



HAL
open science

Winners, Losers and the Political Economy of the Middle East and North Africa: A brief look at industrial development, trade, productivity and jobs

Michelle Marshalian

► **To cite this version:**

Michelle Marshalian. Winners, Losers and the Political Economy of the Middle East and North Africa: A brief look at industrial development, trade, productivity and jobs. Economics and Finance. Université Paris sciences et lettres, 2019. English. NNT : 2019PSLED056 . tel-03222257

HAL Id: tel-03222257

<https://theses.hal.science/tel-03222257>

Submitted on 10 May 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



THÈSE DE DOCTORAT
DE L'UNIVERSITÉ PSL

Préparée à Dauphine - PSL

**Winners, Losers and the Political Economy of the Middle
East and North Africa: A brief look at industrial
development, trade, productivity and jobs**

Soutenue par

Michelle MARSHALIAN

Le 28 Juin, 2019

École doctorale n°numéro

École doctorale d'économie

Spécialité

Économie

Composition du jury :

El Mouhoub MOUHOUD Dauphine- PSL	<i>Directeur</i>
Mohamed Ali MAROUANI Paris 1 Panthéon-Sorbonne	<i>Co-Directeur</i>
Philippe DE VREYER Dauphine-PSL	<i>Président</i>
Leila BAGHDADI Tunis Business School	<i>Rapporteur</i>
Steffen HERTOGE London School of Economics	<i>Rapporteur</i>
Stijn BROECKE OECD	<i>Suffragant</i>
Ishac DIWAN Columbia University; PSL	<i>Suffragant</i>
Adeel MALIK Oxford University	<i>Suffragant</i>

UNIVERSITÉ PARIS-DAUPHINE, PARIS
SCIENCES ET LETTRES (PSL)

SUBMISSION FOR DOCTORAL THESIS

**Winners, Losers and the Political
Economy of the Middle East and
North Africa: A brief look at
industrial development, trade,
productivity and jobs**

*A thesis submitted in fulfillment of the requirements for the degree of
Doctoral Degree in Economics*

Développement, Institutions et Mondialisation (DIAL)
Laboratoire d'Économie de Dauphine (LEDa)

October 30, 2019

“The past resembles the future more than one drop of water resembles another. ”

Ibn Khaldun, *The Muqaddimah: An Introduction to History*

“We should not be ashamed to acknowledge truth from whatever source it comes to us, even if it is brought to us by former generations and foreign people. For him who seeks the truth there is nothing of higher value than truth itself ”

Albert Hourani, *A History of the Arab Peoples*

Abstract

The political economy is an important determinant of the successes and failures of public policies. This dissertation explores how the political economy has shaped socio-political outcomes. I use a comparative study, a case study of a fiscal subsidies, and a case study of liberalization to elaborate this point. In the comparative study on Turkey and Tunisia, I observe that workforce skills have a measurable impact on productivity in Turkey, a country that abandoned import substitution industrialization at a relatively early stage. Whereas the post-colonial institutional setting of the economy and relatively later import substitution industrialization in Tunisia is not amenable to harnessing the skills of the workforce for productivity — even if levels of education were historically higher than in Turkey. A case study on government intervention in the form of firm subsidies in Tunisia finds that governments can use firm subsidies to extend control over the private sector, while still reporting measurable and observable positive benefits to the economy. Lastly, a case study on liberalization demonstrated in Egypt that reforms to remove administrative and tariff barriers disproportionately helped firms in industries with no known government cronies and reduced tariff evasion. However, government cronies operating in the historically important natural resource sector still reaped benefits from liberalization reforms.

Résumé

Les succès et les échecs des politiques publiques sont, en large partie, sont influencés par le contexte politique et institutionnel des économies. Cette thèse analyse la manière dont les résultats socio-économiques des pays de la région MENA sont déterminées par l'environnement institutionnel et politique des différents pays. Trois essais sont proposés. Le premier étudie l'impact des qualifications sur la productivité à l'aide d'une comparaison entre deux pays, la Turquie et la Tunisie. Le second analyse l'impact des subventions sur les performances des firmes. Le troisième étudie l'effet de l'ouverture commerciale sur les importations des biens manufacturés selon que les firmes font partie des secteurs connectés au pouvoir politique ou pas, dans le cas de l'Égypte.

L'étude comparative Turquie-Tunisie, montre que les compétences des travailleurs ont bien un impact mesurable sur la productivité de la Turquie, mais pas en Tunisie. En Turquie, l'industrialisation par substitution aux importations a été démantelée relativement tôt, alors qu'en Tunisie la politique postcoloniale a abandonné sa politique d'industrialisation par substitution aux importations relativement tard. En conséquence, le haut niveau des compétences de la main-d'œuvre en Tunisie n'a pas pu contribué à la productivité à la différence de la Turquie. Ensuite, l'étude de l'intervention gouvernementale sous

forme de subvention auprès des firmes en Tunisie, montre que, comme attendu, les subventions permettent aux gouvernements d'étendre leur contrôle sur les entreprises privées. Cette politique a produit des effets contrastés sur les entreprises tunisiennes. Elle a favorisé l'emploi dans les petites entreprises, tandis que dans les grands entreprises, c'est le capital qui en a bénéficié. Enfin, le dernier essai concernant l'économie égyptienne montre que la réduction des barrières commerciales a davantage bénéficié aux firmes présentes dans les secteurs dans lesquels on n'observe pas de lien de connexion entre l'Etat et les entreprises. La réduction de l'évasion fiscale-douanière favorise les firmes plus compétitives.

Acknowledgements

First and foremost, I would like to thank my jury, Leila Baghdadi, Ishac Diwan, Steffen Hertog, Adeel Malik, Philippe deVreyer, Stijn Broecke. Your attention to my work and the feedback you have given me has improved my PhD and helped me learn how to question my own work. Secondly, I would like to thank my directors El Mouhoub Mouhoud and Mohamed Ali Marouani, without whom, none of this would have been possible. I thank also the various people who have validated (and helped me re-consider) my work. Over the past few years, this has included Francisco Serranito, François Libois, Clementine Garrouste, Emmanuelle Lavallée, Chahir Zaki, Tina Soriede, Quoc-Anh Do, Daniela Scur, Thomaz Teodorovicz, Rim Chabbeh, Hassen Arouri, Monji ben Chabin, Bob Rijkers, Steve Bond, Julien Gourdon, the people at the Economic Research Forum and the list definitely goes on. Unfortunately, my memory has a present-time period bias, and there have been many more people who have supported me along the way.

I would like to take a moment to elaborate a bit more about Mohamed Ali's contribution in particular. I learned more from my interaction with him than in my 6 years of work experience prior to starting my PhD, and I have him to thank for teaching me how to be above all, human. Next, I would like to acknowledge my other co-authors, Gunes and Ulas, through whom, I've learned how to agree and disagree, how to check and re-check and how to come to a consensus on what we can confidently say.

I have a special thanks to people who have helped me edit this book. Including my (poor) family members who put up with my Frenchified English, Natalie for the first round, and Richard for the second round. I also have to give thanks to my friends who supported me and reviewed my work Irit, Korin, Cem, Ana, Morgan, Lam and Austin; and the team at Leda including Clara, Doriane, Charlotte, Christian, Manuel, Raphael, Thomas, Sandra, Dio, Arnold, Etienne(s), Alexis, Lexane, and all the others who have provided inspiration at Dauphine.

There is also a list of people who provided moral supported over the years. Joe, who as my first real mentor. Even though I lost him last year, he is still one of the most important people who has brought me to where I am today. Next, Laura who was always available to talk me through my existential crises. Chloe, without whom I would have never pushed hard enough to do my PhD. Irit, who was there for me when times got tough. Monica, who helped me learn how to focus with popcorn and tapatio. Sharon, my good friend and close confidant from post-Sciences Po years. Francesco, for checking up on me. Cem, who came stumbling into my life a year ago and with whom I will definitely be celebrating this 28th of June. Sebastian,

who definitely lost the bet (on when I would finish my PhD) and now needs teach me how to drive manual.

Last but not least, my family has made this possible for me: To my sisters Natalie, Niyera, and Danila. To Richard, my main competition for being crowned Cesar in our family household and Lawrence, the funnier, and wiser brother. To my cousins and in particular Sally, Hrant and Liza.

I would also like to thank all my old colleagues who have helped me develop as an analyst and researcher, Wen-Hao, Gwenn, Nicole, Maud, Paul, Mark, Tatyana and Reyes, among the ton of other people who have supported me in the past either with technical support, or just a coffee. A special mention goes to Sama Aweidah, who taught me what it meant to have strength in the face of adversity. Nadera, who took a chance on me. I have to give thanks to the Tunisian family, Hayat and Abdou. They welcomed me (adopted me, is potentially the correct word to use) into their house, shared very organic and slow-cooked meals (including one of the best mullukhia of my life).

Of course no one has been more influential in my life than my mother and father, without whom I would be nowhere. To my father, who gave me a love for travelling, history and story-telling. To my mother, who taught me how to be a hard worker and still be available for the important times. To Alfred whom I loved like a second father.

And finally, to Grandfather, Daoud, who taught me how to ride a bike, care for jasmines and to adapt to unexpected turns in life. Thank you for teaching me right from wrong. I dedicate this book to you.

To my grandfather.

Նվիրված է մեծ հայրիկիս հիշատակին

Contents

Acknowledgements	vii
Contents	xi
List of Figures	xiii
List of Tables	xvii
Introduction	1
0.1 Why do we care about institutions and the political economy?	2
0.2 The political economy of government interventionism	7
0.3 Can we cure political capture with competition, or is “laissez-faire” just French for laziness?	12
0.4 Objectives and Chapter Outlines	14
1 Productivity, structural change and skills dynamics: Evidence from a half- century analysis in Tunisia and Turkey	17
1.1 Introduction	18
1.2 A brief comparative historical setting for industrial development and skills in Turkey and Tunisia	20
1.3 Decomposing Productivity and Skills Demand from 1960 to 2010: Data and methodology	25
1.4 Decomposition analysis	26
1.5 Modeling productivity decomposition for regression analysis	32
1.6 Conclusion	42
2 Winners and Losers in Industrial Policy 2.0: A Political Economy evalua- tion of the impacts of the Tunisian Industrial Upgrading Program	45
2.1 Introduction	46
2.2 The Tunisian Industrial Upgrading Program (IUP)	49
2.3 Data Description	51
2.4 Identification Strategy and Econometric Approach	53
2.5 Descriptive Analysis and Regression Results	56

2.5.1	The Perception Survey and descriptive findings from the national firm registry.	56
2.5.2	Regression Analysis	59
	Size and the political economy of industrial policies	70
	Exports by treatment group	71
2.5.3	Caveats and sensitivity testing	74
2.6	Winners and Losers: A short discussion	75
2.7	Conclusion	77
3	Trade, Tariffs and Missing Imports: Using trade liberalization to understand business-state relations in Egyptian manufacturing	79
3.1	Trade and cronyism in context	82
3.2	The Presidential Decree No. 39/2007	84
3.3	Data Description and Identification Specification	87
3.4	Descriptive statistics	92
3.5	An Applied Empirical Approach	94
3.6	Results	96
3.7	Robustness tests and Caveats	101
	3.7.1 A few caveats	104
3.8	Understanding how privileges work	105
	3.8.1 Accounting for missing imports	105
	3.8.2 Understanding economic complexity of imports	110
3.9	Conclusions and Policy Implications	114
	Conclusions	115
	A Appendix: Chapter 1	117
	B Appendix: Chapter 2	143
	C Appendix: Chapter 3	157
	Bibliography	173

List of Figures

1	Corruption Perceptions and Growth	3
2	Institutional Quality and GDP per capita	5
1.1	Composition of Education	23
1.2	Sectoral Composition of Value Added	24
1.3	Sectoral Composition of Employment	25
1.4	Total Productivity Decomposition	28
1.5	Structural Change and Within Component (as a % of total skills up- grading)	29
1.6	Skills Decomposition	31
2.1	Distribution of IUP funds by region	51
2.2	Reported Increases in Employment, Revenue and Export outcomes (Perceptions Survey)	57
2.3	Employment, Revenue and Wages, 2000-2017 (Registered Data) . . .	58
2.4	Matching performance: Kernel Density of Employment and wages .	60
2.5	Matching performance: Variable Bias Reduction	61
2.6	Product & Market Diversification, by treatment status	71
2.7	Price Concentration using the Theil Entropy Index, by treatment sta- tus (after)	73
3.1	Time and Financial Costs to Import (In Days and USD)	87
3.2	Trends in Egyptian Imports and exports	93
3.3	Trends in Egyptian Imports and exports	94
3.4	Effective Tariff rates versus WTO Bound Rates	100
3.5	Differences in missing imports	106
3.6	Dispersion (standard deviation) of the log differences, by year	107
3.7	P propensity to belong to a connected industry, by level of technology	111
A.1	Sectoral Composition of Value Added	123
A.2	Sectoral Composition of Employment	124
A.3	Composition of Education	125
A.4	Government Employment	126

A.5	Total Government Employment	127
A.6	Total High Skilled Government Employment	128
A.7	Cross-correlations for Productivity and Skills Decomposition	129
A.8	Cross-correlations for Productivity and Skills Decomposition	130
A.9	Correlations for Productivity and Skills Decomposition	131
A.10	Productivity Decomposition Correlations, by sector	132
A.11	Turkey : Productivity Decomposition Correlations by sector	133
A.12	Total Productivity Decomposition	134
A.13	Structural Change and Within Component (as a % of total skills up- grading)	135
A.14	Productivity in Tunisia	136
A.15	Productivity in Turkey	137
A.16	Productivity (levels) and Share of Employment (Tunisia)	138
A.17	Share of Productivity (levels) and Share of Employment (Turkey)	139
A.18	Skills Decomposition	140
A.19	Turkey: Fitted versus Actual Productivity Estimates	141
A.20	Tunisia: Fitted versus Actual Productivity Estimates	142
B.1	Distribution and rejection rates of IUP funds by region	143
B.2	Differences in Reported Increases in Employment, Profitability and Export outcomes	144
B.3	Decomposition of expected investment	144
B.4	Competitiveness	145
B.5	Technological Level	145
B.6	Innovation	146
B.7	Wages and Employment, by treatment status (after)	147
B.8	Profits and Profitability, by treatment status (after)	148
B.9	Thiel's Generalized Entropy Index for Market and Product Concen- tration	149
B.10	Thiel's Generalized Entropy Index for Product Concentration	150
B.11	Thiel's Generalized Entropy Index for Product Concentration	151
C.1	Distribution of Value of Imports	158
C.2	Total and Average Imports to Manufacturing Industry	158
C.3	Change in Egyptian Export Values	162
C.4	Distribution of log of differences (under-reporting), by year	168
C.5	Distribution of log of differences (under-reporting), by group	168
C.6	Distribution of log of differences (under-reporting), by industry	169
C.7	Distribution of standard deviation of the log differences, by year	169
C.8	Distribution of z-scores of the log differences, by year	170

C.9 Log of Differences, by Trade Agreement	170
C.10 Log of Differences, by Year	171
C.11 Log of Differences, by Industry Groups	171

List of Tables

1.1	OLS Estimations for Sectoral Productivity (Value-Added per worker), Turkey	36
1.2	OLS Estimations for Sectoral Productivity (Value-Added per worker), Tunisia	37
1.3	OLS and 2SLS Estimations of Sectoral Productivity, Turkey	39
1.4	OLS 2SLS Estimations of Sectoral Productivity, Tunisia	40
2.1	Impact of the IUP on Average Wages from 2000-2017.	63
2.2	Impact of the IUP on Average Wages, by size.	64
2.3	Impact of the IUP on Employment.	67
2.4	Impact of the IUP on Employment, by size.	68
2.5	Impact of the IUP on Net Job Creation, by size.	69
2.6	Sensitivity check using artificially induced errors in identification of treated firms.	75
3.1	The impact of trade reform on imports to connected and non-connected industries	97
3.2	Placebo test in the pre-treatment years.	102
3.3	Impact of trade reform on import values with and without missing imports	109
3.4	Impact of Reducing Red Tape on Connected and Non-Connected Industries	113
A.1	Classification of goods in value chains from CEPII-CHELEM	118
A.2	OLS Estimations for Sectoral Productivity (Value-Added per worker), Turkey	119
A.3	OLS Estimations for Sectoral Productivity (Value-Added per worker), Tunisia	120
A.4	OLS and 2SLS Estimations of Sectoral Productivity, Turkey	121
A.5	OLS 2SLS Estimations of Sectoral Productivity, Tunisia	122
B.1	Description of main variables	152
B.2	Sample T-test for difference between treatment and control group.	153

B.3	Indicators of Market Concentration	153
B.4	Indicators of Product Concentration	154
B.5	Technology-intensiveness of goods (Lall 2000)	155
C.1	Selected 4-digit industries and types of political connections	159
C.2	Description of main variables	160
C.3	Impact of Reducing Trade Barriers on Connected and Non-Connected Industries on import values (Panel Model)	161
C.4	Changes in Log of Import Values (USD): 1-year lagged results	163
C.5	Placebo test outcomes on Log of Import Values	164
C.6	Impact of Reducing Trade Barriers on Connected and Non-Connected Industries (Export values)	165
C.7	Impact of Reducing Trade Barriers on Connected and Non-Connected Industries, without imports from "Free Zones."	166
C.8	Impact of Reducing Trade Barriers on Connected and Non-Connected Industries, by relatively high and low numbers of connections per industry.	167

A Brief Introduction to 3 Essays on the Political Economy in the Middle East and North Africa.

Where has all the development gone? The literature on economic growth in the global south is riddled with advice on how to reduce the gap between wealthy and developing countries, and within societies between the rich and the poor. We commonly see prescriptions involving the use of a mixture of social policies and market-oriented policies. However, historical institutions and incentives among those in power are often blatantly overlooked when prescribing solutions to encourage growth and inclusiveness. The role of individual agency of elites has taken a backseat in the field of public economics, but the persistence and polarizing consequences of elite entrenchment remain strong (Acemoglu and Robinson, 2008; Shleifer and Vishny, 1993; Coase, 1937; North, 1990; Hall and C. I. Jones, 1999). This leads me to the core of my thesis.

The primary and historical purpose of governments, according to Tilly (1978) and Scott (1998) is to raise funds for territorial defense against external threats and internal management of power conflicts. Yet, the political economy of government interventions is filled with opportunists and philanthropists who are either *laissez-faire* advocates or *interventionalists* based on the alignment of a system of institutional incentives. Ibn Khaldun, the late medieval, Al-Andalus-Tunisian scholar in the 14th century who later greatly influenced Ottoman philosophers and historians, cautioned the political elite facing such decisions. The real purpose of governments was first to be concerned with defense against its enemies, and secondly, to create a just and secure society. High among his concerns were about the pitfalls of deriving economic gains for public officials. Ibn Khaldun's advice is modern in its mission and still relevant today, not just for the Arab countries, but also for fragile western democracies.

No matter how it is framed, the grand debate on public economics is still divided into two main groups: interventionists who think the government should be used to correct market failures; and *laissez-faire* proponents who believe the government creates more market failures than it corrects. In institutional literature, Djankov, Glaeser, et al. (2003) identify the equivalent of these two opposites as the two most significant dangers society faces, *disorder versus dictatorship*. There is rarely a common ground between these two views. Like Djankov, I argue that this is because they do not adequately take into consideration the primacy of the political economy and historical institutions in their analysis. Finding a common ground between these opposite approaches involves taking the political economy and historical institutions into account before proposing a model for public economics. This thesis is composed of three essays identifying the role of incentives in the political economy as the diverging cornerstone between these two schools of thought. I argue that the incentive structure of the political economy should guide whether reform agendas should take a *laissez-faire* or *interventionist* approach. It includes a comparative historical approach, a case study of government interventionism, and a case study of *laissez-faire* economics.

0.1 Why do we care about institutions and the political economy?

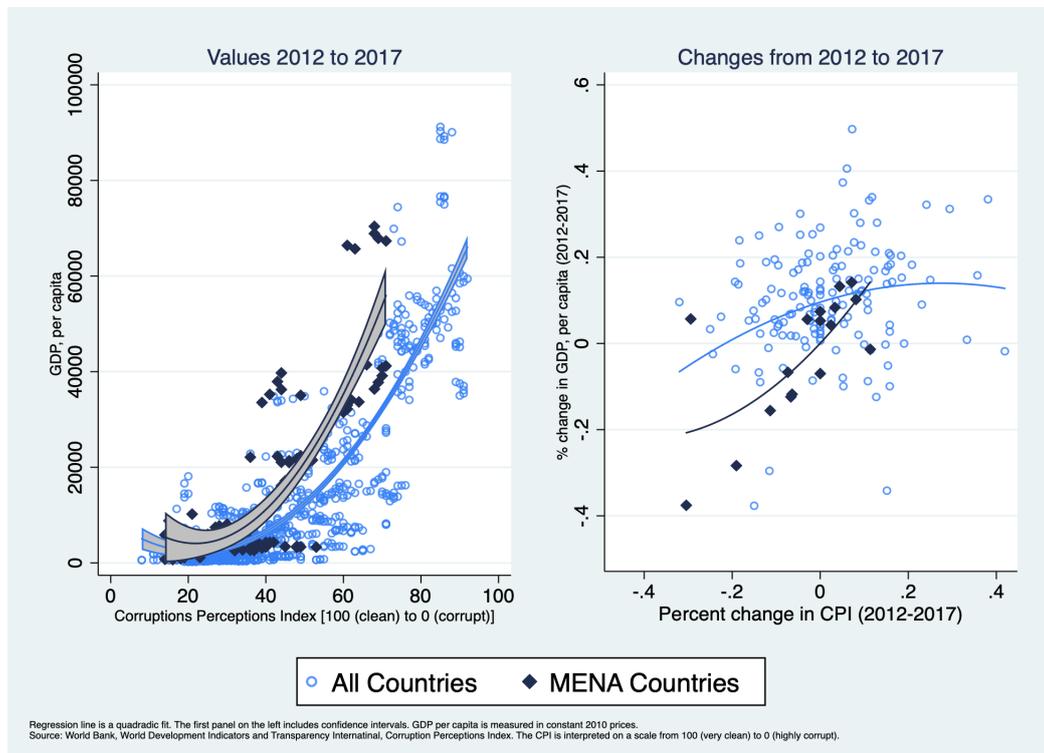
Institutions shape how we understand the world today (Acemoglu, Johnson, and Robinson, 2005; North, 1990). But North (1990) tells us that institutions are path-dependent such that any deviations (or changes) away from this fixed path are pre-determined (in part) by institutional heritage. This means that, as governments modernize, technology changes and individuals participate increasingly in the exchange of information with others, change may happen, but only on a marginal level. The political economy is both an important component and outcome of the institutional heritage. It is the tunnel through which reform happens.

While the political economy and institutions are endogenous, they both have a non-linear relationship with growth. Using very basic measures of the quality of institutions from *Corruption Perceptions Index* (2018), the perception that the government is clean ¹ is positively associated with gross domestic product per capita (Figure

¹This implies that institutions for the protection of the individual are not deliberately perceived as enhancing personal freedoms.

1, left panel²). The level comparisons show an upward and positively accelerating relationship between the perception of a clean government and per capita gross domestic product. While the same trend holds in the MENA region, the perception of clean government still matters, but slightly less. As compared to all other countries, relatively lower levels of clean government are associated with higher GDP per capita. As will be discussed below, this is in part due to the effect of rentier states in the Gulf.

FIGURE 1: Corruption Perceptions and Growth



While the perception of corruption and matters less for GDP per capita in MENA countries versus all others (Figure 1, left panel), the opposite is true when we look at the change in perceptions (Figure 1, right panel). The changes in the perception of corruption matter more in MENA countries than other countries suggesting that better and cleaner institutions are increasingly becoming important in the region.

²For the Figures 1 and 2, countries in the MENA region are Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, United Arab Emirates and Yemen. Data from all years between 2012 and 2017 are included except for in 1 where only the change between the first and last year was kept. The labeled countries include the countries with the highest and lowest GDP per capita (Qatar and Yemen) and the three countries discussed in the following chapters, Egypt, Tunisia and Turkey. The Corruption Perceptions index runs from very corrupt (0) to very clean (100). Data used come from *V-dem (country-year/country-date) dataset v8. Varieties of Democracy (V-Dem) Project. (2017)*, Pemstein et al. (2018), *World Bank Development Indicators (2019)*, and *Corruption Perceptions Index (2018)*

In contrast, while the change in the perception of corruption from 2012 to 2017 has an upward-leaning relationship with the change in per capita change in GDP for all other countries, the relationship is marginally decreasing and very noisy.³ Given at face value, this means that gains in the cleanliness of government correspond to increases in gross domestic product, per capita. However, at the same time these gains tamper out with large levels of changes in the perception of the cleanliness of government and in gross domestic product, per capita. As such, we can say that gains in the cleanliness of government do not necessarily increase marginal returns infinitely for all non-MENA countries. Furthermore, the dispersed nature of the correlation shows that other factors that come into play.

In the MENA region, the correlation between corruption perceptions and per capita GDP is positive and does not show signs of marginally decreasing returns. Furthermore, the estimated trend is much more precise than in the entire sample (Figure 1, right panel), suggesting that the perception of corruption has a stronger relationship with per capita GDP in MENA countries versus other countries. In contrast to the descriptive data for all other countries, the MENA region's increase in the corruption perception index is continuously linked to increases in GDP, even at higher levels of change. This combined analysis suggests that the quality of institutions matters for understanding the current levels of per capita GDP, and even more so for growth in the MENA region. However, the weak⁴ relationship (in absolute terms) between growth and change in perceptions of corruption (institutional quality) does also suggest that this is not the only reason why MENA countries have not grown fast enough.

While a high perception of corruption may describe one aspect of how institutions are important for growth, the political economy is much more complicated than just the perception of corruption. One way to understanding whether institutions within the political economy are serving the interests of people rather than tied to appeals of interest groups is by understanding the *deliberate component of democracy* (Pemstein et al., 2018).⁵ The index first measures the extent to which political elites give public justifications for their positions.⁶ Secondly, the index measures the reach of the consultation process to other elite officials and civil society members.

³This refers to the entire sample for which data is available.

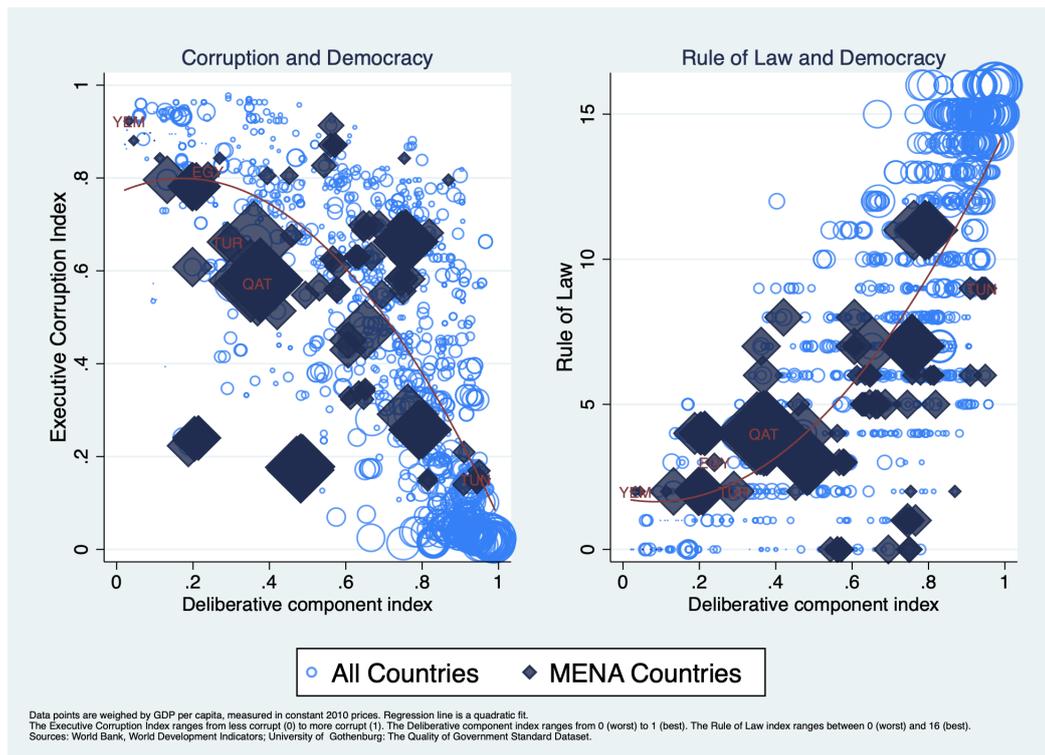
⁴The quadratic fit line demonstrates for MENA countries is more precise than the quadratic fit line for all other countries in relative terms, but as compared to what one would like to see optimally, the relationship is still relatively weak, in absolute terms.

⁵The deliberate component of democracy is a measure of understanding whether the process in which political decisions are made is motivated by the common good, rather than by interest groups.

⁶Here the index would be higher if political elites' justification for their positions is for the improvement of the public good.

Figure 2 demonstrates the relationship between deliberate democracy, growth and two alternative measures of institutional quality. It maps the correlation between the level of corruption of government executives⁷, an index of the strength of the rule of law,⁸ and their correlation with the deliberate component of democracy as well as gross domestic product, per capita.

FIGURE 2: Institutional Quality and GDP per capita



High levels of executive corruption and the quality of government are negatively correlated, according to Figure 2 (left panel). This depiction provides us with descriptive information linking high levels of executive corruption with low levels of deliberate democracy. In other words, the more elected officials are perceived to be corrupt, the less the political economy of policy-making is perceived to serve the wider good. Interestingly, when we look only at the sample of all countries with available data, high deliberate democracy components are frequently tied with low executive corruption *and* higher levels of gross domestic product per capita. However, this is not the case when we only look at MENA countries. While the trend between low levels of executive corruption and deliberate democracy is similar, the gross domestic product per capita is much higher in countries where there are high

⁷The Executive Corruption Index ranges from less corrupt (0) to more corrupt (1)

⁸The Rule of law index is a categorical index ranging from 0 (low) to 14 (high).

levels of executive corruption and low levels of deliberate democracy. The discrepancy is similar when we look at the correlation between the rule of law, deliberate democracy, and gross domestic product per capita (Figure 2, right panel). For all other countries, there is a continuously positive relationship between rule of law, deliberate democracy and gross domestic product per capita. For MENA countries, the relationship between the rule of law and deliberate democracy is positive, meaning the stronger the rule of law, the higher the deliberate democracy component of government. However, the highest levels of gross domestic product, per capita are present in countries that have a low rule of law and deliberate component of democracy.

Why are MENA countries different than other countries? One response is the resource curse of oil-rich countries of the countries in the Gulf. For example, in Saudi Arabia, the fact that rentier states never need to bargain with civil society, and distribute rather than collect wealth, creates an environment where elites compete with each other politically to extract rent directly from the royal family, rather than through competition and productive economic activities. The political economy in this clientelist model lends businesses with close ties to the state easy access to hindering or eliminating government reforms that threaten interests (Hertog, 2011). Furthermore, the social contract and globally fixed wages in the private sector in the gulf states ensures the cheapest skill to labor wages rates without sacrificing basic standards of living for nationals in the labor market (Diwan and Mouhoud, 2016) making labor cheap and labor-intensive activities more productive than in other countries. It is wrong to think that the average person is wealthier in the Gulf countries. While rents are large and it may seem that the average person is much wealthier in the gulf states using the crude GDP per capital measurement, some basic statistics on income inequality suggests that income and wealth is very concentrated in the entire MENA region, and in particular in the Gulf countries. While the data on income equality is scarce and developing, what current information we have suggests that income inequality is higher than the global average and the global average for developing countries, even if it is not necessarily increasing (Hassine, 2014; Bibi and Nabli, 2009). If we remove oil-rich (and population-poor) countries, like Qatar, the trend of correlation between executive corruption and deliberate democracy starts resembling other countries. However, this still does not entirely answer why MENA countries are different, as there are still outliers to the trend that exist in MENA countries but not other countries. Low-quality governance coexists with higher levels of GDP per capita. Through this thesis, I implicitly propose that institutions and the political economy in the MENA region play a stronger (and non-linear) role in capturing rents from growth than in other countries.

