aggregate income will be about 6.6% and 14.5% higher than the benchmark economy after one and two generations, respectively, while corresponding per capita income will be higher by 30.6% and 71.1% in the hypothetical gender-equality economy. This reflects the fact both fertility and population decrease as women are more active in the labor market.

Seguino (2000) investigated whether gendered outcomes in labor markets and education have macroeconomic effects and, in particular, whether gender inequality affects the rate of economic growth. The author defines this link tracing the effects of discriminatorily low wages for women on: (a) exports, and therefore technological change and productivity growth; and (b)

[50] Agénor (2012), and Agénor and Canuto (2013) develop an overlapping generation (OLG) model of economic growth that accounts endogenously for women's time allocation for home production, child-rearing, and market work. The model also accounts for bargaining between spouses, for gender bias in the form of workplace discrimination, and for mothers' time allocation for daughters and sons. The calibration shows that in a low-income country, the elimination of gender wage discrimination raises the steady-state growth rate by about 0.5% per annum.

investment. Based on a dataset of middle-income semi-industrialized economies with varying degrees of export orientation, the findings reported indicated that across countries, and over time within countries, there is a positive relationship between gender wage inequality and growth via both channels.

Klasen and Lamanna (2009) used cross-country and panel regressions to investigate the extent to which gender gaps in education and employment reduce economic growth. The results attested to the existence of two kinds of negative effects of gender inequalities, one that is direct, through the lower labor productivity of women, and the other indirect, through the influence of inequalities on demographic growth and investment. Similar results were reached by Klasen (2000), who investigated this relationship by examining the effects of gender inequality on the quality of human capital, investment, and population growth.

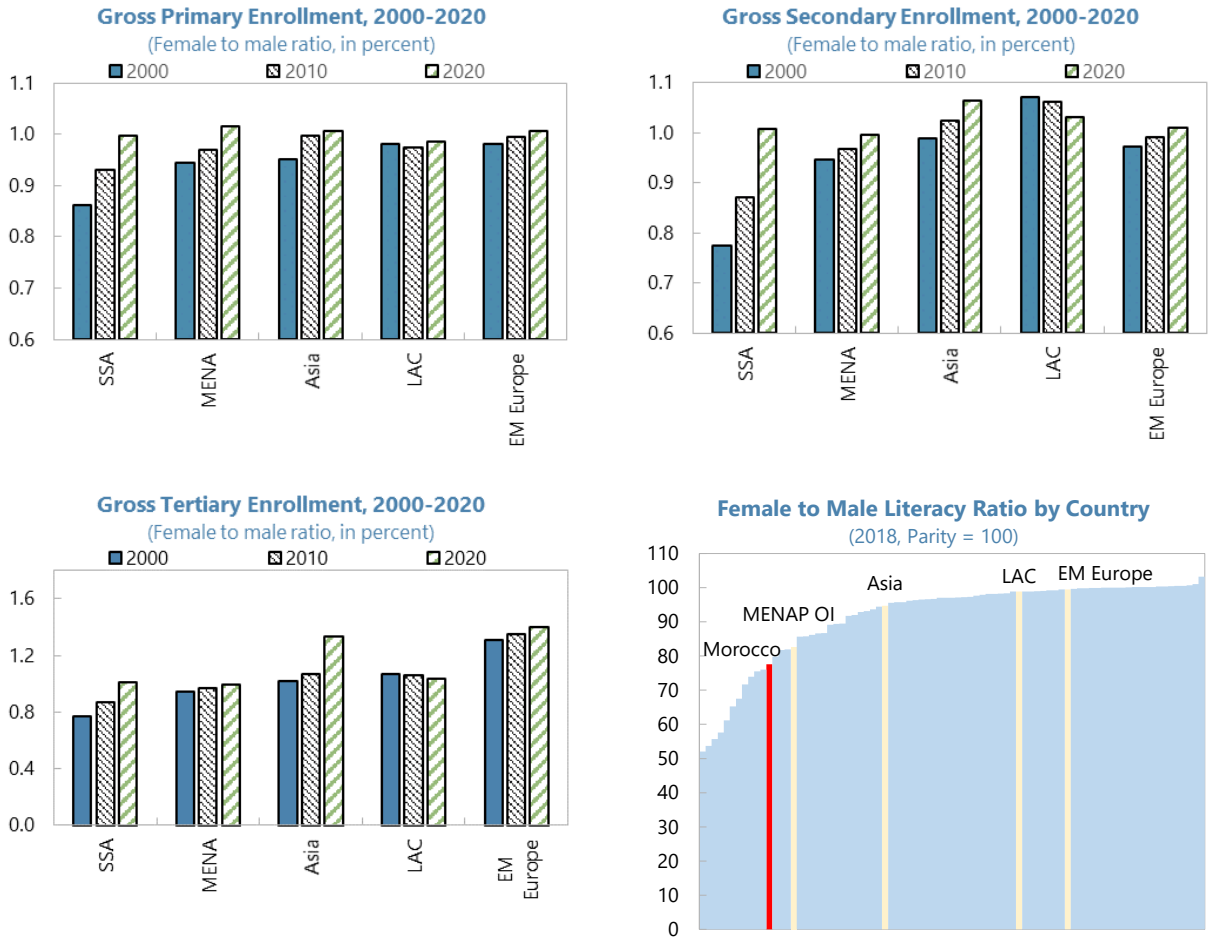
However, the contribution of various gender gaps to growth, after accounting for the impact income inequality, has been less investigated. Most studies examine the effects of different dimensions of gender inequality in separate regressions. Klasen and Lamanna (2009) looks at the impact of gender gaps in education or employment on growth. Elborgh, Woytek and others, (2013) discusses the impact of increasing female labor force participation on potential growth. A few papers who explored the association between growth and a variety of gender gaps (e.g., Mitra, Bang, and Biswas 2015, Amin, Kuntchev, and Schmidt 2015), did not investigate the possibility that income inequality could also capture other dimensions, such as for example the rural-urban income divide, that may also have an impact economic growth.

4.3 Stylized Facts

4.3.1 Education

Much progress has been made in closing gender gaps in education enrollment over the past few decades in the world. There are no more gender gaps at primary level and the gender gap for the secondary level have narrowed significantly, particularly in the SSA and MENA region. Meanwhile, for tertiary education, the gender gap favors women rather than men, as it is now above 100 percent, meaning that the ratio of women to men enrolled at tertiary level schools is now above 100 percent. However, gender gaps in the adult literacy rate still exist, especially for countries in SSA and MENA countries (Figure 4.1).

Figure 4.1: Education and Literacy



Sources: ILO; WDI; and staff calculations.

MENAP OI: Middle East and North Africa, Oil Importers

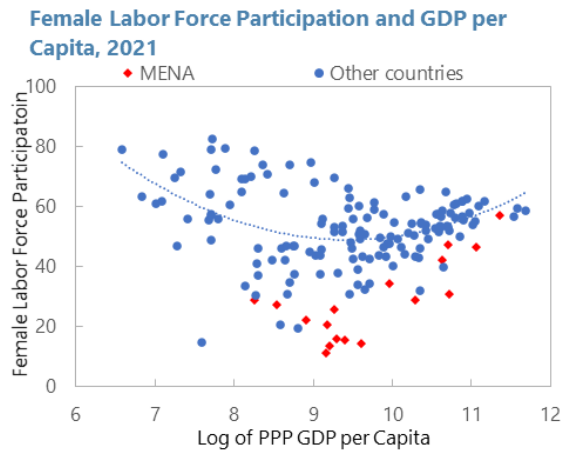
EM Europe: Emerging Markets Europe

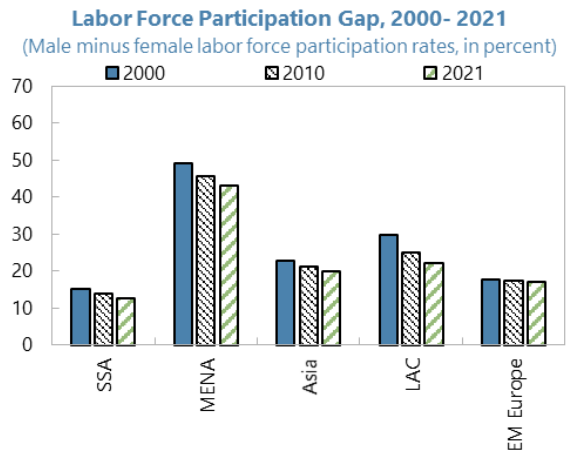
4.3.2 Labor Market

Gender gaps in the labor market are particularly large for the MENA region, followed by the LAC region. The rate of women's participation in the labor force in the MENA region lags behind other countries at a similar income level (Figure 4.2). There are important regionally

specific factors such as history, religion, and culture, as well as social norms that explain the low level of female labor force participation in the MENA region (World Bank 2012). Several papers (Verme and others 2014, World Bank 2015) have argued that jobless growth—coupled with factors such as marriage, education, household composition, perceptions of the role of the women in the household, and society's values regarding gender issues—tends to disproportionally influence female labor force participation. Verme and others (2014) highlight that the slow pace of structural transformation has not allowed sufficient creation of manufacturing jobs where women with a secondary school education could be employed. They also find that marriage and household composition also influence the probability of participation. Educated women are likely to marry educated men who have done better than women in the labor market and may be able to support their families on their own.