0.2 The political economy of government interventionism

In representative forms of government, one can expect that government interventionism directly aims to improve welfare for constituents. However, the use (and abuse) of regulations can often lead to the opposite outcome. In some cases, it increases state control, and in other cases, it can increase rents to special interest groups or individuals with ties to the government. While there is a small literature on how political capture may actually lead to better economic and societal outcomes, the majority of the literature on this topic finds that benefits are primarily for those in or close to the state.

Regulatory use and abuse The nexus between administrative burdens and business-state relations is strong and persistent. Historically protected sectors of yesterday are quite frequently the protected sectors of today. Some of the common ways governments protect firms and sectors from competitors are by creating administrative barriers, increasing restrictions on international commerce, and establishing restrictions on investments. This type of activity increases rents from bribes if the political economy and government institutions are weak (Shleifer and Vishny, 1993).

Public and business leaders can choose to engage in anti-competitive behavior to gain an unfair advantage from asymmetric information. Instead of achieving Pareto efficient outcomes for the whole economy, opportunistic individuals with close ties to the government, or even government officials themselves, adopt monopolistic or cartel-like behaviors. The desire to increase one's share of benefits within a multi-player, multi-round game will eventually lead to a less than Pareto outcome, due to the existence of asymmetric information and first player advantage. In particular, in the case of monopolistic or cartel-like behavior, incumbent elites have the incentives and, in some instances, the means to consistently participate in anti-competitive behavior. In the industrial organization literature, it is well known that monopolistic behaviors include price-fixing (Shapiro, 1983a; Shapiro, 1983b; Wolfram, 1999); controlling supply (Hausman and Leonard, 2002), or restricting entry for competitors (Djankov, La Porta, et al., 2002). This type of behavior disproportionately increases rents to firms with close ties to the government either because executive individuals at such firms have a symbiotic relationship with officials or because the firms are directly run by state officials or those in their close network.

What do we know about how the political economy proliferates anti-competitive behavior? Firms with close ties to government use information to their advantage.

Chekir and Diwan (2014a) found evidence that crony capitalism — a market structure where a few firms benefit from close ties between government officials and government cronies either through family or other networks— and anti-competitive advantages increased the current and future market value of firms for family members connected to the Mubarak regime in Egypt. Firms with close business-state relations, either through family or other network ties, have privileged access to information and influence. These firms arguably have strong incentives to use this information to increased benefits to create non-competitive environments. However, after the 2011 Arab revolution, Chekir and Diwan (2014a) found that connected firms lost more value than others, suggesting that protected firms previously retained benefits that firms without close business-state relations did not, due to their connections. Using a national database, the second study from Diwan, Keefer, and Schiffbauer (2014) found that connected firms were more likely to benefit from various forms of in-kind and financial kickbacks such as trade protection, energy subsidies, preferential access to land and leniency in regulatory enforcement. The authors found an inverse relation between the existence of connected firms and aggregate growth, competition, and firm entry. Their findings suggest that preferential relationship between the state and certain businesses effectively crowd out activities by (other) private sector actors, at the expense of market efficiency and growth.

Another type of favoritism also exists in the form of protection of financial capital for elite stakeholders. Rajan and Zingales (2003) identified this method in their paper exploring interest group theory. They suggest that the political economy has a role to play in the development of the financial sector, identifying key stakeholders as incumbents who may stifle competition, for example, through the use of administrative barriers such as licensing schemes. In Malaysia, Johnson and Mitton (2003) found that financial favoritism can have multiple layers. They found that a shock to the political environment due to the Asian financial crisis reduced direct government subsidies to connected firms, and but capital controls placed during the crisis protected the financial interests of connected firms. The paper found that connected firms gained more from capital controls than non-connected firms. While the literature suggests that capital controls can be used to control macroeconomic shocks and shield countries from speculative crises, but they can also lead to financial gains that disproportionately benefit connected firms.

Firms with close ties to the government⁹ may also use their connections to secure

⁹Close ties between firms and government refer to either senior executive members of firms either in the family or other networks of officials currently in office, or more directly when business executives have held or are currently holding public office.

benefits in the form of bailouts and preferential loans. In a cross-country study, Faccio, Masulis, and McConnell (2006) finds that firms where at least one of the senior executive committees or major stockholders was ever a head of state, minister or member of the parliament, are more likely to benefit from government bailouts. Furthermore, when the government receives loans from the IMF or the World Bank, there is a higher likelihood that connected firms will be bailed out. In a paper by Khwaja and Mian (2005), firms with politicians on their boards in Pakistan receive preferential treatment through larger loans although they have substantially higher default rates.¹⁰ Their findings show that this was only the case when loans were provided by government banks, but not private ones. The bigger the firm, the higher the propensity to default. Furthermore, when firms had close ties to more popular politicians, there was greater preferential access to credit. In Brazil, Claessens, Feijen, and Laeven (2008) found that firms that contributed to the winning politicians' campaigns were more likely to have higher bank financing and increased stock returns. In addition to extracting rents from connections, policies in Brazil were shaped based on negotiations with politically connected businesses rather than on ideologies.¹¹

A close business-state relation can also result in regulations that shield connected firms from competition, market pressures and entry competition. In Tunisia, Rijkers, Freund, and Nucifora (2017a) found that relatives of the Ben Ali family used Foreign Direct Investment restrictions (FDI) to protect connected firms from competition. Connected firms accounted for a disproportionate share of employment, outputs and profits, when the firms sectors were subject to more stringent Foreign Direct Investment authorization and restrictions requirements. Connected firms were four times more likely than non-connected firms to be active in sectors subject to FDI authorization and restrictions. Furthermore, the benefits of connections were unusually large and significant among firms with the highest market share and profits distribution. This line of argument, is similar to the argument by Djankov, La Porta, et al. (2002). Djankov, La Porta, et al., 2002 write that, out of a sample of 75 countries, high costs to entry are correlated with higher corruption, but not with better provision of public or private goods. Meanwhile, these high regulations often result in benefits to politicians in the form of campaign finance and votes.

Opening markets to trade is a ripe occasion for opportunism. Diwan and Mouhoud

¹⁰The Khwaja and Mian (2005) estimates control for firm size.

¹¹While this paper is a reference in the literature, it suffers from endogeneity and reverse causality because successful firms with high stock returns would also naturally be in a better position to contribute to a politician's campaign

(2016) find that trade agreements are often not favorable to non-GCC, MENA countries. Furthermore, when trade agreements are implemented, they are frequently bounded by interests of government cronies (Mouhoud, 2012). Firms with preferential access to the state can lobby for trade reforms (tariff and non-tariff measures) to protect from competition (Eibl and Malik, 2016). The higher the connected firm's import share of goods, the more likely connected firms evade paying tariffs. Rijkers, Baghdadi, and Raballand (2015) found that tariff evasions were correlated with the import share of connected firms, in particular for high-tariff goods while Rijkers, Arouri, and Baghdadi (2017) found that connected firms were also more likely to evade other forms of taxes. Both studies found that firms connected to elites are able to benefit from government interventions more than non-connected firms. Furthermore, there is a high correlation with the costs of entry for non-connected firms in activities dominated by those close to the regime. The authors do not directly address how the Ben Ali families may have also increased access and opportunities to other non-connected firms as an externality of self-motivated behavior, but do find that crony firms entered more profitable sectors, and benefited more from protectionism through government regulation. The formation of policies and the use of regulation to protect the interests of firms with close ties to the government is also a method of extracting rent in the findings of Eibl and Malik (2016). Here, the authors find that cronies leverage their favoritism to increase non-tariff barriers to their benefit. They extend their analysis to show that cronies do not "enter" protected sectors, but rather that the existence of cronies in sectors explains the high level of protectionism for those sectors.

The political economy matters, as do the leaders that hold office. They can either create an environment to benefit their cronies, or focus on providing economy-wide benefits. There are several examples of how leaders in office impact the economy. In a study on leaders in office, Fisman (2001) found that returns of firms with close connections with former Indonesian President Suharto were disproportionately negatively affected by rumors of his declining health. This suggests that when his health was good, President Suharto created an environment for his cronies to benefit. Leaders and how they govern matter for growth. Using natural deaths as an exogenous shock, B. Jones and B. Olken (2005) demonstrated that leader *transition* had an important impact on growth. They found that the death of leaders in autocratic regimes leads to changes in growth, while the death of leaders in democratic regimes does not. With more autocratic leaders and fewer constraints, the effect was even larger. Characteristics of elites in public office has an impact on growth, suggesting that reform-minded public officials may have some chance at good public

economics decision-making. Studies such as Besley, Montalvo, and Reynal-Querol (2011) and Mercier (2016) link education of leaders with growth and democracy, respectively.¹²

Opportunism in large firms as a catalyst for growth The traditional literature on elite capture argues that it diminishes the distribution of welfare in the economy. While no studies find direct net positive externalities of close business-state ties, there is a small and growing strand of literature arguing that larger firms and multinationals are at the forefront of pro-growth policies and the fight against some forms of elite capture in the public sector (Hsieh and B. A. Olken, 2014; Fernandes, Freund, and Pierola, 2016; Freund, 2016). Furthermore, theoretical literature finds that if corruption helps avoid significant costs to businesses than it may, in fact, be welfare-enhancing and can create allocative efficiency as in the equilibrium queuing model of bribery of Lui, 1985. The literature does not explicitly identify these large multinational firms as firms with close ties to the state but does not dismiss the soft power influence of large firms as a catalyst for growth.

Large and profitable firms are more likely to have the means to use soft power to influence policies in their favor. Nevertheless, can some part of this potentially be *good* for growth? If industry giants can sway governments into reducing business and trade barriers, would this not also have a substantial impact on smaller firms? Empirical research and theory tell us that the high costs associated with export activity disproportionately restrict smaller firms from exporting. Reducing these barriers should then disproportionately help smaller firms. Furthermore, if large firms are able to reduce trade barriers and increase export activities, this could also be good for growth. Furthermore, more concentration in export activities for larger firms may help increase overall growth and employment. As such, it is not clear whether government policies (either through interventions or *laissez-faire* approaches) should target the "missing middle" or enabling superstars (Hsieh and B. A. Olken, 2014).

There is some evidence suggesting that foreign firms and multinationals have a role in encouraging regulatory change to improve export patterns for all firms (Freund and Pierola, 2015). For Fernandes, Freund, and Pierola (2016), bigger and more developed countries have more exporters, larger exporters and a greater concentration of exports controlled for the top 5% market shareholders. Their study also

¹²Studies on leader demographic characteristics such as gender (Chattopadhyay and Duflo, 2004), ethnicity (Franck and Rainer, 2012) and the leader's previous profession (Dreher, Sturm, and Vreeland, 2009), and career perspectives for bureaucrats (Bertrand et al., 2016) also demonstrate that the kind of leaders in government, matters for the prospect of growth.

found that developing countries may export less, simply because the industry leaders (large firms) contain a smaller percentage of the total exports than in rich countries. The concentration of the share of total exports at the top of the distribution suggests that in developed countries, there is a better distribution of market shares across firms. Unsurprisingly, they find that higher trade costs impede competition leading to a less efficient allocation of resources. They argue that this is even more important for small and medium-sized firms. However, large and very productive firms are expected to benefit the most from the reduction of trade distortions.

A notable recent addition to the debate in the literature is that of Freund (2016). Individual firms in lead industries can be at the forefront of the production possibilities frontier, where firm incentives may either improve outcomes for all firms or adversely promote monopolistic or cartel behavior. They can grease the wheels of the economy by creating economic opportunities and demanding pro-growth institutions from the government. From the entrepreneurial angle, firms that expand and export goods can increase the demand for stable institutions for a business-friendly environment and outward-looking economies. All firms can benefit from this arrangement if all competitors are exposed to the same rules and opportunities for growth, where policies are not discretionary but applied to address discriminatory market distortions.

In sum, the literature gives a summary of the debate about the political economy and growth. First, individual firms with close ties to the state often use government interventions to protect their own interests. Secondly, leaders and how they govern impact the economy. Third, sometimes incentives of big firms that are industry leaders can have positive externalities on the rest of the economy. However, in the context of countries in the Middle East and North Africa, it is often the case that firms that harbor close relations to the state do not act in the benefit of the larger public.

0.3 Can we cure political capture with competition, or is “laissez-faire” just French for laziness?

In the framework of Hirschman (1970), discontent among the general public with close business-state ties could be addressed through popular vote (Johnson and Mitton, 2003), voice (Chekir and Diwan, 2014b; Rijkers, Freund, and Nucifora, 2017a) or exit (disengagement). In the context with a limited probability of overturning the

government, is there something we can do to limit rent-seeking behavior by corrupt policymakers and anti-competitive behaviors by firms with close relationships to the state?

By far, the most persuasive paper in terms of solutions to the problem of corruption and unfair advantages to connected firms is the work by Sequeira (2016). Why is this specific work different from other papers in the political economy literature? Her work finds evidence of corruption — in particular in the form of bribes paid to public officials to avoid paying tariffs — but also proposes a solution. She finds that the reduction of tariffs reduces the propensity and value of bribes paid. Before changes in tariff levels, bribe payments were high and were made in the expectation of facilitating tariff evasion.¹³ The removal of tariffs significantly reduced the probability of bribe payments and the number of bribes paid. She also observed that the removal of tariffs reduced the misrepresentation of the quantity of imports. In one of my chapters, I conduct an analysis using an exogenous change in tariff levels to similarly understand how trade reforms interact with the political economy and influence import flow.

In a related paper on bribes to corrupt officials at ports, Sequeira and Djankov (2014) found that firms are ready to pay extra fees in transport costs, to ports further away from centers of commerce, to avoid the uncertainty of bribe extortion. Inadvertently, it suggests that another cure for dealing with corrupt officials is increasing competition of public service providers (i.e. increasing points of contact with public offices). Importers with goods that are most likely to suffer from extortion of bribes are willing to incur additional travel costs to avoid paying bribes at different ports of entry.

Creating a level playing field for firms to attract investment and ensure property rights can improve the extensive margins of trade (new products or new markets). Using a quasi-experimental approach, Sheng and Yang (2016) argues that institutional reforms relaxing ownership requirements on foreign direct investment, and improving contract enforcement can increase the extensive margin of trade. They found causal evidence suggesting that these reforms incited firms to diversify exports (new products) in China between 1997-2007. The authors created a measure of ownership for firms using an official government list of industries that were either encouraged, restricted or prohibited from foreign investment. For select "encouraged" industries, firms were given more freedom to choose ownership structures and enjoyed preferable business incentives such as lower tax rates, land costs and duty-free imports. In restricted or prohibited industries, Chinese officials imposed

¹³In her analysis, she estimated changes in bribe payments on similar goods — those which were more easily subject to extortion and those that were less likely— before and after tariff reductions.

strict rules of ownership and notably restricting the level of ownership that could be held by foreign investors. The authors present findings of their an instrumental variable approach using colonial regimes and the provincial population in 1953 as instruments. Among other results, they find that restrictive FDI rules had a negative association with the extensive margin of processing exports (variety of exports). Furthermore, they find that relaxing ownership restrictions increases the extensive margins of FDI exports more than relaxing outsourcing rules.

So far, most of the proposed solutions to reducing rents to corrupt officials have involved trade liberalization, increasing competition in points of service (for example, ports) and reducing restrictions on ownership and investment. However, one can also imagine that liberalization may have the opposite outcome if it is done in a piece-meal manner and there are few limitations on government intervention in private enterprise. For example, when private property is not secure, privatization and the reduction of market frictions can also harm firms with close ties to the government. In China, Fan, Wong, and Zhang (2007) used partial privatization reforms to demonstrate how having CEO, who is a current or former government official, could negatively impact gains to shareholders in terms of long-term post-IPO stock returns and initial IPO returns. In this special case with weak institutions and limited liberalization of capital and product markets, shareholders anticipate that government interference will jeopardize firms' profits and how they are distributed among shareholders.

0.4 Objectives and Chapter Outlines

The objective of this dissertation is to get a clearer understanding of how the political economy plays an important role in the growth and inclusiveness of societies. Whether *laissez-faire* or *interventionists* approaches will lead to the best outcomes depends in large part on the political economy and notably the relative strength or weakness of public institutions. Whether one is a fundamental *interventionist* or a free-market *laissez-faire* proponent, both views can fall short when they do not take into account the political economy. One can argue that we need the state to bring order when we are fearful of political capture and abuse of resources in the private sector. On the other hand, one can also argue that the market will correct itself and that government intervention is more likely to result in abuse of public office than positive outcomes when we are fearful of political capture controlling the government. Indeed, Ibn Khaldun's warning of the pitfalls of financial gain from public office is still relevant today in both of these scenarios.

The first paper approaches industrial development and productivity from a historical perspective. It elaborates on how different institutional settings may be enabling or disabling the contribution of skilled labor to have an impact on aggregate productivity. Both Turkey and Tunisia in their post-transitional states (post-war for Turkey, and post-colonialism for Tunisia) adopted Import Substitution Industrialization (ISI) strategies. However, Turkey started nation-building earlier (post World War I), with a pro-business ISI strategy. On the other hand, in Tunisia, the post-colonial period was followed by a brief period of social planning and a more socialist ISI strategy, before later dismantling it in the '70s and '80s. Here, the industry of non-Muslims that were expelled was absorbed by state-owned enterprises, and the public sector continued to play a strong role in economic planning. Using a comparative approach, we can try to understand how skills in the context of historical political economy and institutions may have guided growth in these two labor rich countries. In Tunisia, we see no link between skills and productivity growth, but hypothesize on the role of the public sector. While skills are historically high in Tunisia, the post-colonial government absorbs these skills and hinders the contribution of these skills to more productive activities in the private sector. In Turkey, there are consistent findings that suggest that the reallocation of skills between sectors has been a net positive contributor to productivity.

The second paper focuses on how large scale industrial programs may be used as a tool to extend the controlling arm of the public sector over the activities of the private sector. By evaluating the impact of the Tunisian upgrading program, the paper finds that how benefits are distributed to firms was indicative of the underlying political purpose of the program. For the most part, gains to capital were dominant when public subsidies were distributed to large firms whereas gains to labor were most clearly observed when funds were distributed to smaller firms. Furthermore, there was rather consistent selection bias that hindered firm deaths but did not abolish it altogether. While some firms may have increased employment, labor (as a resource) was only a productive input in smaller firms. Descriptive evidence also suggests that treated firms have higher values of exports and participated in specialization rather than diversification of exports.

The last paper provides a case study comparing industries where connected firms exist to those where no known connected firms exist to show how trade reforms may affect production activities differently across the two groups. Using the exogenous shock of the alignment of trade standards with international conventions, I find that reducing trade tariffs and burdens increases the value of import flows to non-connected sectors more than it does to connected sectors. While the first finding demonstrates that cronyism had an impact on trade flows, the paper further

explores how cronies gain from higher trade barriers and tariffs. Firstly, reducing trade tariffs reduces the value of "missing goods" arguably due to less tax evasion incentives of connected firms. However, my analysis also finds that imports to manufacturing in natural resource sectors increased for connected firms more than for non-connected firms. This suggests that special interests in the natural resources sector may have still benefited from these partial liberalization reforms.

1 Productivity, structural change and skills dynamics: Evidence from a half-century analysis in Tunisia and Turkey

Chapter Abstract This article explores the contribution of structural change and skill upgrading of the labor force to productivity growth in Tunisia and Turkey in the institutional context of the post-World War II period. Our growth decomposition shows that productivity growth is explained by intra-industry changes for both countries during the import substitution period. However, structural change played an important role in Turkey for a longer period of time than in Tunisia. Based on an instrumental variable regression setting, we find evidence that overall, the change in the share of high skills had a causal impact on productivity levels in Turkey. Secondly, this change in productivity has mainly been driven by the reallocation of educated labor between sectors rather than the absorption of highly educated workers within sectors. On the other hand, in Tunisia, we do not find evidence of links between education demand and productivity. Moreover, the quasi-experimental evidence shows that overall skills upgrading is negatively associated with productivity growth, suggesting a decreasing return to skills over time.

1.1 Introduction

This paper examines the respective contributions of labor reallocation and skill upgrading to productivity variation. In most developing countries, educational attainment has increased spectacularly in recent decades. In the past, education had often been reserved for foreigners and the elite, especially in countries with a colonial heritage. Its spread became widely considered as a vector for modernization during the first half of the twentieth century. Nevertheless, Pritchett (2001) showed that education did not always foster growth. Among the explanations, the low quality of education and skill mismatch have been widely cited. For the latter, low levels of structural change, particularly from basic manufacturing to high value-added industries and services, contributed to the lack of demand for high skilled workers. However, education as a social mobility vector and anti-poverty mechanism continues to be encouraged even when the demand for skilled workers is not high. A stagnation of skilled labor demand can also result from the absence of within-sector skill upgrading. According to Hendricks (2010), within-industry gaps play a much higher role than a structural change in explaining differences in education across countries. In contrast, much of the development literature highlights the role of structural change in income differences between countries (Restuccia, Yang, and Zhu, 2008).

In the past half-century, the most significant trend in structural change has been the reallocation out of the agricultural sector into more productive sectors (Caselli and Coleman II, 2001). On a cross-country level, the catch-up between the US and other countries is higher in manufacturing than in other sectors (Herrendorf and Valentinyi, 2012). While there are substantial differences between countries in services' productivity (Duarte and Restuccia, 2010), cross-country aggregate productivity gaps are in a larger part, due to the agricultural sector (Gollin, Lagakos, and Waugh, 2013). Since 2000, structural change contributed positively to growth in Africa, primarily due to increasing agricultural productivity and rising food and commodity prices (M. McMillan, Rodrik, and Verduzco-Gallo, 2014). Our paper is related to this strand of the literature, which tries to understand the contribution of structural change, among other factors in productivity growth. Previous authors have argued that competitive exchange rates and labor market flexibility are among the most important determinants of growth-enhancing structural change (M. S. McMillan and Rodrik, 2011). There is also literature arguing that productivity growth increases after the implementation of pro-competitive trade reforms in particular when sectors were previously import-competing or that faced onerous domestic regulations (Topalova and Khandelwal, 2011).

Our paper is also related to the literature on the growing impact of skills on productivity with structural change. In a cross-country analysis, human capital and product specialization are essential determinants of economic growth. As countries move into more specialized goods and more knowledge-intensive industries, the role of human capital becomes more prevalent.¹ However, the interaction between human capital and structural change depends on the level of development of the country. Furthermore, there is a correlation between demand for high-skilled labor and a compositional shift of value-added to sectors that are intensive in high-skilled labor (Buera, Kaboski, and Rogerson, 2015).

It is difficult to untangle the direction of causality between productivity and growth within and between sectors because of the endogeneity of key variables. Different rates of productivity can explain structural change (Ngai and Pissarides, 2007), and increases to productivity have a positive impact on the skill premia (Dix-Carneiro and Kovak, 2015). But skilled workers contribute to productivity, with the observed polarization in skills and wages resulting mainly from structural change from manufacturing to services (Bárány and Siegel, 2018).

Our article first explores the contribution of structural change and skill upgrading of the labor force to productivity by taking a comparative historical approach to the post-World War II trends and data in Tunisia and Turkey.² We develop an original database since the 1960s on the two countries and use it to decompose the overall productivity change into within and between components. This decomposition allows us to assess whether labor productivity resulted from workers moving out of lower productivity sectors, like agriculture, into higher productivity sectors, like manufacturing, or if productivity increased mainly because of changes within each sector (M. S. McMillan and Rodrik, 2011). Using a similar method from Berman, Bound, and Machin (1998), we decompose the overall contributions to total skills upgrading to the movement of high skilled workers between sectors and increased concentration of high-skilled employment within sectors. The next step consists of

¹Hanushek and Woessmann, 2008 considers that cognitive skills are even more relevant in determining growth than just human capital as measured by years of education, but limitations in the historical availability of this data make the investigation through this angle more difficult.

²The reason we choose these two countries is that both countries are labor-rich developing countries, where the weak absorption of college graduate job seekers is identified as a particularly acute problem. In more recent years, the research shows that the 2011 Tunisian uprising was motivated by the frustration of thousands of unemployed educated youth (Gatti et al. 2013, Rijkers, Arouri, Freund, et al. 2014, Angel-Urdinola, Nucifora, and Robalino 2015). Furthermore, some aspect of the Tunisian economic post-colonial institutions were modeled after the post-war Turkish state's model.

regressing labor productivity on the various indices computed. Because of the endogenous nature of the relationship between skills and productivity growth, our most convincing methodology relies on instrumental variables.

We find that the total skill upgrading has a causal impact on productivity in Turkey, and its primary driver is the reallocation of skilled workers between sectors, and not skills upgrading within sectors. In Turkey, we show that a one-point increase in total skill upgrading increases sectoral productivity by 0.12 percentage points. More specifically, a one-point increase in the reallocation of the share of the highest skill between sectors increases productivity by order of .26 percentage points. The instrument used did not allow us to identify the causal relationship for Tunisia.

1.2 A brief comparative historical setting for industrial development and skills in Turkey and Tunisia

Overall, Turkey and Tunisia present a suitable point of comparison due to a number of similarities. They are both non-oil economies, with sizable domestic markets, on the European periphery. The macro policy framework in both countries went through a similar shift from the import substitution industrialization (ISI) period with a heavily planned economy roughly between 1960-1980 to the liberalization thereafter. The ISI period also involved reallocating labor away from traditional sectors, primarily agriculture. Finally, the human capital composition improved significantly between and within sectors over the course of policy shifts since the 1960s.³

However, there were significant differences between these two countries as well. Even though nation-state building, the modernization of the state, and late industrialization overlapped in both countries, the process started much earlier in Turkey than in Tunisia. Turkey came out of the disintegration of Ottoman Empire as a nation-state in the 1920s, when most of institution building occurred. By the early 1930s, the nationalization of economy, effectively meaning the removal of non-Muslim elements, was almost complete. Concurrently, the Great Depression and disintegration of the world economy stimulated import substituting industrialization and

³See Karakoç, Ş. Pamuk, and Panza, 2017 for a brief evaluation of industrialization over the whole 20th century. Chapters 11 and 12 of Hansen, 1991 also provide a detailed evaluation of import substitution and liberalization after 1980.

state-entrepreneurship. Therefore, by 1960, Turkey had reached the end of the first stage of import substitution, producing most of non-durable consumer goods (processed food and textiles) domestically. Not least, the pre-1960 period did not see structural change, as Turkey was still a frontier country, as Hansen (1991) called, in the sense that the open land frontier prevented a large scale migration from rural areas and agriculture until the 1950s.

In Tunisia, we observe the implementation of a mix of ISI and nationalization policies, starting from after independence. Before independence, Tunisia had a predominantly agricultural economy, where the urban centers, trade, and small scale manufacturing were controlled by the Europeans, who had settled in the country in the late nineteenth century.⁴ The national census conducted in 1951 shows that Tunisians owned less than 10% of the largest manufacturing firms, as the local bourgeoisie preferred investing in land and commerce instead of manufacturing. After independence in 1956, the government was preoccupied with transferring the administration to Tunisians and the creation of sovereign institutions. The post-colonial period initially started with a liberal economic model (1956-1961) failing in private investment (Bellin, 2002), but, switched to a socialist agenda after 1962 with the expropriation of 450,000 hectares of land from French settlers and collectivized the land of small-holders. The land seizure and collectivization policy ended in 1969 due to its failure to deliver significant improvements, opposition from large landowners, and the international donors. Subsequently, liberalization coupled with a large-scale export promotion program "*Loi 1972*" at the beginning of the 1970s and marked the beginning of the development of the manufacturing sector.⁵

A severe economic crisis and balance of payments problems in the 1980s jointly led to the adoption of a structural adjustment plan (Naccache, 2009), which was followed by the liberalization of foreign trade.⁶ Shortly after that, Tunisia undertook

⁴Indeed, the first industrialization experience was launched by the French in the 1930s to promote local manufacturing (tax exemptions, guaranteed credit, among others) during World War II. However, this industrialization period did not last long. Trade with Europe stopped abruptly. It only resumed after the end of the war, quickly dismantling the burgeoning manufacturing sector (Bellin, 2002)

⁵Not coincidentally, this development was often spearheaded by former civil servants who became entrepreneurs benefiting from government incentives.

⁶This included GATT (1989), the WTO (1994) and the free-trade agreement with the European Union (1995). Nevertheless, trade liberalization was not rampant in the mid to late 1990s, primarily because of preoccupations with social stability and protecting Tunisian firms from international competitors.

labor reforms intending to increase labor market flexibility while maintaining some form of protection to workers, but these had a limited impact on labor flexibility and reallocation (Angel-Urdinola, Nucifora, and Robalino, 2015). Lastly, competition law and a new investment code were established respectively in 1991 and 1993. All these reforms aimed to accelerate the growth in jobs and productivity, but cronyism, corruption, and rent extraction continued to foster to unequal access to business opportunities and limited competition (Rijkers, Freund, and Nucifora, 2017a).

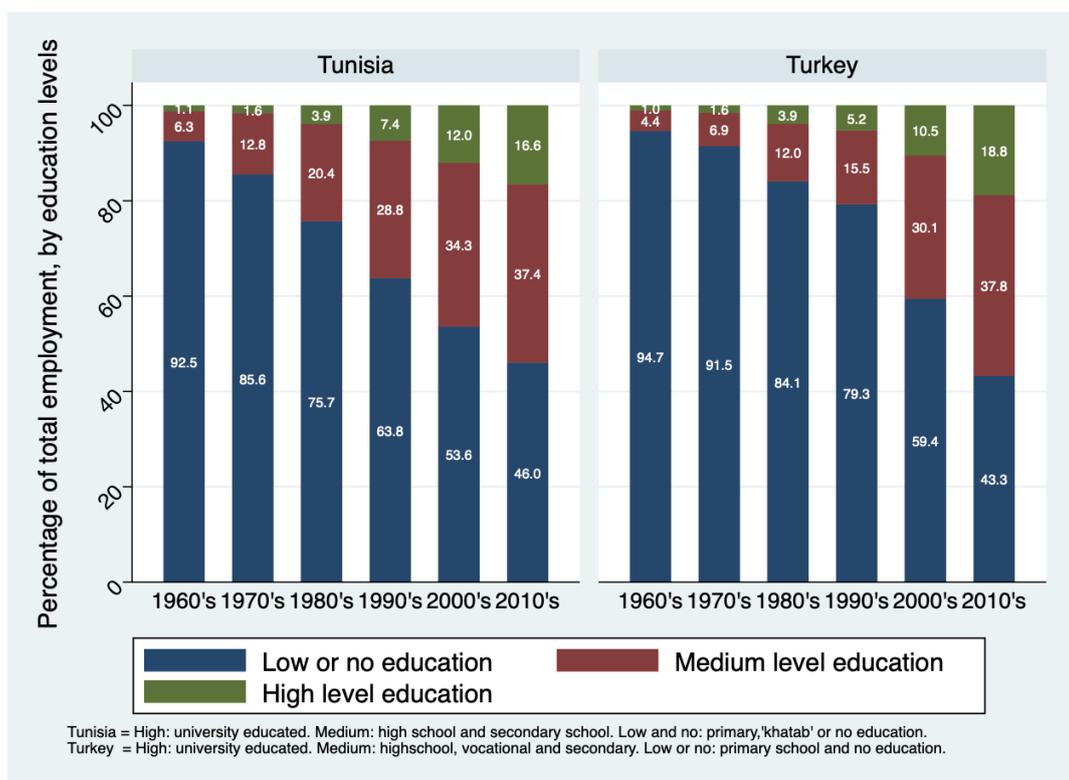
Historically, educational attainment is relatively high in Tunisia as compared to Turkey, as well as in most other MENA countries (Figure A.3). In 1991, mandatory schooling was extended from 6 to 9 years in 1991, increasing average schooling years for most students. In addition, there is some evidence to suggest that the quality of schooling improved. According to UNESCO data, student-teacher ratios for pre-primary schools dropped by half after the 1980s. The trend for student-teacher ratios in primary, secondary, and tertiary schools are all similar. Contrary to countries that were able to quickly absorb a massive increase of educated workers (Marouani and Mouelhi, 2015), in Tunisia, the increase in education was accompanied by massive unemployment of young graduates (30 percent on average and 40 percent for women).⁷

Therefore, by the time both economies embarked on structural change in the 1950s, Turkey had a solid manufacturing base, a large private sector, and an ISI policy that was still more pro-business than Tunisia's nascent socialist institutions. Reflecting on the trends described so far, Figure A.1 shows the sectoral composition of GDP since the 1960s. Turkey witnessed a more clear-cut increase in the share of productivity originating from the services industry. The share of agriculture steadily decreased from 33 to 10 percent, while manufacturing and services share increased structurally and significantly. Meanwhile, the share of the public sector remained small, and in fact, declined after the 1980s. In Tunisia, the composition of GDP shows two periods: one between before 1980 (mostly socialist period) where agriculture expanded, and manufacturing grew perhaps marginally, and one after 1980 where markets more rapidly liberalized. Overall, services interestingly remained stagnant.