Figure 4.2: Female Labor Force Participation Gaps



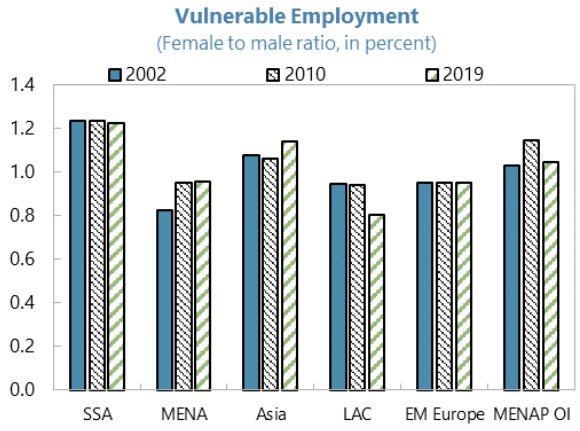


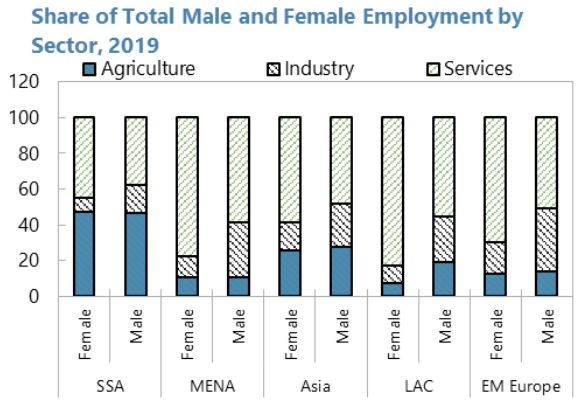
Sources: World Bank; ILO; and author's calculations.

Red dots represent countries in the MENA region

There are also some gender disparities in employment rates as highlighted in Figure 4.3. This figure shows that a smaller share of women working in the industry sector relative to men. It also shows that women are more likely to work in agriculture and services and they tend to occupy more informal and low-quality jobs, particularly in the MENA and SSA regions compared to men (Figure 4.3).

Figure 4.3: Employment Levels by Gender, Sector





Sources : ILO; and author's calculations.

4.3.3 Gender Inequality Index

Gender inequality is measured by the United Nations' gender inequality index (GII). A composite index of gender inequality is useful because different gender gaps are often correlated and re-enforcing each other. The GII captures gender inequality in health (maternal mortality ratio and adolescent fertility rate), empowerment (gap in secondary education and share of parliamentary seats) and economic participation (gap in labor force participation rates). A low GII value indicates low inequality between women and men, and vice-versa. As shown below, gender inequality remains high in SSA countries (Figure 4.4), despite improvement arising from shrinking gender gaps in education, and the fact that female labor force participation rates are on average the highest in the world in SSA. These reflect higher gender inequality in health and share of parliamentary seats. For the MENA region, higher gender inequality than in other regions reflect mainly gaps in labor force participation and share of parliamentary seats.

Figure 4.4: Gender Inequality Index and GDP per Capita

Sources: UNDP and World Bank

4.4 Empirical Analysis

4.4.1 Data

The sample consists of around 100 countries of regions including MENA, LAC, SSA, Asia and selected advanced economies over the period 1990 to 2014. The selected factors influencing GDP per capita growth are described in Table 4.1. The variables are averaged over a window of a 5 years. The gender inequality index captures a combination of intra- and inter-household inequality to the extent that women are either a member of a household or the head of the household. The two measures for income inequality capture inequality at the household level.

Table 4.1: Description of the variables used in the growth regression

Variable	Description	Source
Initial income inequality (t20/b40)	Ratio of income distribution at the top 20 relative to that of the bottom 40 percent of population.	Primarily World Development Indicators (WDI) database, augmented by the UNU-WIDER database.
Initial income inequality (Gini)	The traditional Gini measure of inequality. In this chapter, we use "net" Gini. the first value of the five years is taken into account; that of the previous year when data is missing.	The Standardized World Income Inequality Database (SWIID v.5.0).
Gender inequality	UN's gender inequality index (GII). This index is a combination of various gender gaps in terms of opportunities and outcomes	UNDP
Initial income per capita	The logged real GDP per capita in the first year in each five-year period.	The Penn World Tables (PWT v.8.0).
Fixed capital investment	Gross fixed capital formation in percent of GDP, averaged over five-year periods.	Primarily from the PWT, with some augmentation from the World Bank's WDI.
Schooling	Average years of schooling (in each five-year period) for the population aged 15 and above	Barro-Lee database
Infrastructure index	Composite index from principle component analysis with variables including mobile phones and internet per 100, access to electricity and water, total air transportation of passengers per year and population	World Bank's WDI
High inflation	A dummy variable with value 1 if average annual inflation in consumer prices over a given five-year period is more than 15 percent.	MF World Economic Outlook database.
Institutional quality	A composite index of political risk; higher values of the index (ranging 0-100) imply better quality of institutions and hence lower risk	This is the political risk index from the International Country Risk Guide (ICRG).

Source: Author

4.4.2 Methodology

Despite a few contributions on the topic (see previous section), empirically identifying a causal impact of gender inequality on economic growth is a challenge. The methodology in this literature is to use a regression analysis that relates the countries' per capita income growth to different variables that are proxies of gender inequality and then to control for growth covariates, such as the level of investment, openness to trade, and governmental and institutional quality

(see, for example, Gonzales and others 2015). These approaches can however raise endogeneity concerns as reverse causality is an issue when looking at the role of gender inequality for economic development. On the one hand, development can play a major role in reducing gender inequality. On the other hand, higher gender equality may also support economic development (Duflo 2012; Stotsky 2006; IMF 2013).

To address these challenges, one can use instrumental variable techniques, but it is challenging to find a plausible instrument that contributes to growth only through its impact on gender inequality. Klasen (2002) uses the instrumental variable method in a cross-country study, to address the endogeneity of gender inequality in education and to relate it to economic development. Esteve-Volart (2004), using the instrumental variable analysis, provides suggestive evidence that gender discrimination in the labor market may hamper economic growth. Kazandjian and others (2016), using the instrumental variable generalized method of moments technique (IV-GMM), shows that gender inequality can impede output diversification and lower exports.