The composition of sectoral employment demonstrated a sectoral shift from agriculture to manufacturing and services since the 1960s, and more pronounced employment trends after 1980 in Turkey (see Figure A.2). However, in Tunisia, before

⁷Data extracted from INS website, available here: <http://www.ins.tn/fr>

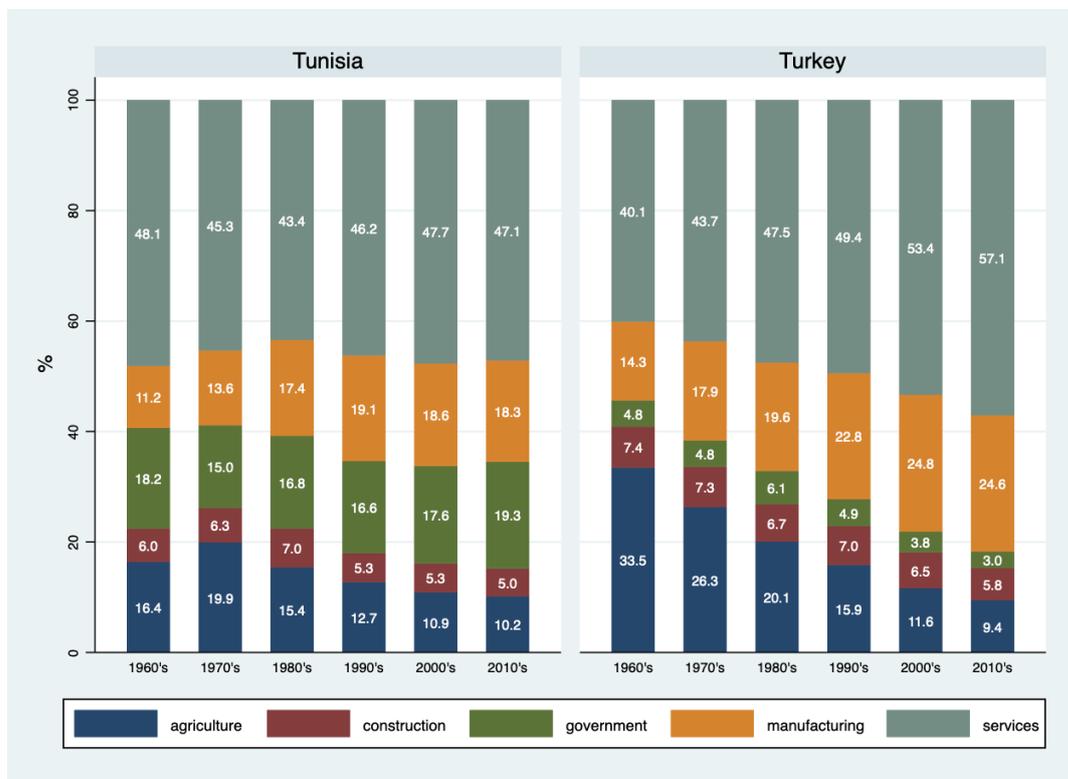
FIGURE 1.1: Composition of Education



1980, the share of government employment declined briefly, while the share of employment in manufacturing increased. Since the 1980s, agriculture declined in favor of services and government. Between the 1960s to the 2010s, the average levels of education of the employed workforce in Tunisia and Turkey increased (see Figure A.3). Initially, Tunisia started the 1960s with a higher percentage of secondary degree educated workforce and relatively less percentage of individuals with no, primary or only *khatib* (or religious schooling) education than Turkey. However, in the 2010s, the profile of the workforce in Turkey matched that of Tunisia, suggesting a rapid catch up in the employed skills base. Interestingly, there is a time lag between Tunisia and Turkey in the diffusion of education. We can see that Turkey's education attainment leaped forward in the 1980s, one decade later than Tunisia. In Tunisia, we observe a trend that supports the implementation of a statist post-transitional model, with a relatively high level of public sector employment and a relatively high level of medium and highly educated workers in public employment (Figures A.4 and A.5).

Historically, the development of the large public sector was a defining characteristic of the post-war economies in the MENA. Owen and S. Pamuk (1998, pp. 99–100)

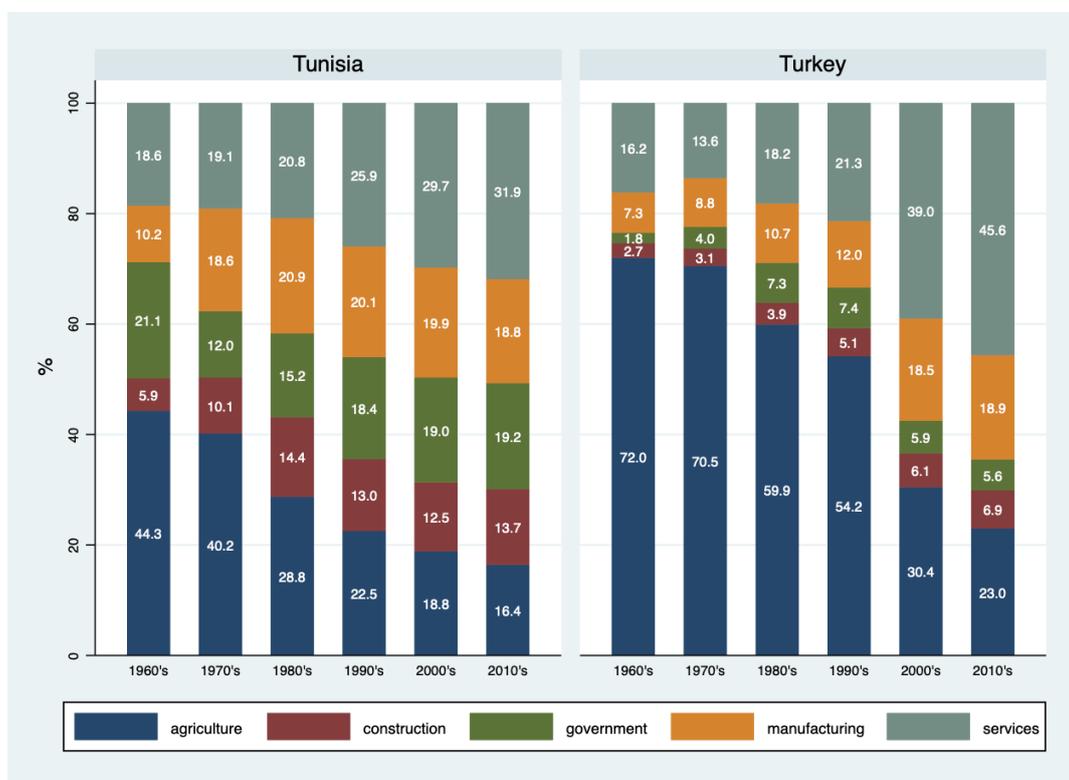
FIGURE 1.2: Sectoral Composition of Value Added



point out that this was typical of ISI strategy in the decolonizing developing countries, yet in the Middle East, the state assumed an even more prominent role.⁸ Along similar lines, Richards et al. (2013, chapter 7) also argue that the caretaker states of the colonial era logically evoked their opposites during decolonization.

⁸Owen and S. Pamuk (1998, pp. 99–100) identify three possible explanations: The absence of a robust private sector due to the departure or expulsion of the existing bourgeoisie, the nature of Arab socialist regimes, and the rapprochement with the Soviet Union. Issawi (1982, pp. 7–8) emphasizes the importance of a peculiar ethnic division of labor in domestic economies in the long nineteenth century, which would later be destroyed by economic nationalism, first in Turkey and then in Arab countries in the post-war years. While the non-Muslim minorities came to assume a large role in trade and manufacturing in Turkey, Syria, and Iraq, the Europeans in North Africa played a similar role as a result of a long historical process. Typically, at the top of this division of labor were Europeans, whose position was secured via a number of legal and economic privileges. The minorities provided administrative and occupational skills, constituting the skeleton of the local bourgeoisie. Then came the local Muslims cultivating the land, and supplying unskilled labor. After World War I, this economic hierarchy was increasingly challenged by political and economic nationalism, which eventually led to the elimination or expulsion of the Europeans and minorities. Therefore, we can argue that the bigger the foreign influence in the economy, the more passive the nineteenth-century state was, and the more likely the transitional state played a more prominent role.

FIGURE 1.3: Sectoral Composition of Employment



1.3 Decomposing Productivity and Skills Demand from 1960 to 2010: Data and methodology

Following the description of the historical context of the two countries, our paper now takes a macroeconomic approach that decomposes the components of changes in productivity and skills from the 1960s to 2010. The decomposition analysis requires data on value-added by country and sector. Critically, to understand skills contributions, we also need to gather data on employment both by country, sector, and education level. There are several international databases with information on value-added per sector. Many contemporaries use data from the Groningen database for internationally comparable value-added data. Studies focusing on employment by sector can use sources such as the UNIDO data on employment by sector. However, matching between the two sources for employment by sector and education for both our countries was not possible. Instead, in a laborious effort, we returned to original data sources to extract data, reclassify, and harmonize between the two countries. The result is a 5-sector database that includes information on value-added by sector, and employment by education and sector.

For Turkey, the data on the educational status of employees for each sector is obtained from the Turkish population censuses.⁹ GDP per sector was used to proxy for value-added data and were gathered from official statistical yearbooks provided by the Turkish Statistical Agency (Turkstat). The national sources for the Tunisia data have been gathered through two main national surveys. The value-added per sector data was obtained through annual statistical books from the Development Plans and Institute of Statistics. Data on employment by education level, and the sector was gathered from periodic censuses and labor force surveys. Both value-added and employment by education statistics were cross-checked with the data from the Tunisian Institute for Competitiveness and Quantitative Studies (*Institut Tunisien de la Compétitivité et des Études Quantitatives (ITCEQ)*).¹⁰ Data on trade flows were gathered from CEPII-CHELEM database that includes several world trade statistics and calculated indicators (CEPII and Saint Vaulry, 2008a).¹¹ Further data used for macroeconomic controls were gathered from the World Penn Tables database (Feenstra, Inklaar, and Timmer, 2015a) and the World Bank's Climate Change Knowledge Portal.

1.4 Decomposition analysis

There have been previous attempts to measure the contribution of TFP to growth in Turkey. Altug, Filiztekin, and Ş. Pamuk (2008) finds that TFP contribution to growth remained at between 3-18 percent between 1950-1979, under different growth accounting specifications, and strikingly TFP growth was even negative in the agricultural sector. In contrast, its contribution increased up to around 30 percent between 1980-2005, most of which came from the non-agricultural sector. They also decompose labor productivity into within and between-sectors components, finding that the sectoral shift component of labor productivity decreased over time (from 55 to 3 percent). Overall, it seems that during the transition from low-to-high productivity path, the importance of sectoral shifts declined, as the non-agricultural sectors dominate the overall picture with high productivity within sectors. Filiztekin, 2000 furthermore finds that the improvement in the manufacturing productivity explains half of the value-added growth. The nexus is particularly relevant for the sectors with higher trade exposure, as he documents that trade share within manufacturing

⁹Data is reported in census results for every five years from 1960 to 1990 and 2000. The years 2010 and 2015 can be found in the employment statistics in the database Turkish Statistical Agency.

¹⁰We are indebted to Monji Ben Chaabene for having shared his work with us.

¹¹CEPII-CHELEM uses data from UN COMTRADE. The advantage of using CEPII-CHELEM over UN COMTRADE is that CEPII applies a harmonization strategy to improve the quality and representativeness of the data and creates useful indicators.

causes productivity growth.

In Tunisia, one notable attempts to measure the decomposition of productivity was conducted in more recent decades. According to Marouani and Mouelhi (2015), productivity growth in Tunisia has more than doubled in the post-1995 period ¹². This finding suggests that the reforms implemented may have had a positive effect on productivity. However, during the years of this study (1983-2005), the change was concentrated on the within sector component of productivity. Structural change was very low during the period before 1995 and nil since, while we would have expected trade liberalization and labor market reforms to enhance the inter-sectoral movement of resources.

In our paper, we followed the decomposition methodology employed by M. S. McMillan and Rodrik, 2011 and Berman, Bound, and Machin, 1998 to understand the respective contributions of within sector and structural change components to the overall productivity and skills upgrading in each sector and on the aggregate level. The two decompositions follow the same logic and are as follows:

- Productivity Decomposition, M. S. McMillan and Rodrik (2011)

$$\Delta P_t = \sum_{i=1}^n \Theta_{i,t-k} \Delta P_{i,t} + \sum_{i=1}^n P_{i,t} \Delta \Theta_{i,t} \quad (1.1)$$

- Skill Upgrading Decomposition, Berman, Bound, and Machin (1998)

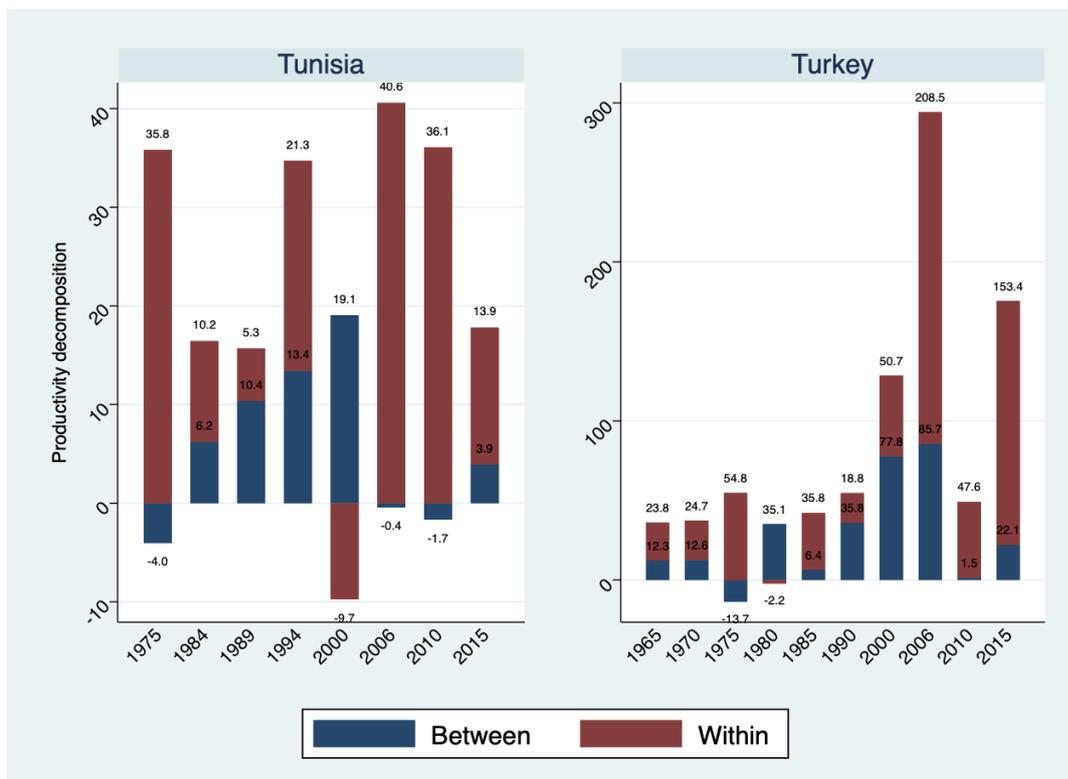
$$\Delta S k_t = \sum_{i=1}^n \Delta s k_{i,t} \Theta_{i,t} + \sum_{i=1}^n \Delta \Theta_{i,t} s k_{i,t} \quad (1.2)$$

where P_t is aggregate productivity, $P_{i,t}$ is sectoral productivity, $\Theta_{i,t}$ is the share of sector i in total employment, $S k_t$ is the share of highly educated labor in total labor and $s k_{i,t}$ is the share of highly educated labor by sector.

Productivity Decomposition The trends in the evolution of productivity for Tunisia and Turkey demonstrated differences over the past half a decade (see Figure

¹²This is in comparison to the 1983-1995 period.

FIGURE 1.4: Total Productivity Decomposition

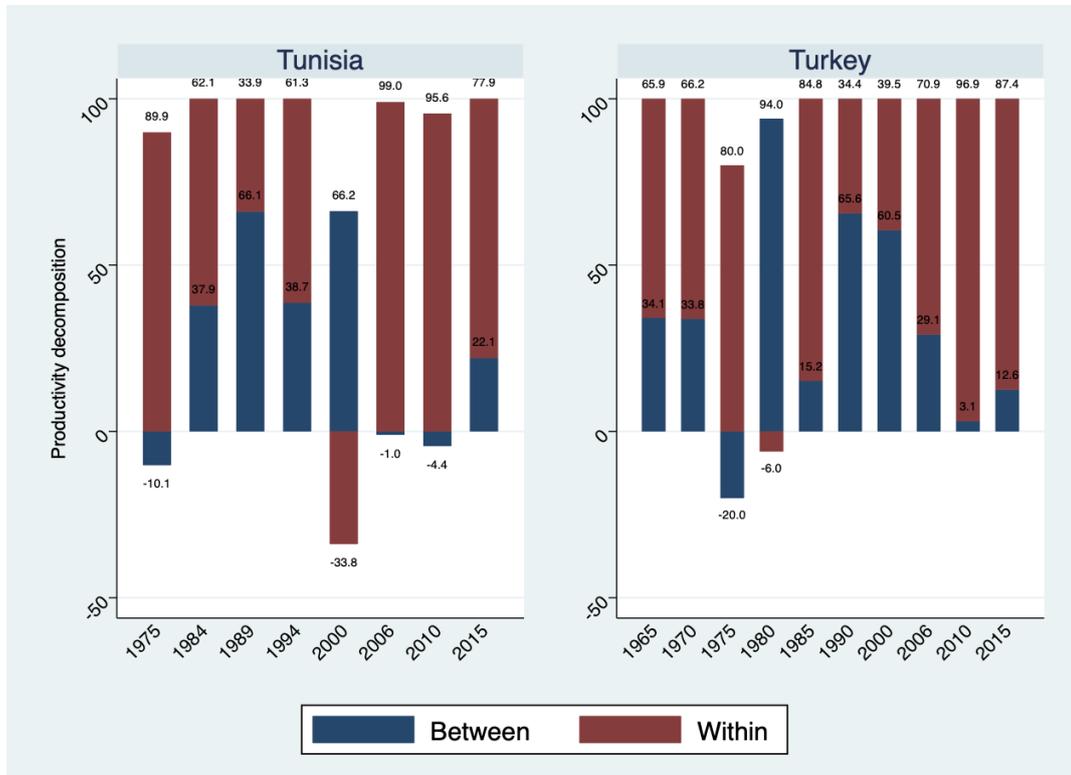


Note: The bars should be interpreted as representing the change between the current year and the prior year (annualized). For Tunisia, the prior year for 1975 is 1967. For Turkey, the prior year is 1960.

A.12 and A.13). For Tunisia, overall productivity after independence was relatively large but fluctuated in the following years. While the within component explained much of the change from the 1960s to 1975, reallocation of resources explained the lion’s share of productivity from 1975 to 2000. The first period saw the end of restrictive regulations on ownership and investment and the beginning of windfall tax incentives for foreign investors in the investment law of 1972 (*la Loi 1972*), bringing the Tunisian industry towards more export-oriented activities in the decades to follow. The next few decades correspond to the structural adjustment period, which cut agricultural subsidies and led to a switch from import-substitution to export-orientation. The relationship changed again in the 2000s onwards, where we observe the resurgence of productivity within sectors as the primary (and almost the sole) driver of productivity, similar to Marouani and Mouelhi (2015).

In Turkey, the story is a bit more marked (Figure A.13, Panel Turkey). Like Tunisia,

FIGURE 1.5: Structural Change and Within Component (as a % of total skills upgrading)



Note: The bars should be interpreted as representing the change between the current year and the prior year (annualized). For Tunisia, the prior year for 1975 is 1967. For Turkey, the prior year is 1960.

the productivity in Turkey in the 1960s was dominated by the within component of productivity decomposition. In the 1980s, the reallocation of resources had a dominant role in productivity. From the 1980s to 2000s, reallocation between sectors was still an important component of productivity but gradually lost ground to the within component. This observation occurred at the same time as the periods of ISI policies and the initial phase of opening up to global markets. From the 1990s onward, productivity within sectors gained ground. The timing of this change coincides with a reversal of political openness to global markets, a reduction of state interventionism, and export promotion. It also coincides with the changes in educational reforms.

Both in Tunisia and Turkey, the between and within trends in productivity vary by sector (Figures A.14 and A.15). In Tunisia's agriculture sector, and to some extent in the manufacturing sector, most of the productivity is driven by within changes,

while in services, productivity is equally about reallocation of labor. Productivity in Tunisia's agricultural sector is dominated by within changes for most of the periods in the last 50 years, while the other sectors do not demonstrate any unusual patterns except for in government where changes within sectors explain productivity more in later years. In Turkey, the agricultural sector plays less of an important role, but manufacturing and services are rather important sectors, and both structural change and within sector upgrading are important determinants of overall productivity. Like in Tunisia, the Turkish service sector is growing in productivity. It is also mostly dominated by the between component of the productivity decomposition in earlier years, but it is overpowered by the within component in later years. Overall, there is no clear correlation between the components of between and within sector productivity over time for either country (see Figures A.7 and A.8).¹³

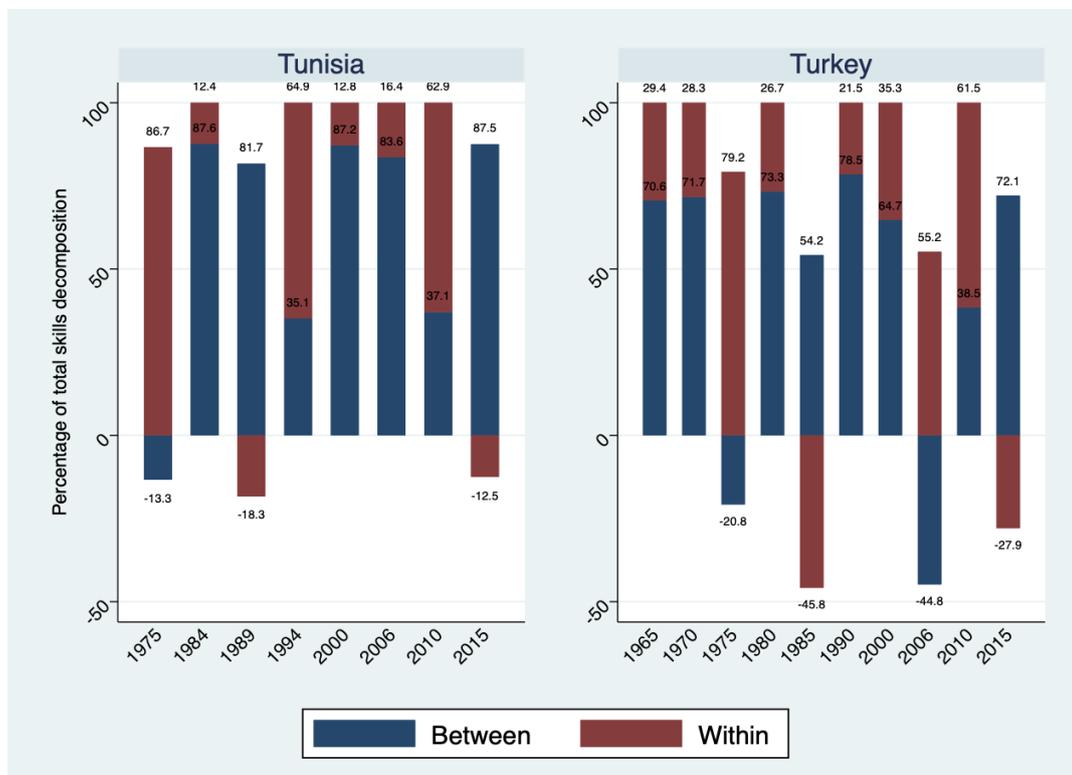
Skills Decomposition The evolution of the skills decomposition for Tunisia is more or less continuously positive over the entire period (Figure A.18). There was only a marginally negative contribution that came from changes within sectors in 1989 and 2015, and a negative contribution of structural change to productivity in our first period from 1967 to 1975. In Tunisia, skill upgrading (or the change in the overall share of high skilled employment) from the 1960s to 2015 was primarily due to the reallocation of skills to different sectors. Once we approach the 90's to 2010, total skills-upgrading starts becoming due, to a more substantial part, to each sector containing a larger share of high skilled workers. The swell of high-skills within sectors that do not coincide with an economy shifting towards more productive activities (c.f. Figure A.20 and A.13), set the background for the 2011 Jasmine revolution and provides fuel for frustration among unemployed, high-skilled youth. At the same time, jobs for high-skilled workers in the government services and public sector (Figure A.16), with low to no tangible productivity, still accounted

¹³On sectoral level, we observe that both countries have grown in the share of employment in the agricultural sector and services. In Tunisia, we observe mostly stable and low levels of productivity per sector but steady changes in the share of employment across most sectors (Figure A.16). As expected, the employment share in agriculture dropped substantially, while the share of employment in services increased. While we observe some increase in the share of employment in government, the share of employment in construction remained minimal, and the share of employment in manufacturing stayed more or less constant over time. In Turkey, the trends were similar, with a sharp drop in the share of employment in agriculture over the 50 years, and a large increase in the share of employment in the services sector (Figure A.17). Like Tunisia, the share of employment in the services sector rose. However, unlike in Tunisia, the share of employment in the Turkish manufacturing sector also steadily rose. This trend suggests that while in Tunisia, the low productivity government sector employment may have expanded and obstructed the contribution of skills to sectoral productivity, in Turkey this is was not the case.

for a relatively high share of employment at that time.

In Turkey, the skills composition of employment was more volatile than in Tunisia. In the period after ISI and a more command-led economy, substantial growth of educated labor force working within sectors was an essential component of overall skills-upgrading. In the later period (1970-1975), moving high-skilled workers between sectors negatively contributed to overall skills-upgrading. In the following periods until 1990, skills-upgrading within sectors had an overall negative contribution to overall skills upgrading. Like Tunisia, the between component of skills upgrading, capturing the increase of employment in sectors requiring high-skilled workers, had an important role in most of the periods from the 1970s. The remarkable negative contribution of the within component of skills upgrading from 1980 to 1985, suggests a loss of relative education levels of workers within sectors. This loss may have been a temporary result of the gradual opening to the global economy, at the same time as the sharp improvement of the mandatory years of education keeping some workers temporarily out of the labor market.

FIGURE 1.6: Skills Decomposition



Finally, while there is little correlation of the between and within (see Figures A.7 and A.8), there is a positive correlation between the between component of productivity and the between component of skills in particular in Turkey (see Figure A.10). This correlation suggests that there is a potential link between productivity and skills reallocation that may be occurring due to the reallocation of resources between sectors rather than within sector upgrading. If we look at the sectoral components of this correlation, for both Turkey and Tunisia, there is a positive association between skills reallocation and resource reallocation and its contributions are productivity-enhancing in the services sector, while it is productivity declining in the agricultural sector (see Figure A.9).¹⁴ This relationship is even more evident in the correlation between the structural change (between) component of the productivity decomposition and the reallocation of skilled workers component of skills decomposition in Turkey (see Figure A.11.)

1.5 Modeling productivity decomposition for regression analysis

Average years of schooling increased significantly in both countries, and yet the contribution of skills upgrading to productivity is largely overlooked in the literature. This section aims to explore whether there is support for the causal inference of the impact of skill-biased structural change on sectoral productivity in Turkey and Tunisia. Our main aim in this section is to estimate the contribution of each of the following measures of skill upgrading to productivity growth:

- **Total skill upgrading:** increase in the share of the highest skilled category of labor in total employment,
- **Skill upgrading within sectors:** increase in the share of the highest skilled category of labor in total employment due to the within sector component,
- **Skill upgrading between sectors:** increase in the share of the highest skilled category of labor in total employment due to the between sector component. This type of increase is also known as Skill Biased Structural Change (SBSC).

Estimating the causal impact of skill upgrading on productivity is admittedly a difficult task given limited data availability and the endogenous nature of the relationship between productivity and skills. In our attempt to establish a sound empirical

¹⁴A positive between component value suggests that the reallocation is productivity-enhancing, while a negative component value suggests that the reallocation is resulting in a net decrease in productivity.

link between the two, we face the following challenges. First, data on sectoral employment by education starts only from 1965 for Turkey and 1967 for Tunisia with 5 to 10-year gaps, limiting a more long-term and more data-rich approach. Secondly, sectors are not consistent across time or between the two countries. The sectors that are commonly available in the official statistics of both countries are agriculture, manufacturing, construction, services, and public administration. This collection of data leaves us a total of 50 observations by five sectors on skill upgrading for Turkey for the years: 1965, 1970, 1975, 1980, 1985, 1990, 2000, 2006, 2010 and 2015. For the upskilling decomposition variables, each year refers to the span between that year and the previous year. The first year of data in Turkey is 1960, and therefore the upskilling variables for the data point 1965 refer to the span from 1960 to 1965. The first year of available data in Tunisia is 1967, and the first data point refers to the span of years from 1967 to 1975.¹⁵ We acknowledge, however, that the small sample size is a significant problem which may cast doubt on our estimations. Hence our results should be interpreted with caution.

The second challenge is that skills and productivity are highly endogenous, and it is notoriously difficult to isolate the independent effects of the two. Our main variables of interest are the total skill upgrading, skill upgrading within sectors, and skill upgrading between sectors, and we use each of them independently (one at a time) because the sum of the within and between components is equal to total skill upgrading. Given the nature of the endogenous relationship between skills and productivity growth, it is ideal to use the Arellano-Bond type system GMM estimators. However, there are reasons why this is not possible. We have only 50 observations for a total of 5 sectors in Turkey, which can lead to problems of over-fitting and instrument proliferation, taking into account the fact that the time dimension is larger than the cross-section, i.e., $T = 10$ versus $N = 5$. Pooling the Turkish and Tunisian data does not solve the problem, as in that case, we would need to drop the sectors and use the overall decomposition results for the two countries.¹⁶ Doing that would reduce the sample size even further without providing any added benefit for

¹⁵The data for Tunisia is more abundant than Turkey and yet more irregular spanning the years: 1967, 1975, 1984, 1989, 1994, 1997, annually between 2000 and 2007, and again for all years between 2010 and 2015, all of which provide 95 potential observations. Using annualized data, we choose to keep similar period gaps between the years in Turkey as in Tunisia to avoid too much noise in regressions. The years used in Tunisia are 1975, 1984, 1989, 1994, 2000, 2006, 2010, and 2015. Since years in which data is available for both countries do not entirely overlap (especially for the period before 2000), we prefer to run separate regressions for both countries to maximize the observations per country. More specifically, pooling the data results in a total of 70 observations of country-year pairs, 35 for each.

¹⁶More specifically, pooling the data means year-sector pairs would not be unique anymore as there are two pairs for each year and sector when Turkey and Tunisia are combined.

a sounder estimation strategy. Instead, our empirical strategy relies on first documenting the correlations based on OLS estimations, and then with the available data at hand, trying to investigate whether skill upgrading has a causal impact on productivity growth using three different sets of instrumental variables for Turkey. For Tunisia, we follow the same procedure.

Our first set of instruments is the lagged values of skill upgrading for each of the three measures that we defined above, plus the lagged values of the share of university graduates in each sector as a percent of the total economy-wide employment. Since the data is available for every five years for Turkey, the instruments that we use are the fifth lags. For Tunisia, since the data is irregular, we use the first lagged value available between two observations (such as using skill upgrading between 1967-1975 for predicting skill upgrading between 1975-1984) and lag $n - 5$ when observations allow (such as using skill upgrading from 2005 to 2010 to predict upgrading from 2010-2015). Our identifying assumption is that the lagged values of skill upgrading and the sectoral share of university graduates in economy-wide employment affect productivity only through their impact on current skill upgrading, and there is no direct association between current productivity and the lagged values of our instruments. Although our instruments pass commonly used identification tests in most specifications, these are admittedly strong assumptions which may, in fact, not hold. Hence we relax these assumptions one by one and try other instruments as explained below.

Using OLS and 2SLS, we estimate the following equation for each country:

$$y_{i,t} = \beta_0 + \beta_1 Skill_{i,t} + \beta_2 X_{i,t} + \beta_3 \rho_t + \Delta W_t' \gamma + \lambda_i + \tau_t + \epsilon_{i,t} \quad (1.3)$$

where $y_{i,t}$ is the log of productivity in sector i between $t - 1$ and t ; $Skill_{i,t}$ is either *i.*) total skill upgrading, or *ii.*) between skill upgrading, or *iii.*) within skill upgrading in sector i between $t - 1$ and t . Following the work of M. S. McMillan and Rodrik (2011) and M. McMillan, Rodrik, and Verduzco-Gallo (2014) and Topalova and Khandelwal (2011), that identify commodity prices and trading trends as important factors impacting productivity, we control for the relative comparative advantage (RCA) of Turkish or Tunisian exported commodities on global markets, with $X_{i,t}$,

which we extract from CEPII and Saint Vaulry (2008a) database.¹⁷ In OLS specifications, we also control for the comparative advantage of EU commodities on global markets. Consistent with the literature on agricultural development (Gollin, Lagakos, and Waugh, 2013), we use average rainfall, ρ_t , as a control for agricultural output trends. These values are provided by the World Bank's Climate Change Knowledge Portal.¹⁸ We include controls for real capital stock growth (at constant 2011 national prices) to control for capital flows. Lastly, following the literature on human capital and productivity (Teixeira and Queirós, 2016; Bárány and Siegel, 2018), we include a variable to control for the change in human capital index between $t - 1$ and t , ΔW_t . Both the financial and human capital values are taken from the Penn dataset.¹⁹ And finally, to follow standard cross-sectional analysis protocols, we control for λ_i sector and τ_t year fixed effects.

We start with baseline OLS estimations for Turkey and Tunisia in Tables A.2 and A.3. Columns (1), (4) and (7) shows the raw correlations between productivity and *i*) total skill upgrading, *ii*) skill upgrading between sectors, and *iii*) skill upgrading within sectors when only the year effects, sector effects, and sector-specific linear trends are controlled. The basic estimations show that there is a negative and but not statistically significant association between total skill upgrading and productivity growth for Turkey and a negative and significant association for Tunisia. When we look at the association between productivity and skill upgrading between sectors and within sectors separately, we see that skill upgrading between sectors, i.e., skilled biased structural change in column (4) is positively but not statistically significantly associated with productivity growth with a coefficient of 0.09 percentage

¹⁷We are able to match CHELEM's relative comparative advantage data with agriculture, manufacturing, and services properly. However, since there is no comparable RCA for construction and public administration sectors, we assign zero for the two sectors. This variable is used as a proxy for country export activity and competitiveness. More details on this variable are in the annex.

¹⁸Since Turkish data is available for every five years, we take five years average of the rainfall data for Turkey, however since the data is irregular, we use the annual rainfall data for Tunisia.

¹⁹The Penn dataset from Feenstra, Inklaar, and Timmer (2015b) uses a measure of human capital from Barro and Lee (2013) that captures the average years of schooling in 5-year intervals by age group for the working-age population. Their variables provide a yearly stock of the overall years of schooling as an aggregate. We acknowledge that there may be some multi-collinearity between our main skills upgrading variables and human capital stocks (supply of skills), but our skills variables include the number of employed individuals in each education category by sector. The employment values are, therefore, based on the demand for skilled workers per sector rather than a supply of educated individuals in the entire country. Furthermore, the primary goal of our paper is to estimate the causal effect of skill upgrading on productivity using employed skills (demand of skills) rather than the causal impact of skills itself. Lastly, we do not directly use human capital stock but the change in the human capital index.

TABLE 1.1: OLS Estimations for Sectoral Productivity (Value-Added per worker), Turkey

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Skill Upgrading	-0.011 [0.096]	0.077 [0.093]	0.074 [0.095]						
Skill Upgrading Between				-0.095 [0.172]	0.008 [0.167]	0.007 [0.173]			
Skill Upgrading Within							0.022 [0.132]	0.162 [0.131]	0.162 [0.134]
Real exchange rate (% change)		-0.235** [0.092]	-0.236** [0.109]		-0.250** [0.091]	-0.247** [0.108]		-0.245*** [0.088]	-0.251** [0.102]
Average rainfall (mm)		-2.133** [0.839]	-2.133** [0.994]		-2.265** [0.829]	-2.235** [0.994]		-2.226*** [0.801]	-2.277** [0.936]
Capital stock growth (logs)		8.354** [3.035]	8.324** [3.534]		8.867*** [3.003]	8.731** [3.533]		8.677*** [2.931]	8.821** [3.353]
Human capital stock (% change)		-18.083*** [6.161]	-18.004** [7.143]		-19.059*** [6.033]	-18.770** [7.061]		-18.596*** [5.996]	-18.860** [6.825]
Comp. Adv. of EU exports (% change)			-0.010 [0.022]			-0.012 [0.023]			-0.007 [0.021]
Comp. Adv. of TR exports (% change)			-0.004 [0.005]			-0.004 [0.005]			-0.004 [0.005]
Constant	-84.776*** [9.868]	18.307 [39.906]	18.272 [48.459]	-85.066*** [9.492]	26.223 [38.886]	24.590 [47.874]	-85.148*** [10.393]	20.439 [37.356]	22.994 [44.731]
Observations	50	45	45	50	45	45	50	45	45
R-squared	0.970	0.977	0.977	0.970	0.976	0.976	0.970	0.977	0.978
Sector specific Time Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Productivity growth refers to annualized growth of value-added per worker. Capital Stock is measured in 2011 national prices.

TABLE 1.2: OLS Estimations for Sectoral Productivity (Value-Added per worker), Tunisia

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Skill Upgrading	-0.212** [0.084]	-0.212** [0.084]	-0.187* [0.092]						
Skill Upgrading Between				-0.262** [0.109]	-0.262** [0.109]	-0.237* [0.124]			
Skill Upgrading Within							-0.561* [0.327]	-0.561* [0.327]	-0.498 [0.410]
Real x-rate growth		0.007 [0.005]	0.007 [0.005]		0.007 [0.005]	0.006 [0.005]		0.008 [0.005]	0.008 [0.006]
Rainfall (mm)		0.025** [0.011]	0.024* [0.013]		0.024** [0.011]	0.022 [0.013]		0.028** [0.012]	0.026* [0.015]
Capital stock growth (logs)		-1.476*** [0.504]	-1.464** [0.523]		-1.492*** [0.498]	-1.481*** [0.510]		-1.372** [0.539]	-1.375** [0.558]
Human capital stock (% change)		-0.206 [0.857]	-0.252 [0.861]		-0.170 [0.845]	-0.204 [0.834]		-0.327 [0.908]	-0.400 [0.965]
Comp. Adv. of EU exports (% change)			0.008 [0.015]			0.010 [0.014]			0.006 [0.018]
Comp. Adv. of TN exports (% change)			0.001 [0.001]			0.001 [0.001]			0.001 [0.001]
Constant	-17.034* [8.591]	-16.844* [8.669]	-16.484* [8.841]	-17.478* [8.511]	-17.268* [8.596]	-16.770* [8.643]	-17.147* [8.852]	-17.040* [8.920]	-16.594* [9.211]
Observations	40	40	40	40	40	40	40	40	40
R-squared	0.981	0.981	0.982	0.981	0.981	0.982	0.980	0.980	0.981
Sector specific Time Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Productivity growth refers to annualized growth of value-added per worker. Capital Stock is measured in 2011 national prices.

points for Turkey. In Tunisia, it is again, negatively and significantly associated with productivity with a magnitude of 26 percentage points.²⁰ Likewise, in Turkey, upgrading skills within sectors is positively associated with productivity (and to a higher magnitude than upgrading of skills in sectors through reallocation), while it is negatively, but not significantly associated with productivity in Tunisia.

In columns (2), (5) and (8), we include rainfall, real capital and human capital stock growth and in columns (3), (6) and (9) we also include the change in the relative comparative advantage of national exports and EU exports as two additional controls. Our estimations show that with additional controls, skill upgrading between sectors is still positive and not significantly associated with productivity for Turkey and that total skills, within sector and between sector skill upgrading is negative but either weakly or not significantly associated with productivity in Tunisia. In terms of magnitude, both columns (8) and (9) show that a percentage point increase in skill upgrading between sectors is, on average, associated with a 0.07 point increase in productivity for Turkey. The change in real exchange rates was negatively associated with productivity in Turkey, but not in Tunisia. This outcome may be due to the fact that in Turkey, exchange rates were fixed over most of the period of analysis, and used as a tool to improve competitiveness. While this was also the case in the earlier periods in Tunisia, exchange rates were floated at an earlier period. Interestingly, average rainfall negatively affects productivity in Turkey, whereas it has a positive impact on Tunisia. This correlation could be due to the fact that agriculture is still a prominent sector in Tunisia for which there could be a boost in productivity after more substantial rainfall, lifting the overall productivity, whereas it is the opposite in Turkey. Our results also show that capital accumulation is positively and significantly associated with productivity for Turkey but negatively associated with Tunisia. The percentage change in human capital stock is negatively and significantly associated with productivity in Turkey and negatively but not significantly associated with productivity in Tunisia. In Turkey, this may be explained in particular by education supply reforms that sharply lifted the supply of educated workers in the economy but did not react to the economy's demand for skills. In our baseline OLS estimations, the comparative advantage for EU exports and the comparative advantage of Tunisian and Turkish export measures are not significantly correlated with productivity.

²⁰The differences in magnitude of estimates in Turkey and Tunisia is also reflective of the different total levels of productivity within each country.

TABLE 1.3: OLS and 2SLS Estimations of Sectoral Productivity, Turkey

	(A) OLS : Log of value added per worker			(B) 2SLS : Log of value added per worker		
	Total Skill Upgrading	Between Upgrading	Within Upgrading	Total Skill Upgrading	Between Upgrading	Within Upgrading
Skill Upgrading	0.074 [0.095]			0.122* [0.074]		
Skill Upgrading Between		0.007 [0.173]			0.259* [0.144]	
Skill Upgrading Within			0.162 [0.134]			0.163 [0.169]
Real x-rate growth	-0.236** [0.109]	-0.247** [0.108]	-0.251** [0.102]	-0.237*** [0.077]	-0.214** [0.086]	-0.259*** [0.070]
Average rainfall (mm)	-2.133** [0.994]	-2.235** [0.994]	-2.277** [0.936]	-2.150*** [0.699]	-1.939** [0.782]	-2.348*** [0.637]
Capital stock growth (2011 national prices, in logs)	8.324** [3.534]	8.731** [3.533]	8.821** [3.353]	8.354*** [2.505]	7.617*** [2.787]	9.073*** [2.297]
Human capital stock (% change)	-18.004** [7.143]	-18.770** [7.061]	-18.860** [6.825]	-18.099*** [5.082]	-16.858*** [5.597]	-19.363*** [4.694]
Comp. advantage of TR exports (% change)	-0.004 [0.005]	-0.004 [0.005]	-0.004 [0.005]	-0.003 [0.004]	-0.002 [0.005]	-0.004 [0.004]
Constant	18.272 [48.459]	24.590 [47.874]	22.994 [44.731]	18.5 [33.352]	11.696 [36.837]	26.634 [30.326]
Observations	45	45	45	45	45	45
R-squared	0.977	0.976	0.978	0.976	0.974	0.977
Controls	YES	YES	YES	YES	YES	YES
FIRST STAGE AND IDENTIFICATION for 2SLS Estimations						
Coefficients of Instruments						
L5. Share of College Grad. in Tot. Emp.				-38.420*** [7.606]	-24.410*** [3.760]	-14.145** [6.370]
L5. Total Skill Upgrading				-0.372 [0.138]		
L5. Between Skill Upgrading					-0.390*** [0.130]	
L5. Within Skill Upgrading						-0.342 [0.212]
Sanderson-Windmeijer F Statistic				13.04 pval(0.000)	22.92 pval(0.000)	2.74 pval(0.0837)
Hansen J Statistic				0.003 pval(0.955)	0.708 pval(0.400)	0.913 pval(0.339)

(1) Newey West standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

(2) Null hypothesis for S.-Windmeijer weak identification test is that the particular endogenous regressor in question is unidentified.

(3) Null for Hansen's J statistic is that the instruments are uncorrelated with the error term.

TABLE 1.4: OLS 2SLS Estimations of Sectoral Productivity, Tunisia

	(A) OLS : Log of value added per worker			(B) 2SLS : Log of value added per worker		
	Total Skill Upgrading	Between Upgrading	Within Upgrading	Total Skill Upgrading	Between Upgrading	Within Upgrading
Skill Upgrading	-0.187* [0.092]			-0.037 [0.239]		
Skill Upgrading Between		-0.237* [0.124]			-0.238 [0.551]	
Skill Upgrading Within			-0.498 [0.410]			0.590 [0.517]
Real x-rate growth	0.007 [0.005]	0.006 [0.005]	0.008 [0.006]	0.019*** [0.005]	0.017*** [0.006]	0.019*** [0.005]
Average rainfall (mm)	0.024* [0.013]	0.022 [0.013]	0.026* [0.015]	0.051*** [0.014]	0.045** [0.018]	0.054*** [0.013]
Capital stock growth (2011 national prices, in logs)	-1.464** [0.523]	-1.481*** [0.510]	-1.375** [0.558]	0.221 [0.329]	0.254 [0.331]	0.184 [0.312]
Human capital stock (% change)	-0.252 [0.861]	-0.204 [0.834]	-0.400 [0.965]	-0.900 [0.906]	-0.670 [1.056]	-0.990 [0.820]
Comp. advantage of TN exports (% change)	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	-0.003*** [0.001]	-0.004** [0.002]	-0.004** [0.002]
Observations	40	40	40	35	35	35
R-squared	0.982	0.982	0.981	0.983	0.984	0.979
Controls	YES	YES	YES	YES	YES	YES
FIRST STAGE AND IDENTIFICATION for 2SLS Estimations						
Coefficients of Instruments						
Lagged Share of College Graduates in Tot. Emp.				-12.2** [4.71]	-5.89 [4.39]	-8.051*** [2.690]
Lagged Total Skill Upgrading				0.009 [0.123]		
Lagged Between Skill Upgrading					0.019 [0.150]	
Lagged Within Skill Upgrading						-0.115 [0.110]
Sanderson-Windmeijer F Statistic				3.42 pval(0.056)	1.05 pval(0.373)	6.34 pval(0.009)
Hansen J Statistic				7.08 pval(0.008)	6.84 pval(0.009)	2.65 pval(0.104)

(1) Newey West standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

(2) Null hypothesis for S.-Windmeijer weak identification test is that *the particular endogenous regressor in question is unidentified.*

(3) Null for Hansen's J statistic is that *the instruments are uncorrelated with the error term.*

If we now look at how good our estimations were at predicting actual productivity levels for Tunisia and Turkey in Tables A.19 and A.20, we see that in both cases fitted values of productivity are quite close to the estimated values for both Tunisia and Turkey. In both cases, the fitted regressions marginally overestimated productivity in the agricultural, manufacturing and services sector – all trade-able sectors. On the other hand, they very precisely estimated outcomes in the construction sector. Lastly, in Turkey, the fitted regression estimates also underestimated productivity in the government sector. However, in Tunisia, the fitted regression estimates overestimated productivity in the government sector.

So far, our estimations aimed to document the basic correlations between measures of skill upgrading and productivity without attributing any causal interpretation. In the macroeconomic literature, finding instruments to push towards causal inference for aggregate values is notoriously difficult. When possible, most authors use GMM methods or lagged values of key variables as instruments. We have discussed why a panel GMM is not possible due to over-fitting, but we can still attempt to follow others in the literature by using lagged values of variables that are closely related to and directly impact key right-hand side values. Following the review on aggregate productivity and education trends by Sianesi and Reenen, 2003, one potential instrument for a macroeconomic study is the lagged values of skill upgrading and the share of university graduates in economy-wide employment as instruments. In what follows below, we rely on 2SLS estimations, which we hope will allow us to document the causal effect of skill upgrading on productivity. Tables A.4 and A.5 show the results of the OLS estimations compared to our set of 2SLS estimations. For Turkey, estimates in the last three columns show that there is a positive and significant impact of total skills upgrading and reallocation of skills between sectors on productivity. More specifically, our results confirm that total skill upgrading and productivity are positively related and statistically significant for Turkey (Table A.4), but there is no meaningful association captured in the last three columns for Tunisia (Table A.5). Moreover, as in the decomposition analysis, our results suggest that the impact, on average, comes from the movement of skilled labor between sectors, rather than the upgrading of skills within sectors for Turkey.

The first stage results indicate that our instruments perform reasonably well for Turkey but weakly for Tunisia. In all specifications in Tables A.4 and A.5, Hansen's J Statistics show that the instruments are uncorrelated with the error term and satisfy the over-identification requirements. F statistics for the first stage for Turkey are

above 10, except for skill upgrading within sectors. Moreover, the first stage coefficients of instruments for Turkey are highly significant, with the exception of the fifth lag of skill upgrading within sectors in columns (3) and (6). The negative coefficients for the two instruments reflect base effects, as larger changes in the past period, on average, led to lower increases in the current period. Overall, based on the instrument validity tests in the first stage, we can at least confidently argue that for the period between 1970-2015, the effect of skill reallocation between sectors on productivity was, on average, positive for Turkey. While this first set of instruments had a measurable impact on productivity, it had no impact on productivity growth. As for Tunisia, although the instruments perform relatively poorly and it is harder to argue based on poor instruments, there is no convincing evidence, using this method and these instruments with the available data, of the impact of skill upgrading on productivity growth whatsoever.

Overall, both the OLS and the 2SLS estimations point to the same empirical finding, that for the period between 1970-2015 *i*) total skill upgrading has been a positive determinant of productivity for Turkey, *ii*) Skill reallocation between sectors was the main driver of productivity increases in Turkey, however, *iii*) there were no robust findings for Tunisia.

1.6 Conclusion

This article aimed at understanding the links between skill demand and productivity using a structural change perspective. We relied on decomposition techniques and regressions using Tunisian and Turkish postwar sectoral data.

The productivity decomposition results showed that structural change played a significant role during the last 40 years in Turkey and Tunisia, but that productivity upgrading within sectors plays a more critical role in explaining overall productivity decomposition only in the more recent years. The skills decomposition results show us that concurrently, overall skills upgrading is characterized by the reallocation of skills across sectors in Tunisia and Turkey. Furthermore, historically, there were more high, and medium-skilled workers occupied more jobs in the government sector in Tunisia than in Turkey, which may have been explained by post-colonial path dependency in the 1960s in Tunisia.

Our regression results show that skill upgrading has a causal impact on productivity in Turkey. The main driver of productivity is the reallocation of skilled labor between sectors and not the increase of the share of highly educated workers within sectors. We do not find a similar effect for Tunisia.

The policy implications of the outcomes are essential. In Tunisia, weak instruments may be limiting further causal inferences, however, descriptively, the reallocation of skilled labor and reallocation of resources (structural change) do not seem to have a strong positive impact on productivity, while it is evident that from the productivity decomposition analysis there seems to be a swelling of resources contributing to productivity within sectors. This analysis suggests that there is a need for jobs that can accommodate and efficiently gain the benefits of higher-skilled workers and that skill supply is not well-matched with skills demand in the economy. Furthermore, the relatively higher allocation of high skilled labor into the public sector may be impeding a more productive contribution of such skills to the economy. In Turkey, the measurable positive impact of skill reallocation, and the concurrent higher levels of productivity are being explained by the growth of sectors (the increases in the within component of the productivity decomposition) in more recent years. This finding suggests that productivity increased by the reallocation of high skills into sectors that are more productive and on the verge of expansion.

The historical context and institutions of both countries are essential in how skills can contribute to productivity in the economy. Historically in Turkey, the private sector was more dynamic at an earlier stage. It experienced growth-enhancing reforms, concurrently with education reforms creating an institutional environment where skills contributed to productivity. On the other hand, a strong statist tradition, in a post-colonial institutional setting, that absorbed high skills into the government sector to build the modern state. Access to education in Tunisia may have been historically higher, but its economy was not moving fast enough to absorb them appropriately. To respond to Lant Pritchett, education went more to productive activities in Turkey, while in Tunisia, high skilled education continued to be channeled to the public sector in the absence of sufficient opportunities in the formal private sector.

2 Winners and Losers in Industrial Policy 2.0: A Political Economy evaluation of the impacts of the Tunisian Industrial Upgrading Program

Chapter Abstract Large scale business subsidies tied to national industrial development promotion programs are notoriously difficult to study and are often inseparable from the political economy aspect of large government programs. One such example is the Tunisian Industrial Upgrading Program. While only a few studies have quantitatively assessed the impact of such programs, the continuation and resurgence of industrial development programs make the rigorous evaluation of this type of program necessary. We use the Tunisian national firm registry database, program data, and a perceptions survey administered by the national research institute to measure the impact of the IUP and its political purpose. Using inverse propensity score re-weighted differences-in-differences regressions, we find that when program recipients are smaller firms, wages increase between 10-17% and employment and net job creation increases suggesting that small treated firms hire more and higher-skilled labor. However, in larger firms, employment does not increase and wages fall, suggesting that there are no benefits to labor when funds go to large firms. We suggest that clientelism is more likely dominant when recipients are large firms.

2.1 Introduction

Industrial policies have long lost favor in light of difficulties in the effectiveness and political economy of structural adjustment programs. The unpopularity of industrial policies grew from its capacity to produce and exacerbate market distortions, as well as the fear of political capture of subsidies in developing countries (Rodrik, 2008). However, little differentiates the failures of these types of policies with the failures in long-entrenched and accepted "horizontal" policies, such as those that subsidize education or health services.¹ Despite concerns and common pitfalls, industrial policy, like social policies, remains a common type of intervention for governments. They are often used to stimulate growth after economy-wide or sector-specific recessions and as part of employment and regional development policy. An example of one such policy is the Tunisian Industrial Upgrading Program implemented in the late '80s and '90s.

Initiatives targeting industrial development are inseparable from incentives in the political economy. State-led industrial policies can be successful at initial stages of development and in the long-run, like in the case of the South Korean model. However, governments often lack a supportive political-economy context and *will* to implement the type of policy reform needed for long-run development. The weak demand for change may be due to the state dominance of the private sector in authoritarian regimes, where the emergence of a robust private sector is considered a threat to state power (Cammett, 2007; Rougier, 2016). Strong authoritarian regimes have a hard time accepting the emergence of a private sector generating its income independently from rents controlled by the State (Malik and Awadallah, 2013). To make sure rents stay in the hands of the government elite, the state guarantees its clients a non-competitive environment and endogenous regulation protecting their interests (Rijkers, Freund, and Nucifora, 2017b). It is in drawing from this literature that we can wonder on both the effectiveness and political purpose of the industrial upgrading program of Tunisia. The IUP may have been successful in some fronts,

¹"Horizontal" policies can impact all sectors, and do not necessarily have a sector-specific component. Nevertheless, they can impact some sectors differently than others. For example, the protection of business and labor interest groups, or education, training, or health-related policies are "horizontal" industrial policies. However, "Horizontal" policies such as training and education are not "sector - blind." They are economy-wide but impact some sectors more than others. For example, focusing on technical computer skills training will not help manufacturing production lines as much as it will provide skilled labor for services. On the other hand, "Vertical" industrial policies have a sector-specific or firm-specific component and can target entire sectors or firms within sectors. Vertical industrial policies can include, for example, policies specifically for tradable sectors or business subsidies or interest rate reductions targeting one type of sector or economic activity. In the context of developing countries, political capture occurs as frequently in the basic social welfare, or "horizontal" policies as in business subsidies and "vertical" policies.

but the political purpose is arguably to serve as an extension of an arm of the state in ensuring political stability and continued rents to government cronies (Murphy, 2006).

The literature on firm-subsidies suggests that these types of industrial policies can have a positive impact on jobs and output, in particular for small firms, (Crisuolo et al., 2019; Bernini, Cerqua, and Pellegrini, 2017; Einiö, 2014), even if this is not always the case (Wallsten, 2000).²³ Furthermore, most studies report finding an anticipation effect before treatment, changes in behavior during the treatment period and varying impacts by the type of subsidy received (Wallsten, 2000; Hottenrott, Lopes-Bento, and Veugelers, 2017; Bernini, Cerqua, and Pellegrini, 2017; Criscuolo et al., 2019).

An evaluation of the impact of the Tunisian Industrial Upgrading Program (IUP) in the context of Tunisia's political economy can bring insights on the effectiveness of firm-level upgrading interventions in supporting labor, and into its political economy implications. Cammett (2007)'s paper suggests that the true "principal," of the principle-agent model in political science, is the state. If this initiative is indeed the state extending its arm through the business elite (if the program was effective in carrying out its political purpose), then we should expect benefits to accumulate more to capital than labor. Alternatively, if the "principal" is ultimately labor, and the state is acting through the private sector to serve the principal, then there should be more gains to labor.

Our article is one of the first rigorous evaluation of industrial policy in the Middle-East and North Africa and one among rare examples in developing countries. This work is relevant both to academics and to policymakers looking to target state interventions better. Until now, there has been minimal research focusing on the impact of firm-subsidies as a part of a more extensive industrial program in the context of developing countries, and no known empirical research linking these programs with the political economy of the country. Tunisia is a suitable country for this analysis for two reasons. First, for practical purposes, the richness of Tunisian panel data on firms means we can follow firms over time for several periods. Secondly, the documented close business-state ties make placing this analysis in the context of the political economy more relevant.

²Other studies find evidence that positive change in total factor productivity is only captured in the long-run, if at all (Crisuolo et al., 2019; Bernini, Cerqua, and Pellegrini, 2017; Einiö, 2014).

³Closely related to this literature, Wallsten (2000) finds that firm-level investment subsidies crowd-out self-raised investments, while Einiö (2014) finds no evidence of crowding out, and McKenzie, Assaf, and Cusolito (2017) finds a positive impact on capital investments and innovations.

The methodology involves an identification strategy and follows with regression analysis. Because of administration restrictions, our identification strategy is based on non-perfect identifiers, similar to in the identification strategy used by Criscuolo et al. (2019).⁴ Once we identify firms, we follow the method of Cadot, Fernandes, et al. (2015) and Hirano, Imbens, and Ridder (2003) who use a weighted propensity score matching method to create control groups and extended the analysis with a fixed-effects differences-in-differences regression analysis. Similar multiple treatment studies use basic matching techniques or more aggregate synthetic control group methods. This approach is analytically similar to the synthetic control group method with a differences-in-differences regression, except by following the Hirano, Imbens, and Ridder (2003) approach, we keep the possibility of firm-level analysis.

As a first result, the fixed effects OLS estimates suggest that the program increased overall employment and wages. However, the effect on employment was not robust to the inclusion of controls and regression re-adjustment, suggesting that on an aggregate level, the program did not increase employment, and that this positive impact was due to selection bias. On a more dis-aggregate level, employment and wages grew in small firms. In our full model, we observed increases in net job creation in smaller firms. In small firms, the estimates suggest that workers retained some of the benefits of this program because they gained in jobs and job quality. Inversely, there is little evidence of wage growth in large firms, but more often significant drops in wages. The decrease in wages is observed jointly with the losses in employment. This observation on wages and employment, suggests that in large firms, there was a substitution of labor. This finding suggests that it is likely that capital-owners retained the benefits from the program. We conclude that this program's political purpose is welfare-enhancing in small firms, but clientelism in larger firms.

The rest of the paper i.) describes the Tunisian upgrading program; ii.) provides a data description; iii.) proposes an identification strategy and econometric approach; iv.) discusses the descriptive analysis, regression results, and robustness and sensitivity tests; and finally v.) discusses the results within the political economy context of Tunisia.

⁴In the paper, we provide additional robustness test on the credibility of our identification strategy, and restrict the analysis to where we have a higher level of sureness in our identification strategy.

2.2 The Tunisian Industrial Upgrading Program (IUP)

The Tunisian Industrial Upgrading Program (IUP) implemented in anticipation of full entry into the the Free Trade Agreement with the European Union, is a "vertical" industrial policy program initially aimed at bringing the competitiveness of firms to a comparable level with European and Chinese firms before the reduction of trade barriers through the EU free trade agreements. At the time of entering the Free Trade Agreement, Tunisia requested additional time to protect firms as they caught up with other countries' levels of competitiveness. They also ask for financial assistance to support structural adjustment. Although the business community claims to have requested the IUP, the program initially started with financial support from the European Union (EU Structural Adjustment Facility) and loans from the European Investment Bank (Murphy, 2006).

The IUP was initially limited to the manufacturing sector. However, in 1997, services with high links to manufacturing were added to the list of beneficiary sectors. More than five thousand grants have been distributed in the last twenty years, corresponding to a total amount of 1260 million Dinar (around 500 million US\$). Two-thirds of the amount was spent on material purchases and the rest on immaterial acquisitions (Ben Khalifa, 2017).⁵ The bureau of the IUP prioritized material investments initiatives that improved product conception, research and development, and laboratory equipment, and immaterial investments that improved productivity and quality of products, the development of new products, and costs related to hiring higher-educated managers (Amara, 2016).⁶

The purpose of the implementation of the IUP was two-fold. There was an economic logic as well as a political logic. Cammett (2007) argues that the dismantling of the Multi-fiber Agreement for textiles and competition from China led the Tunisian government and business elite to focus on becoming economically prepared to compete in world markets. She further comments that from a political stand-point, clientelism in Tunisia helped implement such a program. Murphy (2006) argues that the IUP eventually served to further entrench the role of the state in intervening and

⁵Material investments included technical equipment for management, research and development, and quality control purposes. They could be targeted at modernizing production equipment, adopting new technologies, diversifying the production of goods, integration of new processes in the production cycle, maintenance, and installation of basic utilities (for example, production chemicals, electricity). Immaterial investments included computer programs and technical assistance (in the upgrading of the productivity within the production process), consulting services, financial advisory, technology transfer and support in the acquisition of patents and licences.

⁶Like in the Yemeni firm subsidy matching initiative McKenzie, Assaf, and Cusolito (2017), when the IUP provided material investment support, it required at least some cost matching by firms, and subsidized up to 70% of immaterial expenses up to a ceiling.

controlling the private sector and civil society organizations. The non-transparent method with low-oversight and closed-door meetings within the newly established *bureau de mise à niveau* and the multi-stakeholder financing board (COFIL) further exasperated the concerns among civil society and the major donors that funded the program. It quickly became a widely known fact that many of the family members of the inner circle of the regime benefited from the IUP. In her opinion, clientelism and control were the primary political purposes of the IUP. As such, she argued that the government used early reforms to muster government support and subvert the rise of civil society demands for further reforms.

The qualification conditions for the IUP are rather straightforward. Firms need at least 2 years of formal registry (incorporation) and critically, they need to belong to eligible industries which include the following: agriculture and food; construction, ceramics and glass; chemicals; textiles, clothing and leather; mechanical, metal and electrical work; and diverse industries such as services related to these activities. Inherently, it also required firms to be in the formal market, and that firm fiscal accounts were up-to-date and legible by the selection committee. According to Murphy (2006), firms wishing to benefit from the program made an initial application that responded to a set of principles and objectives, rather than a standard application form.⁷ If accepted, firms are asked to provide a strategic and financial diagnostics. Technical support was then provided by either Technical Centers, the *Agence de Promotion de l'Industrie* for public-private partnerships, or private firms.⁸

Most firms that applied received funding.⁹ The average funds per applicant¹⁰ was higher in the northeastern region (Figure 2.1, Panel A and Figure B.1, Panel C). However, in the last 20 years (1996-mid 2017), the distribution of total funds for the IUP has been primarily concentrated in the northern coastal regions (Figure 2.1 Panel B and Figure B.1, Panels A (weighted) in Annex). Over the entire period of funding, 17% of total funds for the IUP went to the region of Ben Arous. The region of Nabeul received 13% of all funds, and the regions of Monastir, Sfax, and Sousse each received 11% of the total funding pool. The relatively higher approval-to-applicant ratio in the north and eastern coasts (Figure B.1 Panel D) was also reflected in the fact that fewer firms applied in those regions (Figure B.1, Panel B).¹¹

⁷This was also the case in the firm matching subsidy program in Yemen McKenzie, Assaf, and Cusolito, 2017.