In our analysis, we choose system-GMM estimations, which are typically used for few time periods and many individuals; independent variables that are not strictly exogenous, meaning they are correlated with past and possibly current realizations of the error and fixed effects. To estimate the system-GMM regressions, we use the Xtabond2 package for STATA (Roodman 2009). We augment a standard growth model with added gender and income inequality indicators. The following equation is estimated:

$$y_{i,t} = \alpha_t + \beta_{1,\mathrm{i}} + \beta_{2,i} X_{i,t} + \varepsilon_{i,t}, \tag{4.1}$$

In which $y_{i,t}$ is GDP per capita growth, $X_{i,t}$ captures explanatory variables the log of initial GDP, investment, education, infrastructure index, institutional quality, and a dummy variable set to capture periods of high inflation and including gender and income inequality measures. $\varepsilon_{i,t}$ is

the error term and the regression includes country ($\beta_{1,\mathrm{i}}$) and time (period) (α_t) fixed effects. Possible heterogeneity of the relationship between growth, gender and income inequalities are captured through an interaction term between measures of gender and income inequalities and a dummy for low-income countries.

System GMM estimation assumes that good instruments are not available outside the immediate dataset and the only available instruments are "internal"—based on lags of the instrumented variables. Various specification tests are performed to ensure that the assumptions of no second-order serial correlation in the errors and that the instruments are valid. To show no second-order serial correlation, we use the Arellano–Bond test statistic. Moreover, since the system GMM estimators generates a large number of instruments, this can result in over-identification issues. Therefore, we apply the Hansen J statistic to test for over-identification to check whether this is a concern.[51]

4.4.3 Estimation Results

[51] We choose to report the Hansen J test over the Sargan test as the p-value of Sargan test is very sensitive to the proliferation of instruments. But both provide consistent results in this case.

Table 4.2: System GMM results

	(1)	*(2)*	*(3)*	*(4)*
Control variables				
Initial income per capita (log)	-1.267***	-1.438***	-1.913***	-1.421***
Fixed capital investment (% GDP)	0.131***	0.108***	0.084**	0.103***
Schooling (years)	0.021**	0.005	0.024**	0.018**
Infrastructure index	0.177	0.590**	0.252	0.262**
High inflation	1.277	0.064	5.496	-0.738**
Institutional quality	0.130***	0.089**	0.178**	0.063**
Measures of inequality				
Share top 20 to bottom 40 ratio	-0.040			-0.116**
Share top 20 to bottom 40 ratio x LICs	-0.129*			
Initial income inequality (net GII)		0.006		
Initial income inequality (Net Gini) xLICs		-0.022**		
Gender inequality			-0.039**	-0.003
Gender inequality x LICs			0.0005	-0.019**
Number of instruments	18	18	21	21
Arellano-Bond AR (2) (p value)	0.460	0.105	0.349	0.220
Hansen (p value)	0.566	0.410	0.296	0.491
Observations	380	450	369	234
Number of countries	97	97	97	70
Country fixed effects	Yes	Yes	Yes	Yes
Time (period) fixed effects	Yes	Yes	Yes	Yes

Source: Author's calculations.

The dependent variable is real GDP per capita growth, averaged over non-overlapping 5-year periods, for 1990–2014. LICs group includes countries classified as low-income and lower-middle income countries by the World Bank.

The symbol *, **, and *** indicate that the estimated coefficient is statistically significantly different from zero at the 10, 5, and 1 percent level, respectively.

The main results in Table 4.2 are as follows:

Control variables

Initial income is found to be negatively associated with GDP per capita growth—as lower levels tend to be associated with higher growth as countries catch up (Model 1-4). Poor macroeconomic management (proxied by the high inflation dummy inflation) is also negatively associated with GDP per capita growth (Model 4). The quantity of capital force (proxied by fixed capital investment as a percentage of GDP) is positively

associated with GDP per capita growth (Model 1-4). The quality of labor force (proxied by years of schooling) is also positively associated with GDP per capita growth (Model 1, 2 and 4). The quality of infrastructure (proxied by the infrastructure index) is positively associated with higher growth (Model 2 and 4). Lastly, the quality of political management (proxied by institutional quality) is positively associated with growth (Model 1-4). These results are in line with previous studies (Gonzales and others 2015) that also found that variables such as initial income per capita, investment, education, political institutions have an impact of growth.