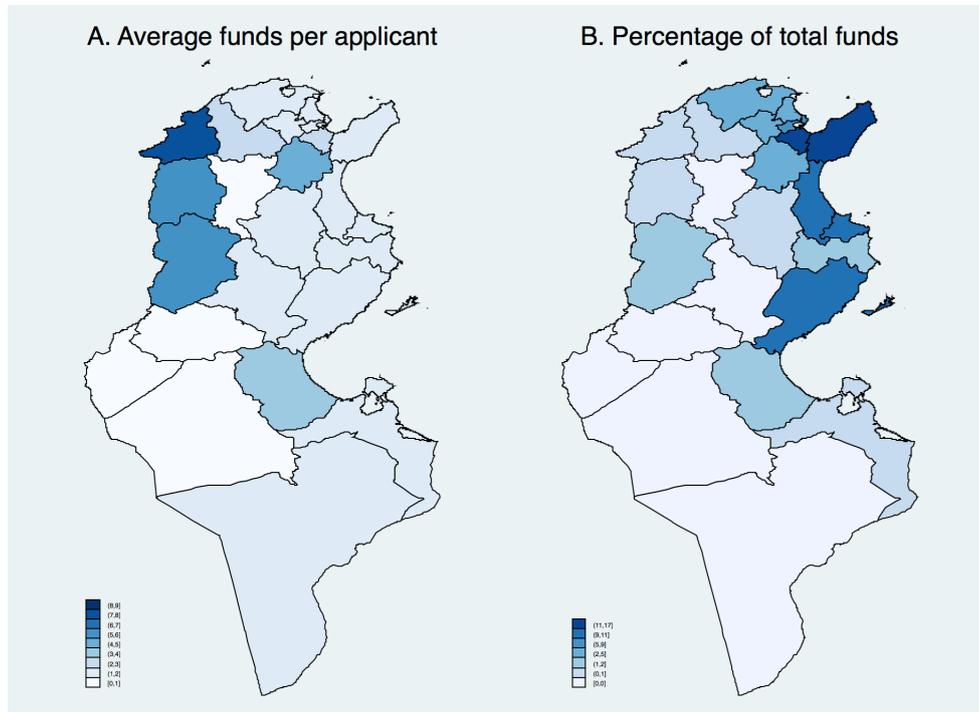
⁸Further information on the decision to select firms was unfortunately not available for this research.

⁹The fact that firms had to apply to receive funding also meant that there is implicit selection bias before firms applied. Firms who applied likely have different observable and non-observable characteristics from those who did not.

¹⁰Average funds per applicant are weighed by total applicants per region.

¹¹This was weighted by total applicants per region.

FIGURE 2.1: Distribution of IUP funds by region



Source: Bureau de Mise à Niveau

Note: Rates are weighed by total applicants per region. Total and average funds are in current millions of Tunisian Dinars.

2.3 Data Description

Main Data Sources Description The primary source of our paper is from the national firm-level enterprise registry (*Répertoire nationale des entreprises*, RNE) administered by the national statistical institute (*l'Institut national de la statistique*, INS). It includes data for all formal firms for 18 years, from 2000 to 2017, with close to 4 million observations. This resource is the most exhaustive source for firm-level data in Tunisia. The database is linked with business turnover, profits, and firm-level employment data from the Ministry of Finance. It was also possible to link the data directly with the national export-import customs database, including export values and quantities on the HS6 product level and by country (for years 2005 to 2010).

For our analytical purposes, we use a sub-sample of firms that had at least six employees in at least one period in the database. The use of this sub-sample means that firms with less than six employees may exist as long as the firm had at least six employees at some point in the 18 years of data available in the RNE. The reason for the restriction on the size of firms is two-fold. First, the quality of the data collected

for firms with less than six employees is low. Second, and more importantly, only firms with six or more employees are *required* to file taxes and can therefore benefit from government subsidies and tax breaks. Firms with less than six employees are often informal and do not benefit from the same financial incentives as firms with more than five employees. For these two reasons, in firm-level research papers, it is common practice to limit the analysis of firm-level initiatives to more than five employees. This subset, therefore, implicitly reduces differences in observables and non-observables. Furthermore, in the same line of thought, we only apply the analysis to firms that officially qualify to receive funding in the following two ways: 1.) by belonging within the eligible manufacturing and services sectors, and 2.) who at some year during the panel, were at least two years old. Once we identified our treated firms, we used a random sample of firms to draw from as the control group.

In order to identify treated firms, we gathered a database with information on treated firms that included the firm identification number, year of treatment, sector of activity, number of workers, location, and exporter status of firms from 2005 to 2011. Because of administrative barriers and because individual firm identifiers were not always reliable, we used firm characteristics available in the treated data to identify treated firms rather than firm ids.¹² In the sensitivity analysis section, we discuss how we tested the strength of this treatment identification strategy.

Although financed by the Government budget and many donors, a quantitative assessment of this program incorporating key economic performance data was never undertaken, but as in the case of most evaluations of industrial policies, a qualitative perceptions survey was administered (Ben Khalifa, 2017). The raw data of the perceptions survey was made available by the institute of economic studies of the Ministry of Development (*Institut tunisien de la compétitivité et des études quantitatives*, ITCEQ) after our request for research purposes. The questionnaire provides qualitative descriptive, perception-based information. The identification of selected firms within the treatment and control groups was conducted internally in the ITCEQ offices.¹³ It includes information from 140 treated firms and 98 non-treated firms that were matched using inverse-propensity score matching on observable firm criteria. The survey is descriptively interesting but limited in its application to rigorous impact evaluation. One limitation of the perceptions survey is that treated firms are firms that were treated in any year before the year of the survey, 2014. We do not

¹²This is similar to the method used by Criscuolo et al. (2019) who also faced issues related to the reliability of identification of treated firms.

¹³The survey was administered using the same stratification methods as the data collected from the national statistical institute and gathered perceptions of the impact of firms.

have further information on the year of treatment for the perceptions survey¹⁴. Secondly, ITCEQ reported difficulties in following up with some firms, and therefore there is a slight attrition bias.¹⁵

2.4 Identification Strategy and Econometric Approach

Identification of Treated Firms We faced administrative barriers in matching firm id numbers to the national business registry data and reliability issues related to the quality of firm ids. Although recent laws were passed ensuring access to program-related information for research purposes, not all ministries were equally cooperative for academic research. Therefore, part of the barriers to conducting a direct matching was administrative, while others technical. To address these concerns, we took an approach that most closely resembles an intention-to-treat design that captures firms that were likely treated, but among whom compliers are unknown. While the administrative restrictions to merging treatment data by fiscal identification numbers was a setback, it allowed us to try more innovative identification strategies. We can consider the resulting outcome as intention-to-treat effects and a lower bound of the average treatment effect since there is a percentage of firms in the treatment group that may not have been treated in reality (Chakravarty et al., 2019). We discuss how we test our identification strategy further in the sensitivity analysis section.

To identify firms, we merged program information with firm-level information on treated firms based on size, sector, locality, and exporter status. Critically, this information was available for each year from 2005 to 2011. Therefore our analysis is only on firms treated between these years, with outcomes one to three years after treatment. In terms of treatment information, the year of treatment reflects the first year of treatment, but no program information is known about the year of subsequent treatments, nor the length of treatment. In total, the treatment identifiers contained 128 sectors, ranging from small to large firms with different export activities totaling to with 2500 such combinations across the span of years 2005 to 2011. While not a perfect approach, this method is associated with a downward attenuation bias of our point estimates. All results reported here, therefore, are lower-bound estimates.

¹⁴This is different from the source where we identify treated firms, where we do have the year of treatment

¹⁵The attrition bias is less than 10% in the data, as reported from the ITCEQ report. Unfortunately, it was not possible to combine this perceptions survey with the RNE due to administrative barriers and authorization requirements.

The resulting strata of identified treated firms captures firms that are highly likely to be treated. This strategy is synonymous with a theoretical intention-to-treat model where there are compliers and non-compliers. The treated groups are weighed by the number of treatments and the number of treated firms within the universe of each stratum. For example, if two firms had the same characteristics and were identified, their group was assigned a weight of 0.5 to account for potential bias in the identification step. After sensitivity tests, we kept treated firms where we were reasonably sure of the identification. We measured how "sure" we were of treatment by ranking the weights and selecting only those above the median level of sureness. Because some firms were treated multiple times, the identified firms that we keep in the regression have weights ranging from 1 to 7. In the sample we dropped, the range for weights within groups were from 0.2 to 1.¹⁶ Additional sensitivity and robustness tests in further sections suggest that our estimates are lower-bound estimates and that the dilution of our treatment variable is only causing attenuation bias (regression dilution caused by random noise) as manually inducing errors-in-variables even by marginal amounts (1%, 2.5%, and 5%) results in outcomes that lose significance and fall in magnitude (Figure 2.6).

Econometric Approach This paper's econometric approach has multiple steps. As a first step, the paper reports OLS panel fixed effects outcomes with and without controls. Because there is a selection bias to get treatment from the IUP program, in the casual inference framework, a simple OLS will be biased. One method for overcoming this bias is to find similar control groups that, at least observably, have similar characteristics to those in the treated group. In practice, the matching literature following the seminal work of Rosenbaum and Rubin (1983) is a first step in trying to find comparable firms. In the process, we compared matching algorithms using different calipers and adjustments through bootstrapping, double-robust methods, and a dynamic panel matching model.¹⁷ There were no substantial differences in the estimates, and a marginal change in standard errors.¹⁸ We decided on a distance caliper of 0.001 that reduced the number of firms in our comparison group,

¹⁶Thanks to Bob Rijkers for suggesting this sensitivity test, and subsequent adaption. We ranked all the weights by distribution. At the 18th percentile, all strata showed at least a one to one match. In testing the sensitivity of our choice of "level of sureness," we increased the level of stringency until we reached a limit, after which our betas were no longer stable. This is the identification issue associated with the re-weighting that appears in the regression.

¹⁷Double-robust post-estimation regression-adjustment is an additional procedure that corrects bias in the standard errors when either the propensity score model or the regression model is incorrectly specified.

¹⁸There were no substantial differences and the analysis with bootstrapping, double-robust estimations and dynamic panel models require more computing power than available in the computers in the national statistical institute.

but left enough firms in the regression to allow us to use various time-invariant and time-variant controls.

Next, we generated the inverse propensity scores within the common support range and included them in a weighed differences-in-differences regression (IPWDID) as in Hirano, Imbens, and Ridder (2003), Imbens and Wooldridge, 2009 and Cadot, Fernandes, et al. (2015). Imbens and Wooldridge, 2009 argue that asymptotically, the use of estimated propensities leads to a more efficient estimator as compared to true propensities. Furthermore, they find that after estimating propensities, the weights given to observations are unbiased. However, one caveat of this method is that very small and very large propensity scores can lead to problems. The intuition behind this problem is that weights will be either too heavy or too weak at the extremes of the distribution and can lead to imprecise estimations. Nevertheless, this issue is less severe in the IPW estimator than a non-weighted regression because the IPW estimator at least reflects the uncertainty of the estimation.¹⁹ In addition to the standardized IPW process, we also include additional weighting to address the issue of non-compliers in our identification strategy, as discussed in the previous section.

Our full econometric specification model is as follows:

$$y_{i,t} = \beta_0 + \beta_1 Treated * After_{i,t} + \beta_2 \sum_{t+n}^{n=3} Treated * After_{i,t+n} + \beta_3 TreatmentGroup_i + \beta_4 Anticipation_{i,t-1} + \beta_5 \sum_t^n Treated * After * Year_{i,t} + \beta_6 X'_{i,t} \gamma + \tau_t + \lambda_i + \zeta_i + \epsilon_i \quad (2.1)$$

where the main outcome variable of interest, $y_{i,t}$ is firm-level outcomes. Depending on the regression, we will focus on the log of employment, the log of average wages per worker and the log of net job creation.²⁰ A description of all variables are available in Table B.1.²¹ β_1 captures the interaction term of the treatment in the year of treatment. This interaction term is our main variables of interest. β_2 is a series of time-specific treatment effects that capture the impact of the program 1-3 years after treatment. β_3 captures the change of the main outcome variable associated with belonging to the treated group. This variable is dropped in the fixed effects panel model but retained in the IPW individual fixed effects model with clustering at the

¹⁹More recent proposals for the use inverse propensity weighting in dynamic treatment models and their applications are being proposed by Berg and Vikström (2019).

²⁰All estimates are in Tunisian dinars deflated for world prices.

²¹While we would have liked to calculate productivity, the database is missing key investment and intermediate input variables.

firm level. β_4 estimates the anticipation effect of the program, one year before treatment. β_5 is a year-specific treatment control that controls for interactions that the treatment has in each specific year of treatment. β_6 captures the impact of a series of control variables, including age, age-squared, size, distance to ports, and lagged and growth components of the production function. The lagged and growth components control for non-linear time trends before treatment. They include the second lags plus averages of past 2-4 years of the log of employment, average wages, net job creation, profit, sales, and exports. In the final specifications, we also control for time trends in the treatment variables with time-treatment fixed effects. Finally, we apply year (τ_t), regional (λ_i), and sector (ζ_j) fixed effects.²²

2.5 Descriptive Analysis and Regression Results

2.5.1 The Perception Survey and descriptive findings from the national firm registry.

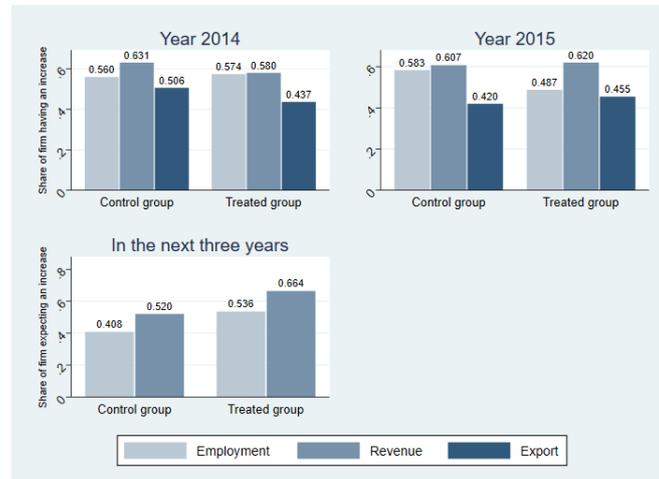
Only one evaluation of the IUP has been carried out in recent years. The ITCEQ survey administered to IUP recipients collected data on the perceptions of treated and a random set of non-treated firms with retrospective information from 2014 and 2015.²³ The survey found that in the past, treated firms were under-performing non-treated firms. In comparison to non-treated firms, treated firms less often reported increases in revenue, and less often reported increases in revenue from exports, and employment (see Figure 2.2 and Figure B.2 in the Appendix). Nevertheless, a higher share of treated firms had expectations of growth in revenues and employment for the next three years, than non-treated firms.²⁴

²²When this combination over-identifies the desired estimation, we use fewer controls and describe it in the table. This was the case when we looked at heterogeneous effects.

²³The ITCEQ asked firms to report sales, employment and exports for previous years.

²⁴In addition to better future revenue and employment expectations, a higher share of treated firms expected to increase investments after treatment as compared to control firms. The type of investments expected by treated firms differs from those in the control group (Figure B.3). Firms belonging to control groups expected higher material investment, whereas more treated firms expected to have more immaterial investments.²⁵ Third, treated firms *believed* that they were more competitive after treatment. They reported having observed the most improvements in product quality. They increased productivity, organization and culture, ICT, and human resources (Figure B.4 in the Appendix), as well as used more innovative technology, communications infrastructure, and automated technologies in the workplace (Figure B.5 and B.6 in the Appendix). For treated firms, the most considerable innovations were innovations in the process, the product, to a lesser degree, innovations in firm organization, and to the lowest degree, to marketing. In terms of tangible aspects of innovation, 10% more treated firms reported registering trademarks and filing patents or licenses. Remarkably, there were approximately 30% more treated firms that reported filing

FIGURE 2.2: Reported Increases in Employment, Revenue and Export outcomes (Perceptions Survey)



Source: ITCEQ

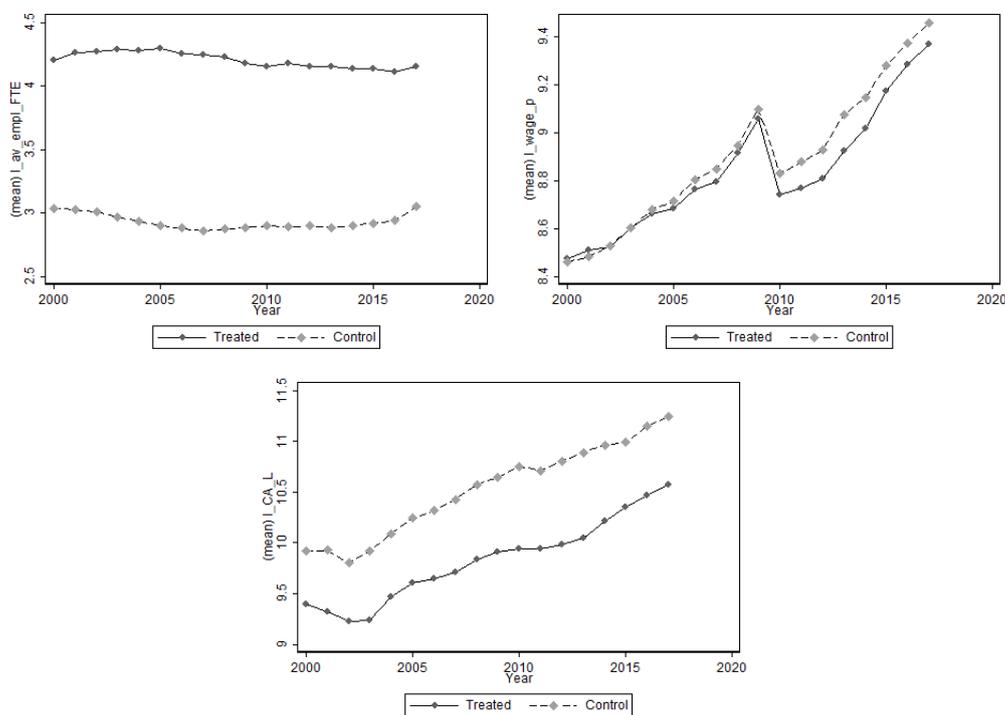
Note: Figure reports percentage of firms reporting any type of increase of each outcome.

However, how does this compare when we evaluate similar outcome variables using registered data on firms (RNE)? To gather similar data from the RNE, we need to create two groups to reflect the groups in the ITCEQ survey, a treatment group (without specifying what year they were treated), and one that includes a comparable set of firms. Descriptive statistics from the national firm registry show only level differences between the treated and control groups, but no difference in growth trends. After treatment, average employment is higher in treated firms, but treated firms pay lower average wages suggesting that the treated group has high levels of labor at lower wages (Figure 2.3). Interestingly, average revenue per worker is lower after treatment for firms in the treated group than in the control group. It is likely that the differences between the perceptions survey and the registered data are likely due to the Hawthorne effect – an effect that implies differences are purely due to perceptions that outcomes will be better because of treatment.²⁶ While most evaluations of industrial policies are conducted using perception-based surveys, this

for ISO 9001 certificates, an international standard that measures the quality of products, than firms in control groups.

²⁶This is why placebo tests were introduced to perception-based experiments in physical sciences. Alternatively, they may be due to misreporting in registered data. For misreporting to have a net effect, all treated firms would to similarly misreport such that the outcome shows no systematic difference between the growth rates of the two groups. We believe this is not credible.

FIGURE 2.3: Employment, Revenue and Wages, 2000-2017
 (Registered Data)



Source: RNE

Note: To make a comparison with the ITCEQ survey, the figure compares firms that were ever treated after treatment, and firms that were never treated.

comparison shows that perception-based surveys are not an optimal tool to understand the impact of such programs. As with other perceptions based surveys and studies, there are strong incentives for reporting managers to provide overly optimistic responses. The differences between the perceptions survey and the analysis using registered data illustrate why more rigorous studies linking program treatment with outcomes for firms is primordial.

2.5.2 Regression Analysis

Regression Adjustment using Propensity Scores. The first step of our analysis involves the estimation of propensity scores. We use a simple logit model to estimate the propensity to be treated. Variables were matched on firm characteristics, including size, restrictiveness, firm origin (foreign or national), firm type (public or private), year, sector, age, age-squared, and coastal (regions by the coast)²⁷. Like Cadot, Fernandes, et al. (2015), the matching criteria also included two-year lags and the average of the 2-4 year lags of employment, total wages, profits, and turnover that accounts for previous trends and avoids direct temporal endogeneity. To control for export ease, we calculated the average distance to the closest two ports using the territorial distance from the city center of the firm to the ports.²⁸ A summary table of the sample differences between matched treatment and control group is available in Table B.2.²⁹ The resulting propensity score measured the average treatment effects of the intention-to-treat group and dropped observations that

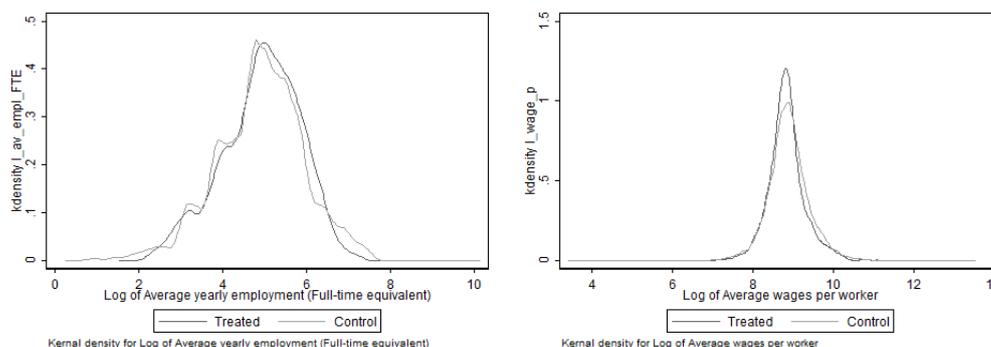
²⁷The coastal variable that captured trends associated to being located on the coast of Tunisia rather than inland. Much of the economic activity lies in the coastal regions.

²⁸Distance to ports variables were estimated using geographical distances from GPS coordinates of the city where firms were located to the GPS coordinate of all current ports in Tunisia. Using the average of two ports establishes some degree of stability of access to ports and other markets in case of recent developments in port expansions.

²⁹In the process of estimating the propensity scores, we applied several matching methods starting with the simplest matching algorithm and extending it to tighter restrictions. Following this, we tested if the performance of the matching improved using Rosenbaum tests, and observed the density plots of propensity scores for treated and control groups. Among the methods used, we applied a strict dynamic Mahalanobis matching, one-to-one nearest-neighbor matching, and Kernel matching procedures with various sizes of calipers. Observing covariate matching and analysis of Rosenbaum bounds on matching estimators guided the selection of matching procedures. In consideration of the marginal changes and the limited improvements of matching using more complicated procedures, we pursued a matching algorithm with a caliper of 0.001, restricted to the common support area, that uses the Abadie and Imbens (2006) standard errors with conditional covariances calculated using two neighbors. Computational limitations on-site and time access controls limited how many variations of the algorithm we were able appropriately assess using our final specifications, but in practice, not much changed between different matching options. The initial matching procedure with different calipers and a full Mahalanobis-metric matching reduced matching bias in approximately the same amount but was heavier in computational power.

did not fit in the common support range of propensity scores.³⁰

FIGURE 2.4: Matching performance: Kernel Density of Employment and wages



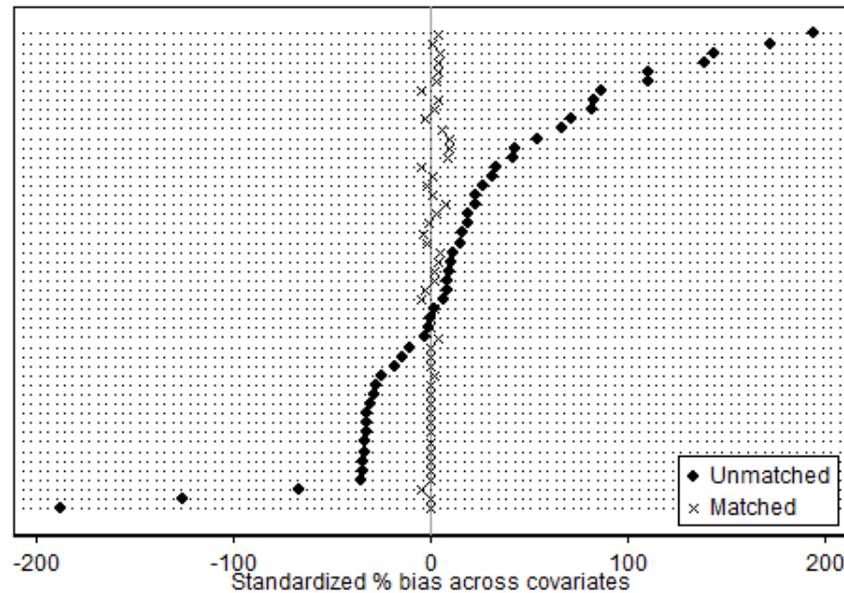
Source: RNE

The graphical results of the matching procedure based on several outcomes are presented in Figures 2.4 and Figure 2.5. Graphically assessing the matching quality of covariates in treated and control groups suggests that the distribution of each of the variables is very similar in both groups (Figure 2.4) and that they both follow a normal distribution. The bias reduction associated with this process is depicted in Figure 2.5. Figure 2.5 consists of a list of all matching covariates and graphically illustrates the gains in comparability resulting from the remove of observations not in the common support and further away from the propensity values of the treated variables.

After the removal of firms outside the common support, there were approximately 2,000 treated observations, and between 68,000 observations in the control group. These numbers were similar when we ran matching algorithms separately for employment and wages. While the matching performance looks promising, there are still caveats. We argue, however, that regression adjustment methods such as the IPW builds on a simple OLS. The limitations to the use of the propensity score method are well-known (Caliendo and Kopeinig, 2008; Dehejia and Wahba, 2002; King and Nielsen, 2016). In the literature, there are, in general, two types of issues that occur. The first involves how the researcher uses the method, and the second involves its econometric limitations. To avoid the first type of issue, we started from the most stringent model, based on the empirical literature that uses this method. One-by-one, we relaxed conditions until we found a combination that brought us

³⁰We chose against using a dynamic replacement model both for computational limitations and because we want to prioritize consistently estimating the closest matching propensities within the regressions.

FIGURE 2.5: Matching performance: Variable Bias Reduction



Source: RNE

the closest to finding matched pairs using both visual propensity score plots and bias reduction summary statistics after matching. We pursued the model on which we were able to include a reasonable amount of controls in the final IPW regression without over-fitting.

The second type of issue is addressed in how we defined our matching algorithms and used it in the next step. We matched on pre-trends and re-introduced controls in the regression adjusted model that incorporated propensity scores. We controlled for lagged trends, current individual fixed effects, and average time trends. The variable that caused the most difficulties was matching on lagged 2-4 years. While this increased the credibility of our matching process, it also limited the years that we had available for our regression, as each observation would now have to at least have four prior years of data and three years of data after the year of treatment. This limited our analysis to firms that had at least seven years of continuous information.

The use of the PSM method is only an initial step in our analysis. The propensity scores are then integrated as weights into our differences-in-differences analysis, which theoretically reduces our bias, and improves our estimations from our original OLS differences-in-differences model (Imbens and Wooldridge, 2009). While ignorability of matched assignments given observable characteristics may still be a concern. Our matching outcomes are not the final results of our estimation strategy.

With the IPWDID we have the opportunity to apply additional control variables in a second stage that attempt to control for selection on growth and time-trend variables.

Regression results on Wages

Results for the impact of the program on employment and wages are reported in Tables 2.1 and 2.3. We report the basic OLS results with controls and without controls in columns (1) to (3). In column (1) of Table 2.1 with only year and sector controls, we see that there is no impact of the treatment on wages. However, there is a positive anticipation effect the year before treatment. We then add further controls for size groups of firms, the age of firms (age and age-squared), the origin of the firm (foreign or local), the type of firm (public or private), whether the firm is geographically on the coastal regions, whether the firm is only an exporting firm (or also produces locally), the distance to the nearest port, and various controls for growth³¹. Column (2) reports estimates after the inclusion of these additional control variables. The estimated effect of the program on wages is still not statistically different than 0. However, there is growth in wages in the three years following treatment, and the anticipation effect is reduced by a third of its original estimate. Lastly, in column (3), if we include controls for the year specific treatment effect³², the impact of the program on wages is positive in the year of treatment, and the three years following treatment. A treated firm has, on average, 1.3% higher average wages, and the impact increases in the following years.

Nevertheless, selection bias due to the firm application procedure, COPIL's selection procedure, and the type of treatment they received would imply that treatment and control groups are not comparable. To get a more credible estimate, it would be best to compare similar groups who at least have similar observable characteristics. As previously discussed, our method to address this issue is to estimate the probability of treatment in the year t (propensity score) and integrate this into an inverse weighted differences-in-differences model. Column (4) of Table 2.1 provides an estimate of the average treatment effect when matching on observable covariates, without the interacted year and treatment effects.³³ The estimation of the average treatment effect is counter-intuitively negative 7%. However, the estimation's power

³¹This includes growth of employment, wages, net job growth, sales, and export value from the previous year; the lag of the values of the same variables, and the 2-4 year lag of values of those same variables.

³²This is an interaction between when the firm is treated and the fact that it is treated in a specific year. Its purpose is to control for time-specific treatment effects that may vary from year to year. This includes individual controls for treatment in 2000, 2001, and so on.

³³With these included, the logistical regression to estimate the propensity for treatment was over-identified.

TABLE 2.1: Impact of the IUP on Average Wages from 2000-2017.

<i>Log of Ave. Wages</i>	<i>OLS Panel Fixed Effects Models</i>			<i>Reg. Adj. Models</i>	
	(1)	(2)	(3)	(4) PSM	(5) IPW
Treatment	-0.003 [-0.447]	0.007 [1.208]	0.013** [2.081]	-0.070*** [-5.134]	0.023** [2.249]
1-year after	0.004 [0.579]	0.018*** [3.621]	0.021*** [3.646]		-0.006 [-0.486]
2-years after	0.007 [1.118]	0.020*** [3.625]	0.020*** [3.249]		-0.012 [-1.133]
3-years after	0.003 [0.430]	0.019*** [3.126]	0.017*** [2.605]		-0.008 [-0.672]
Anticipation	0.030*** [4.654]	0.011** [2.052]	0.022*** [3.687]		-0.008 [-0.637]
Treat*Year	No	No	Yes	No	Yes
Age Controls	No	Yes	Yes	Yes	Yes
Growth & Lags	No	Yes	Yes	Yes	Yes
Type & Origin	No	Yes	Yes	Yes	Yes
Coastal & Port	No	Yes	Yes	Yes	Yes
Year & Sector	Yes	Yes	Yes	Yes	Yes
Observations	327,234	195,501	195,501	69,077	69,077
R-squared	0.347	0.458	0.458	0.0004	0.693
Method	Panel FE	Panel FE	Panel FE	PSM	IPW

Note : IPW estimates are double weighted. The first weight corresponds with a logit propensity that weights control and treated groups by their propensity to be treated. The second weight is a correction weight from the identification strategy. The number of firms in the OLS model is 34,559 for column (1) and 28,336 for columns (2) and (3). The difference between the models are due to a lack of historical information for 2 to 4 years prior to when the firms appear in the database.

T-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1

TABLE 2.2: Impact of the IUP on Average Wages, by size.

	(1)	(2)	(3)	(4)	(5)	(6)
Log of Wages	Small [5, 9]	Sm-Med [10, 19]	Medium [20, 49]	Med-Lge [50, 99]	Large [100, 199]	Very lge [200, 999]
Treatment	-0.004 [-0.082]	0.015 [0.528]	0.091*** [4.594]	0.049*** [3.256]	0.019 [0.918]	0.059*** [3.985]
1-year after	0.177*** [4.735]	-0.0003 [-0.009]	0.050* [1.759]	-0.021 [-1.319]	-0.063*** [-3.048]	-0.019 [-1.065]
2-years after	0.219 [0.861]	-0.090** [-2.294]	0.030 [1.240]	-0.031* [-1.944]	-0.048** [-2.353]	-0.031 [-1.568]
3-years after	-0.134 [-1.578]	0.119** [2.116]	0.045** [2.047]	-0.015 [-0.900]	-0.036 [-1.503]	-0.009 [-0.504]
Anticipation	-0.024 [-0.302]	-0.043 [-1.333]	-0.002 [-0.085]	-0.066*** [-4.196]	-0.005 [-0.190]	-0.030 [-1.566]
Observations	31,203	12,108	11,314	6,496	4,344	3,354
R-squared	0.783	0.771	0.768	0.745	0.647	0.795
Method	IPW	IPW	IPW	IPW	IPW	IPW

Note: Controls includes fixed treatment group effect, year, treatment and year interaction effects, sector controls, and growth and lags of only wage variables. Because of a more limited number of observations, we could not include other controls. The method is IPW with standard errors clustered at the firm level. Robust t-statistics are in brackets. *** p<0.01, ** p<0.05, * p<0.1

is very low (R-squared is 0.0004). When we use the propensity score from this logistical regression and include time-specific treatment effects, our estimated impact of the program on wages is positive 2.3% in the year of treatment and not significantly different from 0 in the years after that.

Not all firms experienced the impact of the IUP in the same way (Table 2.2). The most substantial positive impact on wages – in order of strength in magnitude – is in small firms (5-9 employees), small to medium firms (10-19), and medium firms (20-49). Small firms (5-9) increased wages by close to 18% one year after treatment. Wages in firms between 10-19 employees were more volatile but were net positive, 2 to 3 years after treatment. Lastly, medium-sized firms with 20 to 49 employees showed a 9% increase in wages in the year of treatment. This increase was the most notable in magnitude. Firms in this category also saw 5% and a 4.5% growth in average wages 2 to 3 years after treatment.

There were some impact in medium to large (50-99), large (100-199), and very large firms (200-999), but the results do not suggest that the changes due to the IUP were strongly in favor of labor as they were in small firms. Wages grew in the first year for medium to large firms (50-99) and very large firms (200-999), but the growth in wages was to a lesser degree than the growth observed smaller firms. Furthermore, wages in these two types of firms dropped again significantly 2 to 3 years later. Medium to large firms may have had positive increases in wages the year of treatment, but the increases were anticipated with a drop in wages the year prior to treatment. These estimates suggests that firms either dismissed high wage workers in the year prior to receiving treatment or that low wage workers were replaced by high wage workers, but only in the first year. Lastly, large firms with 100-199 employees showed a decrease in average wages 2 to 3 years after having received treatment from the IUP. For large firms, average wages dropped by 6.3% in the second year after treatment, and 4.8% in the third year after treatment. As we will see in the employment section in Table 2.4, this drop in wages was only accompanied by a 3% growth in employment in the 3rd year. Jointly, this suggests that the program was particularly bad at improving jobs and job quality for workers in large firms, and it is likely that the employment strategy in large firms changed after treatment to one with low wage labor.

Regression Results on Employment

We observe a sizable impact on employment in the first year of treatment and every year thereafter when we only control for year and sector fixed effects (Column (1) in Table 2.3). There is also a relatively large and strong anticipation effect a year

before treatment. However, when we include controls, the impact of the program diminishes sharply down to 1 to 2 % in the years after treatment, and the anticipation effect is no longer significant (Column (2) in Table 2.3). These estimates suggest that most of the growth in employment is explained by the characteristics of the firms rather than the treatment.

As in the previous regression analysis, there are still significant differences between the treatment and control groups that are due to selection bias on the side of applicants and the IUP, making a comparison between the two groups incompatible. To address this, we integrated propensity scores on regressions, adjusted to include propensity weights. The average treatment effect from the simple matching exercise in column (4) of Table 2.3 shows that employment increased substantially. However, the treatment explained very little of why employment increased (R-squared of 0.038, as compared to 0.606 in the OLS Panel Fixed Effects model). When we integrate the probability of being in the treated group in our differences-in-differences model, the magnitudes of the treatment effects remain the same, but our estimates are no longer significant. The inverted propensity score difference-in-differences regression has a rather high explanatory power with an R-squared of close to 1. The explanatory strength of this specification suggests that changes in employment were not likely due to the IUP treatment.

However, these results were not homogeneous for all firms. In the year of treatment, small firms (5-9) grew by close to 50% and continued to grow two years after treatment. They increased employment the year before treatment. Small to medium-sized firms (10-19) grew in the first and second year after treatment. Medium-sized firms (20-49) grew in the first and third years after treatment. At least in small firms, firms increased employment in anticipation of treatment.

There was some measurable impact on employment in firms with over 50 employees, but positive impacts were smaller in magnitude, and in some cases, the impact was negative. For example, in medium to large firms (50-99), there was a 3% growth in employment the year after treatment, but this growth was smaller than other groups and was following a similarly sized decrease in employment in anticipation of the treatment. Large firms (100-199) saw a 3.7% increase in employment the third year after treatment, but this coincided with two previous years of drops in wages (from Table 2.2). Most strikingly, the program was the least supportive of labor in very large firms (200-999). In very large firms, the program had a negative impact on employment (8%) in the year of treatment and a 4.7% decrease in the first year after treatment. For these firms, the large drop in employment coincided with a year for growth in wages, which was not sustained in the following years. This

TABLE 2.3: Impact of the IUP on Employment.

<i>Log of Employment</i>	<i>OLS Panel Fixed Effects Models</i>			<i>Reg. Adj. Models</i>	
	(1)	(2)	(3)	(4) PSM	(5) IPW
Treatment	0.260*** [19.282]	0.016*** [2.745]	0.011* [1.658]	1.545*** [52.40]	0.001 [0.162]
1-year after	0.133*** [10.221]	0.021*** [3.804]	0.015** [2.411]		0.005 [0.612]
2-years after	0.093*** [6.996]	0.020*** [3.507]	0.017*** [2.792]		0.001 [0.115]
3-years after	0.099*** [6.177]	0.013* [1.940]	0.014** [2.010]		0.012 [1.166]
Anticipation	0.169*** [12.415]	0.009 [1.570]	0.003 [0.433]		-0.016 [-1.549]
Treat*Year	No	No	Yes	No	Yes
Age Controls	No	Yes	Yes	Yes	Yes
Growth & Lags	No	Yes	Yes	Yes	Yes
Type & Origin	No	Yes	Yes	Yes	Yes
Coastal & Port	No	Yes	Yes	Yes	Yes
Year & Sector	Yes	Yes	Yes	Yes	Yes
Observations	328,536	195,501	195,501	69,077	69,077
R-squared	0.010	0.606	0.606	0.038	0.949
Method	Panel FE	Panel FE	Panel FE	PSM	IPW

Note : IPW estimates are double weighted. The first weight corresponds with a logit propensity that weights control and treated groups by their propensity to be treated. The second weight is a correction weight from the identification strategy. The number of firms in the OLS model is 34,234 for column (1) and 28,336 for columns (2) and (3). The difference between the models are due to a lack of historical information for 2 to 4 years prior to when the firms appear in the database.

T-statistics in brackets. *** p<0.01, ** p<0.05, * p<0.1

TABLE 2.4: Impact of the IUP on Employment, by size.

	(1)	(2)	(3)	(4)	(5)	(6)
Log of Employment	Small [5, 9]	Sm-Med [10, 19]	Medium [20, 49]	Med-Lge [50, 99]	Large [100, 199]	Very lge [200, 999]
Treatment	0.518*** [12.203]	-0.031 [-1.577]	0.010 [0.689]	-0.005 [-0.502]	0.019* [1.712]	-0.082*** [-3.981]
1-year after	0.135 [1.465]	0.076* [1.910]	0.047** [2.225]	0.033** [2.481]	-0.013 [-1.064]	-0.047** [-2.298]
2-years after	0.127* [1.719]	0.110** [2.530]	0.012 [0.456]	0.012 [0.868]	0.014 [1.037]	0.003 [0.116]
3-years after	-0.095 [-0.846]	-0.064 [-1.620]	0.097*** [3.506]	0.002 [0.098]	0.037** [2.426]	-0.023 [-0.794]
Anticipation	0.173*** [3.039]	0.013 [0.398]	0.023 [1.108]	-0.025** [-2.008]	0.014 [0.936]	-0.074*** [-3.013]
Observations	31,203	12,108	11,314	6,496	4,344	3,354
R-squared	0.269	0.103	0.149	0.135	0.131	0.362
Method	IPW	IPW	IPW	IPW	IPW	IPW

Note: Controls includes fixed treatment group effect, year, treatment and year interaction effects, sector controls, and growth and lags of only employment variables. Because of a more limited number of observations, we could not include other controls. The method is IPW with standard errors clustered at the firm level. Robust t-statistics are in brackets. *** p<0.01, ** p<0.05, * p<0.1

TABLE 2.5: Impact of the IUP on Net Job Creation, by size.

	(1)	(2)	(3)	(4)	(5)	(6)
Log of Net Job Creation	Small [5, 9]	Sm-Med [10, 19]	Medium [20, 49]	Med-Lge [50, 99]	Large [100, 199]	Very lge [200, 999]
Treatment	0.919*** [4.366]	0.432** [2.569]	0.571*** [3.818]	0.078 [0.382]	-0.136 [-0.527]	-0.153 [-0.414]
1-year after	0.091 [0.257]	0.045 [0.128]	0.028 [0.143]	-0.250 [-0.965]	-0.296 [-1.157]	-0.723 [-1.621]
2-years after	0.016 [0.036]	0.346 [1.386]	-0.071 [-0.338]	-0.155 [-0.615]	-0.173 [-0.627]	-0.883* [-1.931]
3-years after	-0.270 [-0.729]	-0.042 [-0.130]	0.050 [0.228]	0.481** [1.972]	0.353 [1.191]	0.754 [1.565]
Anticipation	-0.027 [-0.049]	-0.843*** [-2.863]	-1.008*** [-5.378]	-0.122 [-0.506]	0.405 [1.562]	1.384*** [2.672]
Observations	31,203	12,108	11,314	6,496	4,344	3,354
R-squared	0.269	0.103	0.149	0.135	0.131	0.362
Method	IPW	IPW	IPW	IPW	IPW	IPW

Note: Controls includes fixed treatment group effect, year, treatment and year interaction effects, sector controls, and growth and lags of only net job creation variables. Because of a more limited number of observations, we could not include other controls. The method is IPW with standard errors clustered at the firm level. Robust t-statistics are in brackets. *** p<0.01, ** p<0.05, * p<0.1

fall in employment suggests that large firms' strategies after treatment was not very beneficial for labor. The strategy for large firms receiving treatment seems to be to replace low wage employees with fewer, high wage employees. Lastly, in medium to large (50-99) and very large (200-999) employment falls the year before treatment.

Trends in net job creation³⁴ reflect the analysis on employment for size groups (Table 2.5). Our decision to include this is to address the concern that stronger growth in smaller firms could only be due to composition effects. In columns (1)-(3), firms in the small to medium-sized groups all show an increase in net job creation in the year of treatment, even if there were some anticipation effects in the small to medium, and medium categories. There are almost no measurable results of the program on net job creation in larger firms. While medium to large firms (50-99) may have some growth in net job creation, it is in the third year, and smaller than the growth in the smaller sized firms. There is a negative (but not very significant), the impact of the program on net job creation very large firms (200-999).

³⁴As a reminder, net job creation is an increase in the number of individuals employed, minus the losses in the number of individuals employed.

Size and the political economy of industrial policies

On an aggregate level, the IUP marginally improved wages (2.3% in the year of treatment column (5) of Table 2.1), but there is less convincing evidence that the IUP was good for employment. Taken for face value, the global picture shows that the program increased wages for workers, but did not change the number of workers employed. This finding is in line with the overarching goals of the IUP.

The heterogeneous estimates of the IUP on wages and employment depict a different story. These results suggest that the IUP was successful both in terms of employment and wages in smaller firms in the Tunisian economy. If the strategy of a firm is to increase competitiveness through more qualified workers, then we should observe an increase in wages per worker. If more qualified workers do not crowd out other types of workers, then we should also see a growth in net job creation and to a lesser degree, in employment. In smaller firms, we observe both an increase in wages and a growth in employment and net job creation. There is almost no evidence that large and very large firms increased net job creation in the year of treatment or any of the three years following. The strategy for smaller firms, therefore, was based on the competitiveness of labor resources, while the strategy for larger firms seems to be one of labor substitution.

Nevertheless, the strategy was not the same in larger firms. If machines replaced humans for low-skilled repetitive tasks only, we should observe increases in wages per worker but a decrease employment due to machine-based displacement (Acemoglu and Autor, 2011; Acemoglu and Restrepo, 2018). While we do not have data on material investments in the RNE, we observe this trend in wages and employment only in very large firms (200-999 employees), and only in the first year.

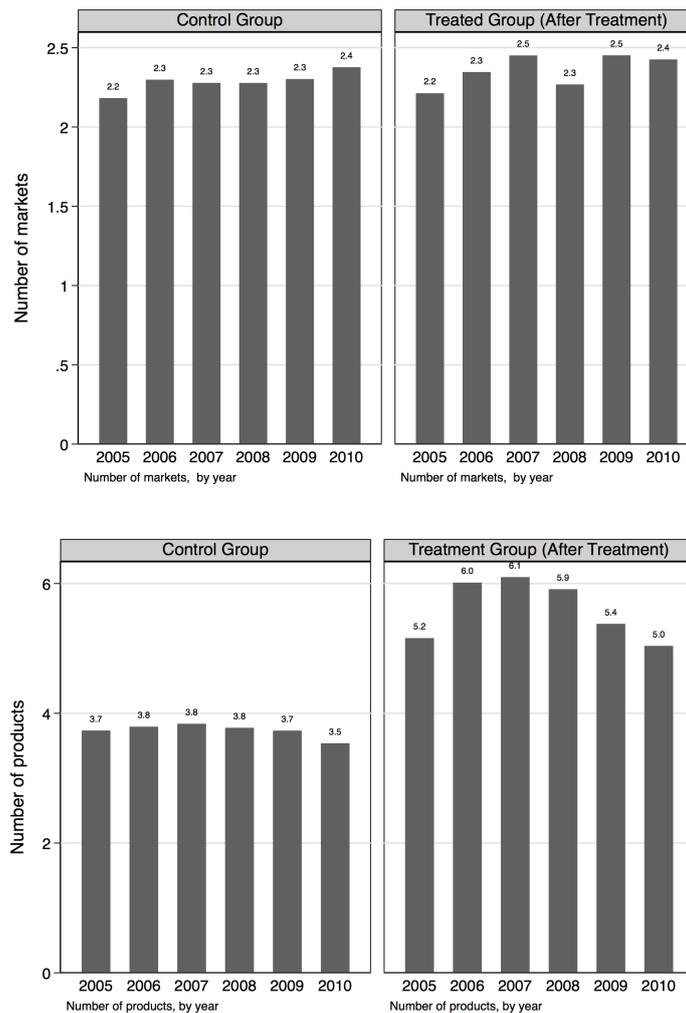
In the context of the political economy of Tunisia, the program had some benefits for labor in small firms, but its purpose in large firms does not suggest that it supports the larger welfare of labor resources unilaterally across all firms. It is possible that the purpose of providing funds for larger firms was a political tactic rather than part of an initiative to support labor. Indeed, the research done by Cammett (2007) and Murphy (2006) argue that controlling capital owners and providing benefits for association with the government was one of the primary purposes of the IUP.

Political economists looking to understand how the state may encroach on the private sector may take this as an example. In opening the program to everyone, but continuing to give funds to firms that have minimal net effects in increasing employment or wages, demonstrates the revealed preferences of the state in such a large-scaled industrial program. If the IUP was looking to maximize social benefits, we should observe a focus on programs that promote the hiring of more qualified

workers, proxied by higher wages. We do not see this in large firms. Most of the gains in wages are in small firms that also jointly increase net job creation.

Exports by treatment group

FIGURE 2.6: Product & Market Diversification, by treatment status



Source: RNE

One major target of the IUP program was to help competition in exports. One way of looking at whether the IUP program increased global competitiveness is to evaluate changes in aggregate export outcomes. Because the program was meant to help firms face new challenges from external competition, we expect firms to either compete on prices, markets, and goods. As demonstrated in Figure 2.6, treatment groups did not have notably higher access to markets, but they did have a more

diverse set of products for exports. While these findings are not causal on a firm-level, they demonstrate that treated firms increasingly diversified products but kept similar market strategies on an aggregate level.

In addition to descriptive trends on the extensive and intensive margins of trade, we may also be interested in export strategies for treated and control groups as an outcome of the implementation of the IUP. One way to do so is to analyze changes in the price concentration of difference exports to international prices in markets. We can evaluate the relative concentration of markets and products using the Theil's entropy index (Theil, 1972), given by

$$T = \frac{1}{n} \sum_{k=1}^n \frac{x_k}{\mu} \ln \left(\frac{x_k}{\mu} n \right) \quad \text{where} \quad \mu = \frac{1}{n} \sum_{k=1}^n X_k \quad (2.2)$$

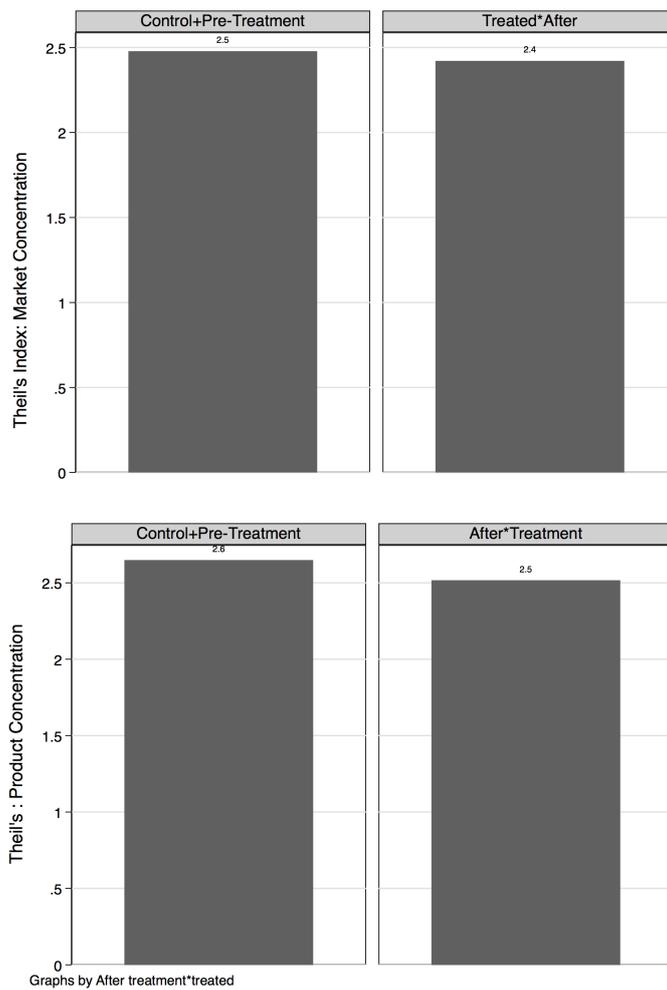
The Theil index measures an entropic "distance" the population is away from the egalitarian state of everyone having the same values. If all firms have the same values of products (or value of exports to markets), then the index will go towards 0. The index is higher with more diversified values of exports to markets and for products. Unlike the figures provided on the number of products and the number of markets firms access, the Theil index shows how varied export *values* are by markets and products. Figure 2.7 shows that treated firms have marginally less variance in prices of exports by market and goods, than control firms. Prices in export markets and products converge to the egalitarian state after treatment, suggesting a specialization strategy among treated firms.

Interpreting these findings together provides some information on export strategies post treatment. After treatment, treated firms have more concentrated export values both by markets and products (lower variances), but and export a higher number of products (even though product price diversification is falling). Non-treated firms are more diversified in values of exports (higher variances) and in goods, but export a lower number products than treated firms. Treated firms are producing more exports of goods to markets that are sold at relatively similar prices.³⁵ In the literature, Cadot, Carrère, and Strauss-Kahn (2011) suggests that exports trends move between diversification and concentration in a U-shaped pattern as GDP per capita at PPP prices increases. The macroeconomic comparison here suggests that the IUP program pushed firms to more diversified product exports (but not markets) and to more concentrated prices.³⁶

³⁵Similar to other treated firms.

³⁶If we take this as progress, then this situates Tunisian firms to the left side of midpoint of the U-shaped Theil curve for exports, placing them on the left of the median level of

FIGURE 2.7: Price Concentration using the Theil Entropy Index, by treatment status (after)



Source: RNE. Note: An Index close to 0 suggests that values are becoming more concentrated.

We have broken down export diversification to understand group trends (Annex Table B.3 and B.4). The tables suggest that an overwhelming portion of outcomes is explained by changes in the intensive margin of trade (or specialization) rather than diversification (extensive margin). The decomposition market and product concentration show that the relatively more concentrated outcomes are a result of specialization within treatment and control groups, rather than due movement in or out of treatment and control groups. Anecdotally, the Tunisian shoemaker that is a beneficiary of the program is now more likely to be selling the same leather sandals as his neighbor, who is a beneficiary of the program, but this will differ from the type of shoe their non-treated neighbor sells.

While we were unfortunately not able to capture this in the regression analysis due to data limitations,³⁷ the macro-level analysis suggests macroeconomic level diversification of exports and concentration of prices.

2.5.3 Caveats and sensitivity testing

The results and interpretations elaborated in the regression analysis and the macroeconomic trade section should be interpreted with some caution. First, there may be concern about the robustness of our identification strategy. We argue that like an intention-to-treat intervention, there is a variation among firms in the treatment group that are always-takers, never-takers, and defiers that can potentially confound results. We argue that this would cause a downward bias in the magnitude and preciseness (attenuation bias), which is the lesser evil of two less-than-optimal outcomes. We argue to outcomes of this choice would only dilute the full measure of the impact of the program.

To convince readers that our identification is not spurious, we can show in Figure 2.6 that even inducing marginal errors of 1%, 2.5% and 5% of a transitional type (movement in and out of treatment groups) induces attenuation by reducing the standard errors and magnitude of the beta terms, but does not over-estimate the treatment effect. If anything, the results presented demonstrate that even the non-significant findings are potentially informative. To induce the error-in-variables of the treatment, we randomly allocated half of the 1% (and later 2.5% and 5%) of treated firms and placed them into the non-treatment group and a second random half of the non-treatment into the treatment group. The results in Table 2.6 shows

export diversification. We expected that as the Theil index approaches 0, the concentration of exports will slow down, and eventually reverse, pushing firms to diversify again.

³⁷Detailed export data was only available for a subset of the years that other data was available (2005-2010).

TABLE 2.6: Sensitivity check using artificially induced errors in identification of treated firms.

	<i>Average treatment effects (PSM)</i>			
	Original	.5% error	1% error	2.5% error
Log of Employment	1.545*** [52.397]	0.259*** [8.110]	0.092*** [3.899]	0.047*** [2.634]
Log of Wages	-0.070*** [-5.134]	-0.024 [-1.444]	-0.005 [-0.448]	-0.010 [-1.020]

Note: T-statistics are reported in brackets.

that values decrease in significance, and magnitudes, as measured by a decrease in t-scores and, does not change in direction.

Another caveat is that we have no information on the types of subsidies received. The program information provided officially tells readers that the program varies between material and non-material subsidies and firm support, but it was not clear how each type of subsidy is distributed among firms or in what form. There may be heterogeneities in the type of treatment received by firms that may also be driving results. Unfortunately, we are not able to distinguish the impact of the different types of material and non-material investments that were provided to beneficiaries. As we saw from the ITCEQ survey, both are relevant for treated firms, and treated firms reported expecting more immaterial investments than non-treated firms. A strong shift in material and non-material investments may have been useful to provide more information on how the funds are being used, but this was not available. It would have been optimal, if possible, to have access to further information on investments and value-added to estimate measures of productivity as boosting competitiveness is more sustainable through productivity growth.

2.6 **Winners and Losers: A short discussion**

The Tunisian IUP was not a failure for labor, but it was not a landslide victory either. There were variations in the distribution of outcomes between labor and capital owners, which gave the program its wins and losses, as suggested by Murphy (2006). This paper links the heterogeneity of outcomes to the model of economic governance in countries with a strong state and close government-business ties.

Workers are winners when small firms receive IUP funds. Inversely, it is more likely that profits are retained by capital owners when treatment is assigned to large and very large firms. When smaller firms receive treatment wages, employment, and net job creation increase and the firm strategy is to employ more high-skilled labor. When larger firms receive treatment, the firm strategy is one where employment and wages fall. Lastly, macroeconomic outcomes suggest that the IUP increase diversification of products exported but encouraged a price concentration strategy among treated firms.

The discussion on the impact of the IUP is therefore summarized into three points. First, small recipient firms tend to increase employment and wages after treatment. This finding suggests that benefits are at least partially retained by owners of labor when funds are distributed to small firms. Secondly, larger recipient firms rarely, if ever, share gains from profits to workers in terms of jobs or wages. This finding suggests that benefits are retained by capital owners when funds are allocated to larger firms. The decision to allocate the IUP resources, therefore, faces a trade-off: either provide support to firms that are 1.) small and better for workers, or 2.) those that are large but do not increase wages or employment. Lastly, there is some evidence suggesting that an aggregate level, more diversified products are being exported, but with higher variance in price. The second option is arguably preferable for capital owners and those with close ties to the state, while the first one is preferable for owners of labor. The evaluation of the IUP in Tunisia demonstrates how firm subsidies can go further for workers and employment when they are targeted at small firms. In the political economy context, it is also suggestive of the use of such programs to control the private sector rather than encourage its growth and sustainability.

If we consider this within the literature on strong command-led economies and the principal-agent theory, we can make two contributions. First, if the government indeed uses business to control the economy, then the IUP is an excellent tool. The program distributes benefits to both labor and capital. It creates jobs in some types of firms and capital in others. There is evidence of its impact on the increasing competitiveness of export and increases in the number of products exported. On the other hand, if the government were indeed the agent and the population the principal, then this program should only be targeted towards how to increase jobs and improve wages. The current arrangement for distributing funds via the IUP does not indicate that labor owners (non-capital owners) are the only principals and that the government is the welfare-maximization seeking agent. In this arrangement, there is evidence to suggest a more symbiotic relationship between businesses and the state such that the ultimate agent is still businesses, and the principal remains

the state.

2.7 Conclusion

The IUP impacted firms in different ways. As predicted by the literature, some aspects were successful. The reported perceptions from the ITCEQ survey led us to believe that employment should grow as a result of the program (Figure B.2). However, this was only true for small firms. For larger firms, the program was associated with less employment, lower wages, suggesting more gains to capital. There may have been more employment initially in large firms, but no increase in employment numbers or job quality (wages).

Like the literature tells us, some command-led initiatives can provide benefits at initial stages of development (Murphy, 2006; Cammett, 2007). However, the findings of this paper do not suggest that it ultimately serves the wider public, nor do they adequately push for reforms that can lead Tunisia into the next step of its industrial development. The media and stakeholders argued that at the time the IUP was launched, it would help Tunisian firms access new markets and modernize its sectors. There is little evidence of outreach to new markets, and we see an increase in skills (proxied by wages) but only in small firms. While there was at least some increase in employment and wages in small firms and evidence of increased product exports, there is little to show for modernization's impacts on overall job quality, except in small firms. The available data does not suggest that wages or skills went up in large firms. The literature tells us that big firms are important (Freund and Pierola, 2015), but if we care about jobs, industrial policies are better targeted towards small firms (Criscuolo et al., 2019).

3 Trade, Tariffs and Missing Imports: Using trade liberalization to understand business-state relations in Egyptian manufacturing

Chapter Abstract Over the past half a century, Egypt developed from a statist economy, with strong business-state relations, to a more liberal open-market economy as it slowly began opening up to international markets. Its entry into international markets came alongside several exogenous changes to trade policy. Exploiting a change in trade reform policies that aligned administrative, tariff and non-tariff barriers to international standards, I use a differences-in-differences method to measure the impact of trade liberalization reforms on import values, between industries where connected firms are known to exist, and those where no known connection exists. The outcomes show that the reduction of trade barriers associated with the reform, improved the inflow of imported goods to non-connected industries more than connected industries, suggesting a corrective impact of administrative simplification on the competitiveness between industries. I tested different explanations for the treatment outcomes and found evidence of tax evasion as an important strategy for firms in connected industries. When checking for heterogeneities by technological complexity of industrial output, the reform benefited non-connected industries more than connected industries, except for in natural resources and medium level manufacturing activities.

The 19th-century history of Egypt was one of a government, managed by very prominent families, a powerful military elite, and a command-driven economy. After over half a century of military, economic, and political intervention, the post-independence period saw a resurgence of Egyptian and Pan-Arab nationalism and a continued stronghold of the economy by the central government. In the late 20th century, the economy opened up to markets, and Egypt's reigning elite, while retaining control of government positions, were starting to move into the private sector. During this period, relations between the state and business flourished.

In a relatively small and open market economy, trade and commerce are substantial opportunities for rent-seeking entrepreneurs and political elite alike. However, it is technically challenging to capture rent-seeking behavior in quantitative studies. In particular, nepotism and its strategies are not clearly understood in trade-related studies. The limited transparency of ownership makes it difficult to identify firms with close connections to the political elite. However, if one could identify economic activities where cronies are known to be active and evaluate a policy change with an exogenous push that may shock both connected industries and non-connected industries, we could use these divergent impacts to understand how business-state relations and potential strategies for extracting privileges may manifest. In Egypt, an exogenous push from the WTO towards privatization and reform of the customs administration provides an opportunity to measure the impact of administrative reforms on industries benefiting from political favors.

Controlling for major determinants of import trends, should there have been no prior strategy among connected firms to model import trade barriers in their favor, there would have been no differences in import values to industries after trade and customs reforms. If this underlying hypothesis of no differences is rejected, the size and direction of the difference could direct further investigation into what kind of strategies were likely to have been in place prior to reforms. The current literature on business-state relations suggests that privileges may be channeled through different avenues, one of which is tax avoidance. A change in the rules set to govern may disrupt *import declaration* patterns) and could distort firm-level decisions heterogeneously for connected and non-connected firms.

Building on the work of Diwan, Keefer, and Schiffbauer, 2014 and Chekir and Diwan, 2014a, my paper captures industrial trade trends where firms connected to Hosni Mubarak's regime operate. Connected firms, identified as firms in which Board Members, CEOs, and executive officials were publicly known to either be a family member or a close confidant of Hosni Mubarak in 2004, are identified

in industries with correspondences in product-level trade.¹ I take advantage of this identification strategy and an arguably exogenous partial-liberalization trade reform package to measure how trade policies may have hindered firms in non-connected industries from previously importing more competitive goods.

Using this identification strategy, I test the existence of privileges through a simple differences-in-differences methodology focusing on the impact of the reduction of trade barriers in industries with known connections to the Mubarak regime from 2005 to 2011. The argument in this paper is that, if there are changes in the post-reform period, then the reforms had an impact on import intensity between connected and non-connected groups.² An increase of the difference between the two groups can be proxied as the *degree* of heterogeneity, while the direction of the change can help untangle underlying *direction* of privilege bias. The results provide a start for further exploration of the potential strategies of shirking firms.

The primary analysis uses an OLS differences-in-differences model, and controls for a set of relevant variables. The main results show that differences between connected and non-connected industries in the post-reform period do exist with evidence of a more substantial flow of imports to connected industries before reforms. When holding for changes in tariffs³ and other controls, the impact of the reforms is still prevalent. The difference between industries increased 3-fold when controlling for a measure of the competitiveness of the goods imported and the added value generated in the exports. These findings were robust to the parallel trend test, placebo tests, and the exclusion of oil and special export zone activities. The results of these tests and specifications did not suggest that other factors may have explained the change in import trends.