Income Inequality

In model 1 and 2, income inequality is robustly related to lower growth in low-income countries, irrespective of the measure of income inequality. The negative association between growth and income inequality among low-income countries is robust to the measure of inequality, proxied by the Gini coefficient and the income gap between the richest (top 20 percent) and the poorest (40 percent bottom) segments of the population. For example, a one-percentage point reduction in the initial Gini coefficient in low-income countries is associated with a 0.11 percentage points cumulative increase in growth over a 5-year period. These findings are consistent with previous studies, which find the relationship between growth and inequality negative below a certain threshold of income per capita (see Neves and Silva 2014).

Gender Inequality

In model 3, growth is also negatively associated with the multidimensional index of gender inequality. The findings suggest that a one percentage point reduction in gender

inequality in low-income countries is associated with cumulative growth over 5 years of 0.39 percentage points. This result is in line with previous estimates (Amin, Kuntchev, and Schmidt 2015).

Gender and Income Inequalities

In model specification (4), gender inequality appears to significantly and negatively impact growth for low-income countries only when the model includes both gender and income inequalities. The findings suggest that a one percentage point reduction in gender inequality in low-income countries is associated with cumulative growth over 5 years of about 0.2 percentage points in low-income countries. One plausible explanation is that since gender inequality tends to be higher in countries that are at an early stage of development, its effect tends to decrease as the economy grows (e.g., reverse causality).

Arellano-Bond and Hansen J test

The Arellano–Bond test statistic is used to show no second-order serial correlation. Based on the results, we accept the null hypothesis that the errors terms are not serially correlated. Moreover, we applied the Hansen J statistic to test for over-identification. The joint null hypothesis is that the instruments are valid. This statistic passes the criteria for no over-identification problem. We conclude that the Hansen J test for overidentification does not reject the validity of the instruments.

4.5 Conclusion

This chapter examines the effects of gender inequality in a panel of 100 countries over the last two decades. We find that further progress in reducing gender inequality could deliver significant sustained growth dividends. The results that both gender inequality and income inequality jointly matter for growth in low income-countries, implies that gender inequality

affects growth via different channels than income inequality for these countries. The implications for regions with a large share of low-income countries such as MENA and SSA are important. These two regions have made progress in reducing gender inequality over the last twenty years, but they continue to be characterized by comparatively high levels of gender inequality (SSA region) and gender gaps (MENA region).

It is therefore particularly important for MENA and SSA countries, to make progress with reducing gender inequalities to achieve sustained growth. The fact that the SDGs explicitly recognize gender inequality as a separate goal is encouraging. The SDG goal on gender equality (SDG 5) aims to achieve gender equality by ending all forms of discrimination, violence and any harmful practices against women and girls in the public and private spheres. It also calls for the full participation of women and equal opportunities for leadership at all levels of political and economic decision-making. Countries in the MENA and SSA regions should develop comprehensive strategies in this area, which would also support their economic development goals.

While legal restrictions based on gender and other gender gaps are often the consequence of social norms, an issue that goes beyond the scope of this chapter, the removal of legal restrictions and increasing the accessibility of education and healthcare may boost the likelihood for social norms to change. Replacing maternity and paternity leave with parental leave options could also help break down gender stereotypes and encourage female labor force participation. Equality in inheritance rights can also create opportunities for women to own housing or land (World Bank, 2015) and then lead to smaller gender gaps in labor force participation (Gonzales et al, 2015a). The World Bank's 2022 Women, Business, and the Law report notes that the legal framework in several MENA and SSA countries still allows for gender inequality in pay,

marriage-related constraints, property and inheritance laws, and pensions. While most studies have emphasized the importance of education in models of female labor supply, a number of studies have also included wages as a key in modeling female labor supply models (Heckman and MaCurdy 1980). Women also face barriers should they choose to work after having children. Access to safe public transportation and improved road accessibility can decrease women and girl's travel time and therefore reduce the costs related to work and going to school outside the home (World Bank, 2016). Governments could invest in public childcare facilities, that would free women's time to go to school and join the labor market, since women spend the most time on household work. Fiscal policies can be effective in promoting gender equality. Gender budgeting, for example, allows fiscal authorities, at any level of government, to assess the needs of men and women; identify key outcomes or goals; plan, allocate, and distribute public funds; and monitor and evaluate achievements.

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