Understanding the mechanisms behind changes in imports in industries where connected firms operate is opaque without further hypotheses testing. One first hypothesis may be that connected firms were previously better at avoiding tariff evasion. A simple accounting exercise demonstrates that during the same post-reform period, the occurrence of trade value discrepancies between trading partners and Egypt dropped. These findings suggest that reducing administrative barriers may have also reduced incentives to under-report trade values (tax evasion). Prior to reforms, tax evasion was a practice used more abundantly in connected sectors, aligning with

¹The identification of connected firms became evident because of information released about members of Mubarak's family and close confidants after the 2011 Arab Spring uprisings in Egypt.

²Because of the nature of the Arab Spring uprising in 2011 and volatility of the administration, it is expected that after 2011, this relationship may have changed again.

³I used average effective tariffs, because of differences between most favored nation tariffs and applied effective tariff rates

the findings of Sequeira, 2016. The second hypothesis is related to the increasing demand for imports depending on the technological complexity of sectors. One can expect that sectors where demand for technologically sophisticated imports is stronger, that there may have been a more considerable discrepancy between the two sectors. This explanation is likely if the propensity of connected industries to blocking imports increased as the complexity of the good increases. Overall, this was the case for low and high-technological level sectors. However, the reform had the opposite impact on the volume of imports in the natural resource, and medium-technological level sectors.

The following sections of the paper is organized as follows: a brief literature review and descriptive statistics; followed by the empirical approach and identifying specification; a description of the data sources that is used; results; robustness tests; explaining results by tariff evasion ("missing imports") and vi.) using the technological level of production as a proxy to check for heterogeneities.

3.1 Trade and cronyism in context

After independence in 1952, Egypt's manufacturing sector under Gamal Abdel Nasser became an essential element of statist industrial policies. However, wide-spread deregulation and privatization of the manufacturing sector only occurred in the '70s under Anwar as-Sadat and in the '90s under Hosni Mubarak. Those who were fortunate enough to start businesses during these periods saw their firms grow substantially (Sfakianakis, 2004; Chekir and Diwan, 2014a; Loewe, 2013).⁴

Concern over business-state relations is prevalent and growing where discretionary powers on assigning tariffs schedules and administrative processes are prone to limited transparency, anti-corruption oversight and are managed through close business-state ties. While literature specifically on Egypt is limited, there is a growing number of relevant research in other countries that may help frame the context for Egypt. In global literature, the potential for gains from corruption expands as global trade intensifies. Dixit, 2003 argues that increasing trade, or more precisely, increasing the

⁴In the early 2000s new reforms took place to increase overall competitiveness and investment in the manufacturing and other sectors. The macroeconomic reforms included liberalizing the financial sector (in 2002), floating the currency (in 2003), and massive privatization (in 2004). Between 2004 and 2007, customs tariffs and procedures were reformed, clearance procedures were reportedly simplified, and duties were lowered. By 2006, the Ministry for Trade and Industry set up the Egypt Industrial Development Strategy, and the newly established Ministry of Investment took steps to improve industrial productivity by increasing gross domestic investment through the use of the General Authority for Investment in Free Zones (GAFI) (Loewe, 2013).

distance (geographical or otherwise) between trading partners, can reduce incentives to participate in "honest" trade because of the local bias of contract enforcement. Honesty is likely to decrease as trade expands globally, and new trade partnerships are formed. The decrease is due to more limited oversight and contract enforcement with new partners until relationships and agreements are solidified. For this reason, liberalizing markets and opening to partners further away would disproportionately favor firms that are capable of participation in graft and corruption. Furthermore, recent work in Egypt also suggests a causal relation between close business-state relations and increased number and scope of non-tariff barriers (Eibl and Malik, 2016 and Rijkers, Baghdadi, and Raballand, 2015).

Taken in context, the work of Dixit (2003), Eibl and Malik (2016) and Rijkers, Baghdadi, and Raballand (2015) suggest that as markets expand, the opportunity to attain gains from corruption grows. The stronger the ties between government and business, the more trade barriers are put into place to the benefit of connected firms. If this is the case, the combined impact should be a reduction in trade and imports for non-connected firms, or more generally, to sectors in which non-connected firms operate. To the knowledge of the author, the few rigorous empirical studies that exist on corruption, trade, and political connections do find evidence for the role of rent-seeking and opportunism in business-state relations (Fisman (2001) in Indonesia; Ferguson and Voth (2008) in Nazi Germany; Diwan, Keefer, and Schiffbauer, 2014 in Egypt; Coulomb and Sangnier (2014) in France; and B. A. Olken and Barron (2009) for transport bribes in Indonesia). However, only one directly addresses how to reduce the rents gained from corruption (Sequeira, 2016).

While studies on the impact of corruption may be slowly expanding, few offer studies solutions. Facilitating trade through the reduction of tariffs and customs regulations limits the scope for gains from corrupt practices, both on the side of enforcers (public servants) and the side of self-promoting business leaders (Bensassi and Jarreau, 2019). In lieu of a uniform reduction of trade barriers in high-tariff and customs environments, one must place hope that incentives of influential public servants and business elite align with those of the rest of the economy. Indeed, corruption can be trade-enhancing if incentives of influential firms and high-value exporting agencies are aligned with those of the rest of the economy (Dutt and Traca, 2010; Mishra, Subramanian, and Topalova, 2008).⁵ If incentives are aligned, close ties between

⁵Like tariff barriers, non-tariff barriers are crucial for gains from trade and firm-led growth in Egypt and the MENA region (Hendy and Zaki, 2014; Ghali et al., 2013; Augier et al., 2012; Davies, 2013; Karray, 2016). Similar to studies capturing corruption through tariff barriers, empirical researchers have limited work in measuring the impact of non-tariff barriers on reducing corruption. This limitation is a result of difficulties in measuring corruption in non-tariff barriers in connection to administrative burden and red tape reform.

government and business interests can help overcome trade barriers that may, at least in part, help those not connected to the state. In absence of the alignment of such incentives, a non-discriminatory reduction of barriers avoids accumulating advantages to connected firms and industrial activities.

A single event directly related to trade liberalization can be used as a mechanism through which opportunism can be proxied, and potential solutions can be proposed. In the applied trade and political economy literature, Sequeira (2016) used trade liberalization to examine the impact of changes in tariffs on corruption patterns in South Africa. Similarly, my approach measures how trade liberalization resulting from reductions in tariff and non-tariff barriers can act as a tool to uncover imperfect competition and reduce inherent non-competitive advantages between industries.

3.2 The Presidential Decree No. 39/2007

Administrative reforms that simplify customs procedures and costs can bring considerable financial and operational relief to firms participating in trade. In addition to economy-wide benefits, reducing barriers to trade limits opportunism in customs and trade interactions. Such reforms have the potential to bring firms and industries on a more level playing field. In the case of Egypt, we use such reforms to measure opportunism using an exogenous shock to the regulatory environment during Egypt's liberalization years.

The 2000s was a time for partial liberalization primarily through reductions in tariff barriers. The Presidential Decree No. 39/2007 and its amendments called for a reduction of tariff and non-tariff barriers. The decree and its amendments were signed by Hosni Mubarak and his Minister of Trade, Youssef Boutros-Ghali. Boutros-Ghali was a representative for the World Trade Organisation's Doha round negotiations.⁶ The reforms on the local Egyptian level were heavily influenced by rules-based governance at the international level (WTO), even if there is cloud around potential gains due to post-revolution accusations against Boutros-Ghali. The text of the decree (Ministry of Finance, 2010) evoked the :

⁶He was also the nephew of the former Secretary-General of the United Nations, Boutros Boutros-Ghali. Accusations of corruption in the post-revolution government on Boutros-Ghali were among the weakest of all senior leaders in Mubarak's administration. He was famously known for his 4-minute court trial in *absentia*, and has been formally accused of using government printers for campaigning and abuse of access to impounded cars for personal use.

- simplification of the structure of tariff rates that facilitated their implementation—more specifically— the reduction of tariff rates from 12% to 10%, from 22% to 20%, from 32% to 30% and from 40% to 30% (with a few exceptions);
- the balance between products proposed at different levels of the supply chain (manufactured products, intermediate goods, and raw materials);
- simplification of temporary goods procedure in customs law;
- the elimination of complicated tariff lines;
- the reduction of tariff rates on selected imports of basic commodities, medication and intermediate and capital goods;

In addition, the decree included initiatives to make Egyptian trade data compatible and comparable with the International Convention on the Harmonized Commodity Description and Coding System; support production activities that create a fair and competitive environment; develop of stakeholder partnerships to ensure transparency in the decision making process; and contribute to the creation off a clean environment through customs duties (2%).

The reforms pursuing liberalization were arguably (at least mostly) exogenous because they were a result of alignment with external (international) regulatory reform. Egypt, as one party among others, would have a hard time endogenously determining international trade rules. During the period leading up to the decree, Egypt increased its bilateral and regional trade agreements with the US, EU, and with African partners, which required further liberalization of imports for previously protected activities. Furthermore, it started aligning internal customs procedures with the World Trade Organization's standards (and therefore not internal standards). Changes to the technical standards improved the business climate for importers and exporters. The reforms harmonized administrative practices that brought Egyptian standards closer to international standards (OECD, 2010). The external push of these reforms and the practice of reducing tariff rates to their lowest rounded numbers provides grounds for setting up a basic impact assessment.⁷

The reforms could impact the economy in several ways. Because it pushed trade policies towards alignment with the WTO standards, I would suspect that increased competitiveness of imports due to lower tariff and non-tariff barriers would be the primary causal avenue of impact. One would expect to see the overall level of importations increase in part because foreign goods become cheaper in terms of money

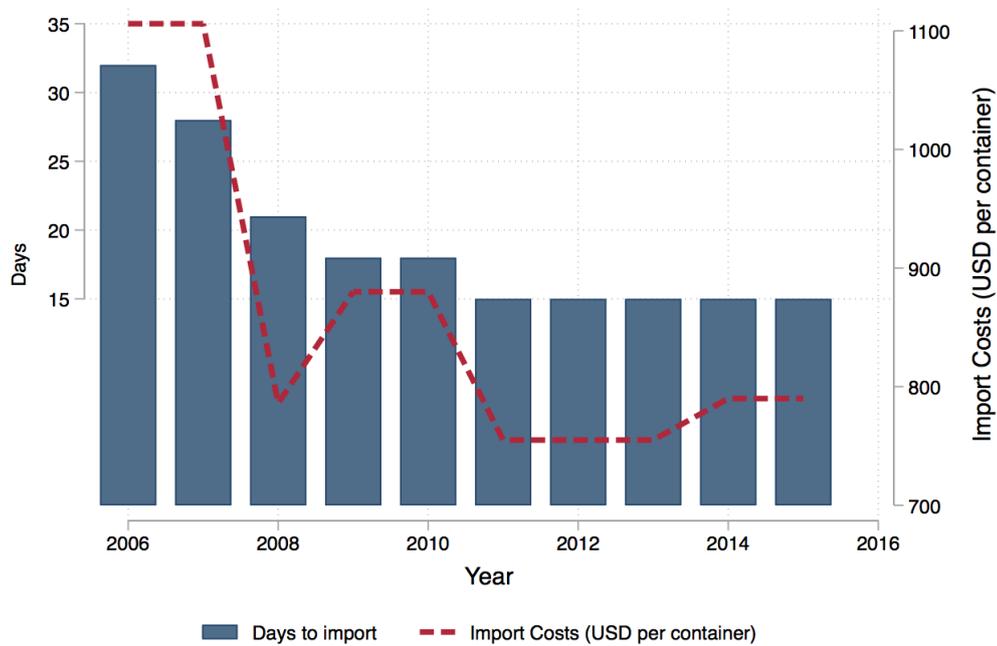
⁷Nonetheless, it is possible that in implementing these reforms, some concerns regarding the endogeneity remain. If this were large enough to impact the findings, the study would suffer from attenuation bias and the estimates would be lower bound estimates.

and time (income effect). Likewise, one would expect that a reduction of trade barriers would make imports cheaper relative to locally sourced goods (substitution effect). Firms will either choose to substitute locally sourced goods for imported goods or will be able to use imports as complementary goods within the production cycle. In this context, we would also expect the most prominent increases may come to industries that previously imported goods with higher tariffs in the most protected sectors.

In Egypt, the literature tells that that trade policy has been used as a tool to support the government clientelism (Eibl and Malik, 2016). If this is the case, then removing trade barriers should increase imports across the board, but more for those operating in non-connected sectors. Furthermore, one causal avenue could be through its interaction with patterns of bribery, as in Sequeira (2016) and Bensassi and Jarreau (2019). If this is the case, then higher tariffs should also mean less declared imports as the pay off of bribing port officials to mislabel or overlook imports is higher. We would expect that the reduction of tariff and non-tariff barriers through this reform should then reduce the incentives and payoffs of bribing and increase the value of declared imports. It is unclear why we should expect connected firms to under-report more than non-connected firms, but we can hypothesize using post-analysis outcomes. Two dominant scenarios arise. We can suspect that connected firms may have an easier time than non-connected firms in knowing who and how to bribe officials than non-connected firms. Alternatively, non-connected firms may practice more tariff evasion because incentives to evade taxes for non-connected firms are higher when trade barriers are higher.

Finally, there is a reason to believe that the implementation of the objectives was successful. The World Bank's Ease of Doing Business indicators estimated that time (measured by days) and financial costs (measured by USD per container) of importing was substantially reduced, in particular from 2007 to 2008, and continued to fall after that. As demonstrated in Figure 3.1, the average days required to import goods were reduced by a quarter (7 days) from 2007 to 2008, and followed that trend in the subsequent years. Likewise, financial costs involved in processing imports fell close to 30% from 1106 USD per container to 786 USD per container in 2008 but rose slightly in 2009 to 2010, but went below 2008 levels after 2010.

FIGURE 3.1: Time and Financial Costs to Import (In Days and USD)



Sources: World Bank, Ease of Doing Business - Costs of Imports

3.3 Data Description and Identification Specification

The primary data set used for the analysis is the Egyptian Export-Import Data (EID), a commodity and firm-level database that provides data on the incidence of import activities managed by the Economic Research Forum (ERF) through their collaboration with the General Organization for Export and Import Control in Egypt. The database covers the period of 2005 to 2014 and includes the country of origin, country of destination, trader identification, trader type⁸, product code (using HS6 Harmonized System of product codes), and value in both USD and local Egyptian currency. The value of imports (and in some cases, the value of exports)⁹ has been

⁸This is an administrative grouping carried out by the Egyptian export-import agency.

⁹Testing for distributional normality of the value of imports (USD-PPP adjusted), demonstrated that a transformation might potentially improve the robustness of results. The study tested for the robustness of results with and without import values above 1 million and found that both versions lead to similar outcomes, but had different distributional characteristics. After a simple logarithmic transformation, Shapiro-Wilks tests for normality demonstrated an improvement; however, due to the size of the database, further testing was necessary. Using a skewness transformation, adding an additional constant (with the best fit at $\log + 2.48$) to the transformation improved the measure of skewness, but reduces Kurtosis and confounds the interpretation. All graphical representations of the data using

adjusted for purchase price parity using the World Bank's International Comparison Program database's PPP conversion factor using private consumption (LCU per international \$).¹⁰

To control for changes value-added processed goods to be exported (or re-exported) in the supply chain, I calculated the margin of value-added of goods. This value is the net value added of the goods (VA) as a share of the value of all imports.

$$VA_{j,t} = \frac{M_{j,t} - X_{j,t}}{M_{j,t}} \quad (3.1)$$

In equation 3.1, $VA_{j,t}$ is the net value-added in exports for the industry j in year t . This aggregated value is important for reasons related both to interpretation and technicalities. First, if we only look at value-added of the same imported and exported products, then we are only capturing re-exports and are limiting our analysis technically only to firms that import and export. Instead, if we look at the value of imports and exports of the industry by year, then we are capturing a larger level of variation that is more telling of sector-specific trends in the use of goods in the supply chain. The industry level aggregation is more easily interpreted as the changes in value-added of exported goods within each industrial activity.

In order to extend the analysis to the industry-level, the EID database's HS codes were matched using a conversion table provided by the World Bank's World Integrated Trade Solutions (WITS) guidelines.¹¹ While the conversion of products into industries where they are most intensely used is a key identifying factor that allows this analysis, it also comes with caveats. The use of this conversion table means the

a simple log compared to the transformed log provide similar results. Normal and normal quartile plot analysis suggests that both log transformations follow a log-normal distribution. For this study, the simple log transformation will be used.

¹⁰Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as U.S. dollar would buy in the United States. This conversion factor is for private consumption (i.e., household final consumption expenditure). For most economies, PPP figures are extrapolated from the 2011 International Comparison Program (ICP) benchmark estimates or imputed using a statistical model based on the 2011 ICP. For 47 high- and upper-middle-income economies conversion factors are provided by Eurostat and the Organisation for Economic Co-operation and Development (OECD).

¹¹The merger is not perfect for all cases as it combines commodities and activities. Therefore the interpretation of the findings should be nuanced to account for inconsistencies that may arise when discussing the use of commodities as primary goods or intermediate goods rather than final output for resale. Furthermore, to combine 6 level HS codes and to correspond ISIC 6 level codes available through the WITS with the available 4 level HS codes in the EID data set, some granularity of the ISIC classification was lost. Where necessary, the ISIC codes outside of the WITS guidelines were assigned to HS4 codes using the nearest neighbor method.

analysis of each import is matched only with its most likely and most intensively used industry. While this is the method commonly used in papers that merge trade into an industrial level analysis, an alternative option would have been to match imports to firms with firm-level data directly. However, even with further access and administrative permission to match data with firm-level production and characteristics data, firms' activities are more diverse than purely in one sector. Often firms operate in several sectors but only officially claim the sector in which the majority of their activities are carried out. This approach, while seemingly second-best, avoids mismatching input goods to economic activities linked only to the most prominent activities of firms when they should be allocated to secondary activities. In a more concrete example, a steel manufacturing company may need to import raw steel ore as well as equipment parts that they need to develop products in a secondary activity. If they declared manufacturing in raw steel processing as their primary economic activity and we were able only to match commodities to this firm, then while we would be accurately matching firms imports, we would ignore the fact that the firm operates in two (usually) related but different economic activities.

To incorporate the potential changes to the flow of imports due to tariff measures, I used data on tariffs from trading partners to Egypt from the WITS-TRAINS-Comtrade database. The analysis primarily uses the *Average Effective Tariff* rates that provide the average of the applied tariffs per HS codes and country. This value is aggregated and weighted in the database to account for differences in what is announced legally and what is applied in reality for each good in each country. The use of this tariff rate instead of the Most Favored Nation (MFN) rate brings us closer to what importers face. While MFN rates are often rates bound by international bilateral agreements (rather than WTO binding rates), they do not vary by country as much as the average effective rates. Furthermore, WTO Bound rates are useful as a benchmark as they are set at an international level and change less often than rates agreed upon by bi-lateral and regional trade agreements. They are not used directly as a control but will later be used as an instrument for tariff rates because of their nature, which is exogenous to Egyptian tariff negotiations.

A measure of technological intensity from UNCTAD (Ranjan, [Forthcoming]) is used to incorporate controls related to the position of goods in the supply chain. The level of technological advancement of imports is classified into seven main fields: non-fuel primary commodities; resource-intensive manufactures; low skill and technology-intensive manufactures; medium skill and technology-intensive manufactures; high skill and technology-intensive manufactures; mineral fuels; and unclassified products. They broadly fit within a supply chain analysis that views technological complexity as progressive steps in global supply chains.

I turn to the CHELEM-CEPII database that uses harmonized data on multi-lateral trade, and gross domestic product to generate a measurement of relative demand for goods through changes in the *revealed comparative advantage* for products by product type, importing country and year, from 1967 to 2015. The revealed comparative advantage is calculated in the following way:

$$RCA_{i,k} = 1000 * \frac{W_k}{YPPA_i} \left[\frac{X_{i,k} - M_{i,k}}{W_k} - \frac{X_i - M_i}{W} \right] \quad (3.2)$$

In the equation 3.2, W represents world exports; $YPPA$ is GDP measured in thousands; X represents exports; and M represents imports for each good k from country i to Egypt. Values are available for every year, with the base year 2010.

The resulting RCA value measures the distance between the position of each product in the market and its global position and weighs it with the world commerce for each good by the country-specific GDP. It then eliminates fluctuation in product placement that is due to changes in other countries by weighting with world export share as a percentage of total GDP. The final value or indicator, the revealed comparative advantage¹², is weighted by changes in global trade rather than changes in just one country, adjusted for PPP, and includes estimates for goods and services (Saint Vulry, 2008). The data has corresponding tables to transfer goods into ISIC classifications to facilitate industry-level analysis.¹³

In the Egyptian context, the RCA is exogenous by nature. Egypt, being a mid-sized economy, cannot significantly impact global trade volumes neither in supply nor demand of goods, except potentially in the oil sector. This sector will be excluded from the analysis to avoid confounding results with the rest of the economy. Furthermore, the interpretation of the RCA is related to its relative sizes and proximity to unity or 0. A value of *less than unity* implies that the exporting country has a revealed comparative **disadvantage** in the product in reference to Egypt. However, if the *index exceeds unity*, the exporting country is said to have a revealed comparative **advantage** in the good that is being imported to Egypt. We expect the RCA to be positively associated with import demand because cheaper goods (more competitive) from outside Egypt should increase the demand for imports of that commodity from that country.

¹²Otherwise known as the *avantages comparatifs révélés, deuxième version*.

¹³In the course of the study, the use of the CHELEM database is provided on a good, country and year level, however, harmonization practices and attrition among countries that could not provide full information for each product and year, supports the inclusion of a more aggregate estimator that provides for comparative advantage on a more aggregate, regional level. Information on trading partner country and region is used from the Chelem database.

Lastly, there are many useful trade-related variables available through the BACI datafiles from the CHELEM-CEPII. Because this analysis focuses on outcomes in trade values, the standard economic literature employs the use of augmented gravity models to estimate import flows. The basic gravity model integrated into the analysis includes values of log GDP and log GDP per capita of partner countries as well as the physical distances from capitals¹⁴. In addition, I augment the model with values indicating whether the country is a neighboring country (adjacency). While I attempted to further augment with other characteristics, further variables indicating whether trading partners share a colonial history, or common languages were largely captured in regional fixed effects. The inclusion of such variables did not change estimated betas but resulted in over-estimated regressions.

Identification Specification For this study, the primary identification criteria used are based on the work of Chekir and Diwan, 2014a and Diwan, Keefer, and Schiffbauer, 2014 who identify politically connected individuals holding executive or senior positions in firms. The researchers interviewed stakeholders to gather a list of individuals connected to the Mubarak regime and matched this list with representatives whose assets were frozen after the 2011 revolution. Their list was merged with the Orbis database with information on board members, managing directors, and principal shareholders for the 854 firms found on the Cairo stock exchange. Using internet searches, the authors identified the names of subsidiaries of 104 firms and matched these with the Orbis database. They were able to identify 469 firms controlled directly or indirectly by these businessmen and placed them into industry groups. Table C.1 from Chekir and Diwan, 2014a gives further information on the categories used in matching by industry level.

Using the work of these authors, it was possible to identify industries where at least one firm had a known connection to the Mubarak regime and as well as industries where firms had no known connections to the ruling elite. We should be careful with this approach for a few reasons. First, there is a bias in where we have information on government cronies and sectors. The estimates of crony sectors, therefore, capture only the most visible of sectors where connections to the state exist. This bias is, unfortunately, challenging to ameliorate with the currently available information. Nevertheless, this bias means that what was not captured leads to a downward bias of the magnitude of estimates and an increase in noise in the variance of estimates. Secondly, while analysis is bound to an industrial level because of administrative restrictions in matching with data on firm characteristics, there is a methodological argument for this level of argument that is also valuable.

¹⁴This uses the circular major city-level method

The use of the at-least-one within the industry method reflects the fact that trade policies do not discriminate among firms importing the same good. A firm owned by Mubarak's close friend, Ahmed Ezz, the owner of Ezz Steel, can lobby for lower tariffs for raw materials and equipment, but as long as it goes through official routes, all others in the same industry will also benefit from lower tariff rates. Inversely, should Ahmed Ezz prefer to take an import substitution strategy for his firm, he would lobby to raise import duties and procedures for those who might compete with the outputs of his firm. This anti-competitive behavior will benefit his firm's activities as well as activities in firms operating in the same activity. Therefore, while it is important to note that the analysis is bound to industrial level identification (due to how cronies are identified in industries), there is also a logic in this identification level that tells us about cronyism and its spillovers to others in the same sector. Focusing on average effects by commodities and activities, rather than firms is logically sound in this case because government tariff reforms do not discriminate between firms, but rather between commodities.

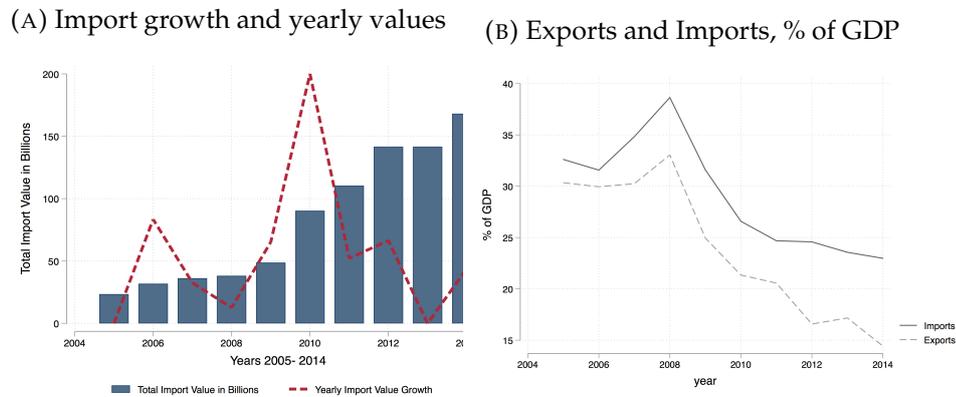
3.4 Descriptive statistics

Aggregate trends in the value of imports for Egypt demonstrated persistent increases in the value of goods imported to Egypt (Figure 3.3, Panel a). From 2005 to 2014, the total value of imports ranged from 23 billion to 168 billion USD (PPP). This same period demonstrated remarkable growth in import values, in particular between 2009 and 2010, when growth in import values from the previous year reached close to 88%. Growth quickly stabilized and even became stagnant in the period following the Arab Awakening of January 2011. At the same time, the yearly growth of import values peaked in 2010 and returned to a standstill in 2013. When accounting for imports as a percentage of GDP, estimates from the World Bank indicate that the value of both imports and exports fell continuously over the same period. However, export values as a percentage of GDP fell 50% from 2005 to 2014, while import values as a percentage of GDP fell less than exports, by close to 30% (Figure 3.3, Panel b).¹⁵

¹⁵Among imported goods, distributional trends in the value of goods show that a small amount of high valued transactions account for the majority of the market share from 2005-2014. For Egypt, the top 10% of the highest values for imported goods account for over 90% of the total value of all imported goods (see Figure C.1 in Annex). While this is not uncommon, demand shocks to markets with high import values may have important implications for the analysis. Within the group of imported goods composing the top 10%, manufacturing goods compose 96.6% of all imports.

Between the period 2005-2014, the largest share of imports went to manufacturing firms. This held across all distributional categories (see Figure C.2 in Annex). Compared to imports

FIGURE 3.2: Trends in Egyptian Imports and exports



Source: World Bank, World Development Indicators

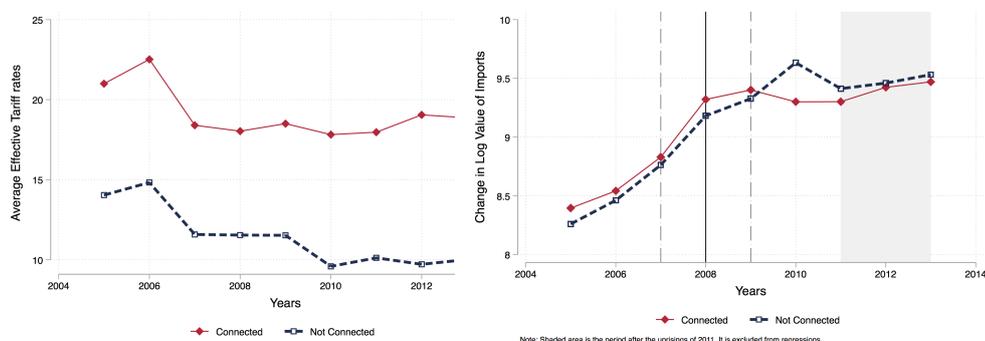
While time and costs to import were drastically reduced following the reform period (Figure 3.1), during the same period imports grew substantially (Figure 3.2a) without a substantial increase in export demand (Figure 3.2b). It is unclear if changes in the time and costs to import were directly influenced by changes in the major reforms identified in the presidential decree for connected and non-connected sectors. The decree indicated that trading procedures and tariffs would fall without discrimination between industries. In Figure 3.3a, the difference in tariff levels between connected and non-connected firms is apparent. In line with the findings from Eibl and Malik, 2016, the higher level of tariffs for connected industries suggests higher protections for import competition in the industries where connected firms operate. While overall levels of tariffs are higher for industries where connected firms exist, the trends in tariff changes did not substantially differ between the two groups before the reform period. However, starting from the period 2007-2010, the *movement* in changes in tariff rates is more advantageous for imports to non-connected sectors in 2010, where there was a stronger drop in tariff rates for non-connected sectors.

In terms of import trends, aggregate estimates indicate that import values for goods arriving in Egypt rose consistently for both connected and non-connected groups for the years leading up to the reforms. Following this period, the trends of the value of all imports per year for each group diverged. Visually, this is represented in Figure 3.3b, where divergence in trends is evident in pre and post periods. The

to other industries, the value of imports for the manufacturing industry is substantial. Summary statistics indicate that while the total value of imports is large for the manufacturing industry, that average import values are dwarfed by the number of low-value transactions in other sectors of the economy.

FIGURE 3.3: Trends in Egyptian Imports and exports

(A) Average effective tariff rates by connected status (B) Change of Import Values to Egypt (2004-2014)



Sources: WITS-WTO-UNCTAD, Egypt Import-Export Database and Diwan, Keefer, and Schiffbauer (2014)

pre-reform periods show steady growth in both connected and non-connected industries. While the reform was initiated in 2007, its implementation staggered to 2008. The summary statistics depicted immediately after from 2008 to 2009 in Figure 3.3b show that the growth of imports to industries where connected firms reside is falling while the growth of imports to connected industries continues growing. In the following year, there is strong growth of imports to sectors where there are no known connections to the state, while for the first time, there is a decline in imports in sectors where there are known connections to the state. Lastly, in the years following the revolution (2011), trends in imports to both sectors converged and smoothed out.¹⁶

3.5 An Applied Empirical Approach

In theory, should there have been no previous favoritism for strategies of firms with close business ties, this uniform application of a reduction of tariff and non-tariff barriers should have an overall positive impact on the value of goods imported regardless of whether sectors benefited from trade barriers or protections. The costs, in time and financial burden, should be reduced, without discrimination based on

¹⁶The area in Figure 3.3b below is shaded in gray to indicate that these years are not included in the analysis. In the years following, the political events in 2011 are expected to have changed the underlying structure of privileges, at least momentarily. One expects that the removal of the Mubarak regime may have brought the gap between connected and non-connected firms down to zero or a more natural level. The increased divergence after the 2013 period could also be explained by events surrounding the change of regime; however, further years and analysis are needed to provide more robust analysis.

specific firm characteristics outside of economic activities. Therefore one would expect a positive impact or an increased flow of imports to all industries uniformly and no statistically different difference between the growth of imports between two groups.

In addition to the standard determinants of the value of imports, the existence of heterogeneous privileges may be a source of additional variation. Connected firms may have created favorable conditions to import goods for their production (relative to costs and regulations in other industries), or relatively worse conditions for foreign competitors that may try to take part of the market share. This study proposes to take into consideration the political connectedness of industries as a differentiating variable. I propose to explain changes in import flows in the following manner:

$$\text{Log}(M)_{i,t} = f(C_i, R_t, T_{j,i,t}, D_{i,t}, X_{i,t}) \quad (3.3)$$

with $\text{Log}(M)$ as the reported change in import value per good imported within an industry and year, C_i is an indicator of whether or not the industry is within a sector with other known members of the inner government circle of Hosni Mubarak, R_t is a variable indicating the periods before and after the reform, T as tariffs and non-tariff measures related costs of importing per good, industry and year, D as industry-specific demand of goods and X as country, year and other control variables impacting imports including a standard gravity model. This function suggests that for firms in industries with connections to the political elite, the cost of importing is different from industries where there are no known connected firms. It is assumed that the impact of the reform becomes a function of whether or not a firm operates in an industry that is politically connected. Because we are discussing commodity level reforms within industries, these benefits would have externalities on other firms within the same industry.¹⁷

The reduction of administrative barriers, such as the time and financial cost of importing, should have a positive impact on the value of imports without differentiating between connected and non-connected firms. I capture the change in import value for connected and non-connected firms before and after the implementation of reforms just before 2011. The simple differences-in-differences linear regression relationship is as follows:

¹⁷Other benefits to the growth of the firms within connected industries may exist that impact the growth of a firm within the industry and its propensity to import. There may likewise be an interaction term that captures the impact of privileges on several determinants of import flow.

$$\ln(Y_{k,i,t}) = \beta_0 + \beta_1(\text{Connected})_i + \beta_2(\text{PostReform} * \text{Connected})_{k,i,t} + \beta_3(\text{PostReform})_t + \beta_4(\text{Controls})_{k,i,t} + \varepsilon_{k,i,t} \quad (3.4)$$

In equation (3.4) the main outcome variable, $Y_{k,i,t}$ is the log of import values per year t and commodity k (associated with industry, i). Unless otherwise noted, this will be the outcome variable of interest in all specifications. The coefficient β_1 captures the level effect of a dummy variable corresponding to 1 if the industry code corresponds to industries where at least 1 firm has been identified as having political connections with the Mubarak regime in industry i ; β_2 is the interaction term, the main coefficient of interest that captures the effect of the reform on connected industries in year t and commodity k in industry i ; β_3 captures the effect of the dummy variable that corresponds to 1 for the period after the 2007/8 reform in period t ; and finally, β_4 captures a series of controls including industry, year, and export origin in year t and industry i .

In regressions following the basic specification and controls, I add controls for that account for some of the non-random variations in the differences-in-differences. These controls include average tariff and non-tariff measures, changes in the demand for goods (revealed comparative advantage), the industrial-level value-added in net exports, an augmented gravity model, and if partners are in any major trade agreements with Egypt. The gravity model for bilaterally traded goods that incorporates (negatively) the distance between trading partners and controls for GDP in both trading partners and augments the model with a variable capturing bordering countries. Information on how they were calculated are described further in the section on data description. More information on the description of the variables are available in the in Table C.2.

3.6 Results

In the post-reform period, we observe a divergence between connected and non-connected industries (see Table 3.1 for pooled OLS and Table C.3 for panel results).¹⁸ While overall growth in imports was positive for all industries, compared to non-connected industries, connected industries had less growth in terms of imports. The

¹⁸Due to the highly unbalanced nature of the panel data, the research uses pooled OLS with industry, trader group, year and country controls. It is notable, however, that on the level of individual importers, import volumes are explained to the changes in the competitiveness of goods.

TABLE 3.1: The impact of trade reform on imports to connected and non-connected industries

Log of Import Values	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) IV
Connected * Post-Reform	-0.136 (0.0727)	-0.156* (0.0739)	-0.417*** (0.0667)	-0.444*** (0.0621)	-0.435*** (0.0665)
Connected Industry	0.299*** (0.0750)	0.217** (0.0737)	0.139 (0.0889)	0.128 (0.0827)	0.139 (0.0754)
2008 Reform	1.073*** (0.0436)	0.980*** (0.0464)	0.690*** (0.0503)	2.891*** (0.528)	2.923*** (0.504)
Tariffs		-0.0171*** (0.00287)	-0.0164*** (0.00424)	-0.0161** (0.00445)	-0.0105*** (0.00189)
Non-tariff		1.159*** (0.0322)	0.999*** (0.0721)	0.948*** (0.0687)	0.958*** (0.0611)
Comparative Advantage			0.00210*** (0.000428)	0.00259*** (0.000442)	0.00257*** (0.000415)
Gain in value-added			0.0945*** (0.00841)	0.0940*** (0.00908)	0.0979*** (0.0118)
Constant	12.01*** (0.108)	12.39*** (0.134)	11.82*** (0.114)	190.5*** (44.94)	191.4*** (44.07)
Observations	274668	263497	252204	249881	249881
Controls	Yes	Yes	Yes	Yes	Yes
Tariffs & NTM	No	Yes	Yes	Yes	Yes
RCA	No	No	Yes	Yes	Yes
Value-Added	No	No	Yes	Yes	Yes
Gravity	No	No	No	Yes	Yes
Instrument	No	No	No	No	Yes

Standard errors are clustered at the individual trader level and are presented in parentheses.

Basic controls include Industry, Region and Year. The instrumental variable specification passes the first stage F-test with F-test = 5843.37, significant at the 1% level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

estimates with basic industry, year, country and trade agreement controls indicate that there is no difference in import values between connected and non-connected sectors, but strongly positive increases in the post-reform period for both groups, and a stronger increase overall for firms in connected sectors. However, if we hold for average effective tariff levels and non-tariff measure as in column (2), then we

see marginally significant interaction terms in favor of non-connected industries. Imports to industries with ties to the government decreased as compared to non-connected industries after reforms by 15.6%. The interpretation of this coefficient is that industries containing connected firms observed a loss in import values as compared to those from industries with no observed connections to the regime after the reform. However, the basic controls with tariff and non-tariff measure controls are only significant to the 10% level. In column (3), I include controls for global changes in the demand for competitive goods and the growth of the value of supplies of goods exported. This set of controls raises the absolute value of the estimate of our interaction term by almost a 3-fold, to 41.7%. Accounting for the demand for imported goods and the next export supplies led to a sizeable change in the policy interaction term, suggesting that this was an important factor to consider.¹⁹ In the following years, the impact of the reform remains robust (Table C.4). The estimates continue to demonstrate a negative difference between connected and non-connected firms.²⁰

A common model in trade economics incorporates the fact that trading costs are not empirically null and augment as partners increase in distance (economic, physical and institutional). In international trade literature one also considers the economic size and other characteristics that may descriptively bring cause a relationship between two countries.²¹ Because estimating trade flows is not the main specification of this paper, I incorporate the gravity model as controls and augment for factors already not accounted for by my main specification in column (4), primarily country adjacency.²² The functional form of the gravity model is the following:

¹⁹Using both industry-level effects and clustered errors on industrial and year levels keeps the point estimate the same, but standard errors increase enough to reduce all significance of the result. Similarly, using additional controls for types of traders reduces the significance of the results. The difference between the clustering options are expected as the identifying variables are estimated on an industry level, and industry and trader codes groupings are too small to produce efficient estimates. This mechanical reduction of significance is a result of the structure of the functional form and identification specification of the DiD and therefore is not being used for the analysis.

²⁰The special status of Egypt's prominent oil industry may be highly sensitive to international demand and supply. The prominence of oil in Egypt is an essential aspect of its geopolitical status. Given the prevalence of oil as an exporting sector and to avoid the particular political status of raw oil import and export, I excluded this from the analysis.

²¹Characteristics that often augment the model include shared colonial heritage, language or ethnic groups and whether countries are bordering.

²²After testing for alternatives, I include a basic gravity model that is augmented with whether countries are adjacent to Egypt. Regional controls already take into account much of the variation found between countries with shared colonial heritages, languages and ethnicity.

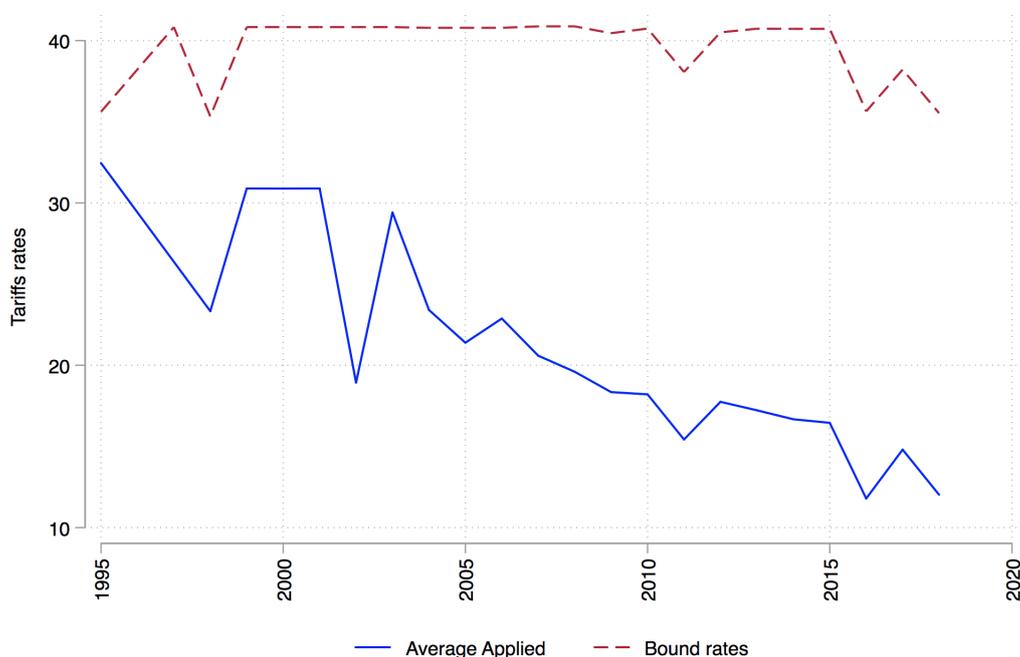
$$\ln(Y_{k,j,t}) = \beta_0 + \beta_1 \ln(gdp_{i,t}) + \beta_2 \ln(gdp_{j,t}) - \beta_3 \ln(distance)_{i,j} + \beta_4 (ajacency)_{i,j} + \varepsilon_{k,i,t} \quad (3.5)$$

In this specification, the main outcome variable is the log of imports for goods k , in country j (Egypt), in each year t . The coefficient β_1 captures the GDP (2010 prices), from country i , in year t ; β_2 captures the GDP (2010 prices), from country j (Egypt), in year t ; β_3 captures the negative relationship between distance and trade for country i with trading partner j (Egypt); finally, β_4 is a dummy variable that captures where the trading country has a shared geographical border with Egypt. Integrating equation (3.5) as controls into equation (3.4), estimates change only by a few points, as depicted in column (4). The estimate of the impact of the reform on connected firms controlling with augmented gravity model increases the absolute value of the estimates only by a few points to 44.4%—suggesting that most of the variation was already controlled.

Lastly, there may be concern over whether import flows simultaneously determine tariff rates. If this is the case, then our underlying assumptions on the exogeneity of this control variable is threatened. As governments set effective applied rates, it is possible that those with ties to governments may try to influence them. To try to account for this endogeneity, I instrument the average effective tariff rate with the international bound tariff rates. Bound tariff rates are the rates that are agreed upon by the World Trade Organisation that stipulate that member countries should not charge rates about bound rates. In most cases, countries negotiate lower rates in bilateral and multi-lateral agreements such that bound rates guides rather than what is effectively applied. Figure 3.4 demonstrates the slow-moving nature of bound rates. While average effective tariff rates fell continuously over the period, WTO bound rates remained the same.

The regressions in column (5) control for the potential endogenous nature of tariff rates by instrumenting them with the variation captured in international bound rates. There are no substantial changes in international bound levels observed during the period (Figure 3.4). However, there is still a statistically significant correlation for all years (0.8768, significant at the 1% level) and independently for within each year between bound rates and tariff rates, satisfying the instrument requirement of *relevance*. Furthermore, because Egypt is a medium-sized economy, it alone is not a dominant negotiator in WTO talks, including in the most recent Doha

FIGURE 3.4: Effective Tariff rates versus WTO Bound Rates



rounds. This suggests that the unobserved requirement of *exogeneity* is likely satisfied. Instrumenting the potential bias in average effective tariff rates with bound tariff rates reduces the impact of a one-unit change in tariff rates on import values by 0.6 percentage points. Incorporating this specification reduces the interaction term capturing the effect of the treatment only by 0.9 percentage points. The overall effect of the reform still shows that non-connected industries now import more relative to connected industries. The analysis still suggests that lowering tariff barriers and non-tariff measures for everyone increases the inflow of imports to non-connected sectors more than connected sectors.

The estimates in columns (1)-(5) arguably capture a "black box" that supports the conjecture that connected industries observed a loss in import values after the 2008 reforms as compared to non-connected industries because of improved flows of material goods for non-connected industries.²³ These losses were due to the combined package of reforms that included changes in the structure of tariffs and the reduction of administrative barriers. The results support a hypothesis that prior to trade liberalization reforms, there was a higher level of imports for firms in connected industries. Reducing trade barriers inadvertently revealed prior existing import trends attributed to connected industries, and had an equalizing effect between industries. Because there is such an essential difference in outcomes before and after

²³Column (5) will be discussed in the following section.

reforms, this "black box" provides some information on the potential direction of non-competitive privileges in protected industries, but not precisely how the privileges were perceived.

3.7 Robustness tests and Caveats

The validity of any Differences-in-Differences approach rests on the assumption that apart from the reform, the two groups would have continued the same trajectory. In an attempt to convince readers that data on import values had similar trends for both groups prior to the reform period, I conducted a placebo test using the year 2006 as the year of the reform and ran an analysis in the differences between the two groups from 2005 to 2007. Since the reform was initiated during the period between 2007 and 2008, it would be reasonable to assume that this period is already partially treated. Using the period 2006 may also have some pre-treatment anticipation effects, but it is expected to be smaller than post-treatment. As demonstrated in the results found in Table C.5, without any controls, there is a very small difference between the two groups (6%) and is not significant. With the same controls as the main specification, the interaction term is no different from 0. This null result provides supportive evidence for a validating a parallel trend assumption.

Another concern on the driving mechanisms of the results is whether demand for exports changed heterogeneously for industries with connected and non-connected firms. To test this hypothesis, the same regressions were carried out on the differences in the growth of exports between connected and non-connected firms (Figure C.3 and Table C.6 in Annex). Overall, changes in the value of exports demonstrated that connected and non-connected firms had similar growth trends where exports for connected firms remained consistently higher than exports for non-connected firms. This trend demonstrates that while there was a fall in exports from connected firms during the year of the reform, there is no significant difference between connected and non-connected industries. Visually, the figure demonstrates that imports to firms in connected industries increased in the years leading to the 2011 revolution and after the fall of the Mubarak regime. This additional information, while statistically insignificant, could potentially indicate an underestimation of the real benefit of being within politically connected firms, rather than disprove the previous analysis.

Egypt imports raw materials from zones with special tax benefits or "Free Zones" (Table C.7, column (4)). Rather than utilizing free zones to increase competitiveness in markets equally, if we are in an environment where crony firms benefit more from government tax breaks, then we expect that more raw materials in crony dominated

TABLE 3.2: Placebo test in the pre-treatment years.

	(1)	(2)	(3)	(4)
Log of import values	OLS	OLS	OLS	OLS
Connected * Placebo	-0.0598 [0.0549]	-0.0718 [0.0536]	-0.0292 [0.0534]	-0.0755 [0.0432]
Connected Industries	0.146 [0.147]	0.315*** [0.0675]	-0.0517 [0.0766]	-0.138 [0.0680]
Placebo Reforms	-0.161** [0.0549]	0.458*** [0.0527]	0.0424 [0.0711]	-0.0652 [0.0443]
Tariffs			-0.0157** [0.00467]	-0.0103 [0.00519]
Comparative Advantage			0.00380*** [0.000541]	0.00432*** [0.000516]
Gain in value added				0.0799*** [0.0100]
Constant	8.761*** [0.153]	12.35*** [0.148]	12.98*** [0.219]	-30.93*** [3.059]
Observations	129874	123926	111922	110727
Controls	No	Basic	+T&RCA	+VA&Gr

Standard errors are clustered at the individual trader level and are presented in parentheses. Basic controls include Industry, Region and Year.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

sectors will come from special tax zones. In the regression, we would expect that removing these zones as a source of raw material goods would reduce the difference between connected and non-connected sectors. Excluding Imports to Free Zones from the regression made almost no difference, and estimates for the remaining data remained significant.

Lastly, the degree of "connectedness" of the sectors may be impacting results heterogeneously. We can either expect that the existence of more cronies (connected individuals) in sectors can lead to more pre-reform benefits if the relative power of influence is compounded by having more cronies. Alternatively, cronies may have more gains if they are of the anti-competitive type (against other cronies). In this scenario, the strongest cronies would be in sectors less competition from other cronies. When I separate sectors that have a relatively higher (greater than 10) and those with relatively less (less than 10) connections to the state, the results show that sectors that were previously benefiting more had more cronies (Table C.8). Therefore it would seem that the first hypothesis of the relationship between cronies and trade reform finds stronger support. It is more likely that the more cronies in the sector, the higher the import barriers in that sector. If we get rid of sectors with relatively fewer cronies, we see that sectors with more cronies had much higher imports than non-connected sectors and those with a low level of connections before the reform. The impact of the reform increases.²⁴ What is surprising is that in sectors with relatively fewer cronies, there is, in fact, more benefits to sectors with connected firms after the reform. It, therefore, could also be suggesting that liberalization of trade to all sectors benefited sectors with few cronies more than sectors with many cronies.

If fewer cronies meant that each crony had more power prior to the reform, then this would have meant that the basis for the assumptions of this paper was not upheld. If inversely, more cronies mean more power to change trade policies in one's favor, then the premise of the paper holds. Furthermore, this also suggests that there is a threshold above which cronies have a real impact on changing trade policy to their favor. Without further formalization of the strength of the relationship (network effects) of each crony with the government, it is difficult to find the right answer to this hypothesis. Furthermore, the fact that this analysis is limited to a range of 7 to 12 cronies per sector²⁵ also does not provide a very ample opportunity to test this hypothesis.

²⁴This is compounded if we accounted for controlling for tax evasion, which will be explained more thoroughly, in the next section.

²⁵The number of cronies per sector is noted in Table C.1.

3.7.1 A few caveats

Concerns over the endogeneity of the identifying variables capturing connected industries are important but are outside the scope of the study at hand. Whether one is in the connected industry or not is part of the identification of interest. The endogeneity associated with the identification strategy is expected. However, it is hard to argue that the reforms themselves were entirely endogenous as it was a response to international harmonization and standards. Nevertheless, if the reforms were in part, determined endogenously by firms in connected sectors, this could be more problematic. Indeed, Eibl and Malik, 2016 use causal inference methods to show that more non-tariff barriers exist in industries with more connected firms. To at least partially address this, I control directly for tariff barriers, and non-tariff barriers are highly multi-collinear with the country of origin. This multicollinearity is partially an outcome of the structure of data available on non-tariff barriers. The WITS-WB-UNCTAD's primary source for non-tariff barrier data is from i-TIP, a legal data source that is created by collecting official legal complaints. Most non-tariff barrier complaints were lodged for only a few countries (mostly China). Furthermore, the number of non-tariff trade barriers is (at least partially) controlled by regional fixed effects.

Another caveat is that the main specification of this study is based on the assumption that connected firms stay connected. This is a strong assumption to make, and unfortunately, the evolution of the status of firms as connected or non-connected is currently not measured by this study. However, there is ample qualitative evidence that supports the steady and continued influence of members from the business community on the public sector after the 1996-2006 period (Roll, 2010; Sfakianakis, 2004). And descriptive information on the longevity of connected firms.²⁶

Next, the impact of the reform can likely have been confounded with the impact of other reforms and in particular, the global economic crisis in 2009. The underlying argument within this event study would be that the global financial crisis would have heterogeneous effects on connected and non-connected firms within the manufacturing sector, but some sub-sectors may be suffering more than others. This concern is addressed by the inclusion of the variable capturing changes in the demand for Egyptian goods (revealed comparative advantage). It is notable, that the inclusion of this variable generally increases the observed differences between the

²⁶For instance, politically connected firms tend to live longer than other firms (between 11 and 30 years old) such that firms, no matter the type of political connection, were more likely to be older than other firms (Diwan, Keefer, and Schiffbauer, 2014). Further information on entry into the treatment groups or as connected firms is available in the Annex table C.1.

two groups, while at the same time controlling for global trends in demand for each good associated with industrial production.

Finally, it is clear from the construction of the identification strategy that the results are indicative of an average treatment effect on treated industries. The analysis is an industrial pooled study rather than a population study, as firms operating in the identified industry can either be connected or not connected. Due to the impossibility of randomizing the treatment within groups, controls have been used to capturing characteristics not related to the reform or the connected/non-connected status of firms that may heterogeneously impact connected and non-connected firms.

3.8 Understanding how privileges work

One attempt at understanding the nature of benefits is to look at how this black box may perform if we were to try to account for trends in tariff evasion and heterogeneity by technical complexity (and, therefore, different import demand). The following sub-sections provide further details on the effects on missing tariffs and heterogeneity due to import demand and technological complexity.

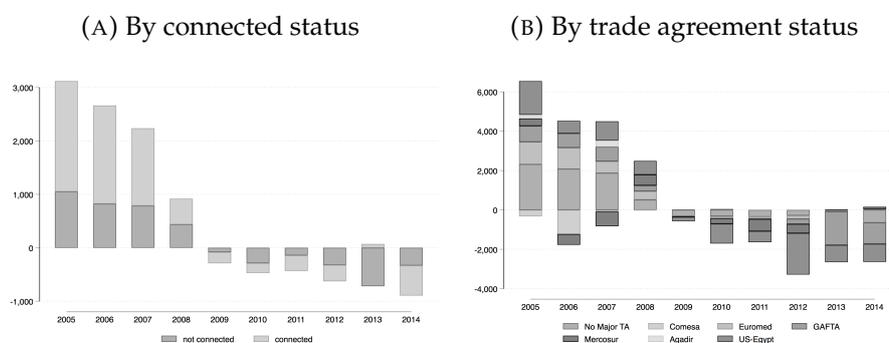
3.8.1 Accounting for missing imports

The prior analysis confirms that there were differences between connected and non-connected industries before and after the reform period but does not help us understand the mechanisms underlying cronyism and trade. High tariffs and non-tariff measures provide the opportunity to pay bribes to avoid high import costs. We can expect to have net gains for importers in sectors where regulation is relatively more liberalized (Dutt and Traca, 2010). One explanation for the change in import trends could be linked to practices in tariff evasion. Theoretically, with no change in contract enforcement, the reduction of tariff and non-tariff costs should reduce incentives to participate in corruption and tax evasion.

In the literature on trade and tariff evasion, Ray Fisman measured country level "missing imports," or imports that do not match partner country exports, between Hong Kong and China (Fisman and Wei, 2004), and from other countries to the US (Fisman and Wei, 2009). Rijkers, Baghdadi, and Raballand, 2015 identified firms in Tunisia owned by Ben Ali and his close ties, and linked these to import tariff evasion. This was measured by the discrepancy between the import value reported by Tunisian customs and export value reported by trade partner countries. In their findings, the importance of the amount of evasion increased for commodities with high tariffs.

Both studies conducted a simple accounting exercise that compared both sides of international trade flows. The authors both measured the value of imports declared as exports to the country of interest, by all other partner countries. They compared these estimates with imports declared by the receiving country. Incentives to under-report imports are strong when the importing country gains revenues from import tariffs. In light of this simple approach, and the reduction of administrative barriers that the 2007/2008 presidential decree targeted, an accounting practice measuring the difference between what is declared by trading partners and national agencies may also provide some light as to how we can understand the results of this paper.

FIGURE 3.5: Differences in missing imports

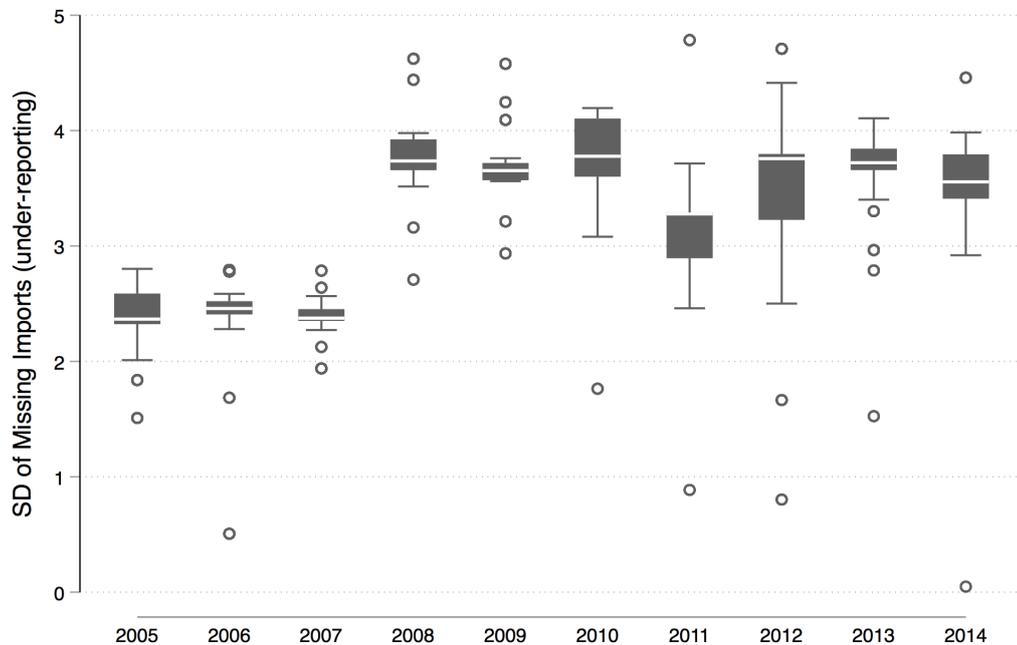


Source: TRAINS and EID

In this section, I compare the value of imports (in logs) declared in the national Egyptian imports-exports database, and subtract the value of exports declared for the same year, for each product from the WITS-COMTRADE database on global trade flows. In using data from two different sources, one should expect to find discrepancies between reported values for technical reasons. UN COMTRADE warns users to expect a 10-20% discrepancy for goods declared as imported from national sources, versus those same goods, declared as exported.²⁷ Nevertheless, in the regression analysis, level discrepancies are accounted for in a year, regional and trade agreement partner fixed effects – such that only discrepancies that vary with time are captured as coefficients.

²⁷Part of this discrepancy is due to accounting differences, and data quality. Secondly, while imported values include costs, insurance, and freight, exported values often are calculated as "free on board." Furthermore, data quality is not consistent between trading partners, and there is an expected amount of incorrect classification of goods. Lastly, one should expect that imports are usually recorded with more accuracy than exports because imports generate tariff revenues while exports do not.

FIGURE 3.6: Dispersion (standard deviation) of the log differences, by year



Source: TRAINS and EID

In conducting the analysis, only two-thirds of reported traded goods were matched, meaning that a third of the data was incorrectly classified by one of the trading partners. Under the assumption that without substantial review and coordination efforts the discrepancies should remain consistent overtime, this discrepancy should be *differenced* away using time fixed effects. Goods may either be under-reported, meaning that values reported from the Egyptian national export-imports database are lower than values reported from foreign countries, or over-reported, meaning that values reported from foreign countries are higher than value reported by the importing agency in Egypt. Under-reporting is suggestive of combined tariff evasion and partial measurement error (administrative error), while over-reporting is suggestive of pure administrative error.

Using yearly data on log of discrepancies between trade values, there is a clear change in the values and the standard deviation of discrepancies between the two data source over the years (Figures 3.5 and 3.6). The differences in total values demonstrates that the strongest drop in under-reported (or "missing") values are connected firms prior to the year of the reform but no clear trend by trade agreement.

The level differences of missing imports are strong and show strong evidence of tax

evasion prior to the reform period. But, this trend but may be due to underlying difference in the level of imports. To avoid bias by levels, rather than level differences, the dispersion (standard deviation) in under-reporting values can be more informative. The dispersion of under-reporting is measured by the standard deviation data points away from yearly sectoral means (Figure 3.6). Jointly, the large levels of under-reporting of imports and the trends in variability of missing imports at the occurring at the period as the administrative and tariff trade reforms in the presidential decree is suggestive evidence of how changes in administration may be impacting incentives to evade tariffs. The largest change is between the years 2007 and 2008, the same year as the presidential decree to simplify tariff and non-tariff barriers. In Years 2005, 2006 and 2007, the mean standard deviation was between 2 and 3 deviations from the mean value, while in 2008, the deviation of values from their means increased to between 3 and 4, suggesting that values were more disperse in 2008 than in other years.

In sum, under-reporting prior to the reforms were more consistent (precise) and higher in value. The under-reporting levels after the reform were lower, and less precise. These two statistics jointly suggest that prior to the reform period missing imports were larger in value and more likely deliberate (within 3 standard deviations of the mean). Conversely, under-reporting was lower in value and less deliberate after the reforms. Only after 2010 (after the range of our analysis), does the dispersion in standard deviations suggest that outliers are becoming more random, but the overall levels of missing imports suggests administrative error and over-reporting.

Yearly values of the sum differences between what is reported by other countries and what is reported by Egypt demonstrates that there is a large amount of imports "missing" coming into Egyptian customs. There is notable a higher percentage of missing imports from connected sectors, and manufacturing firms, while the association with missing imports and trade agreements are not systematic. The difference between reported imports from all other countries and Egypt is close to 10% points for 2005 until 2007. Following the reform in 2008, the discrepancy between the reported total values of other countries' exports to Egypt and Egyptian imports from other countries drops by half and continues to fall until 2011. These dates correspond with the years of the customs reforms and administrative simplification, and the beginning of the Egyptian revolution.²⁸

The findings in Table 3.3 give us estimates to support the graphical descriptions.

²⁸Further information on decomposition of changes are available by industrial level in the Annex Figure C.11, and trade agreements in the Annex Figure C.9.

TABLE 3.3: Impact of trade reform on import values with and without missing imports

	(1)	(2)	(3)	(4)
Log of Import Values	OLS	OLS	OLS	OLS
Connected * Post Reform	-0.445*** [0.0621]	-0.0989* [0.0412]	-0.100* [0.0445]	0.652*** [0.102]
Connected * Post y=0 × ln(under-report)				0.346*** [0.0164]
Connected * Post y=1 × ln(under-report)				0.195*** [0.00819]
Log of Missing Imports (under-report)		0.343*** [0.0132]	0.343*** [0.0120]	
SD of Missing Imports (under-report)			-1.005*** [0.101]	
Connected Industry	0.129 [0.0827]	-0.302*** [0.0529]	-0.338*** [0.0571]	-0.218** [0.0662]
Post Reforms	2.891*** [0.526]	-25.45*** [1.835]	-16.36*** [1.339]	2.429*** [0.141]
Tariffs	-0.0161** [0.00445]	-0.0249*** [0.00495]	-0.0223*** [0.00475]	-0.0221*** [0.00404]
Non-tariff measures	0.948*** [0.0687]	0.427*** [0.0573]	0.448*** [0.0546]	0.714*** [0.0684]
Comparative Advantage	0.00259*** [0.000442]	0.00249*** [0.000247]	0.00241*** [0.000243]	0.00217*** [0.000393]
Gain in value added	0.0940*** [0.00907]	0.0349*** [0.00522]	0.0323*** [0.00508]	0.0407*** [0.00472]
Constant	190.5*** [44.82]	-2266.1*** [159.7]	-1596.3*** [122.5]	9.318*** [0.129]
Observations	249747	110636	110636	111028
Controls	Yes	Yes	Yes	Yes

Standard errors are clustered at the trader level and reported in brackets. All regressions include Industry, Region, Year and Trade Agreement fixed effects, and controls associated with the augmented gravity model.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Columns (2) and (3) show that when we account for missing imports and their variability that our OLS estimates fall substantially and become almost non-significant. As a first step, this confirms what one can observe graphically –that the reform had an impact on reducing the relative import of goods to connected sectors as compared to non-connected sectors, but that this was due to changes in tax avoidance patterns. Controlling for the under-declaration of imports reduces the difference between connected and non-connected sectors. This change suggests that non-connected sectors had more incentives to shirk taxes on imports than on average for firms in non-connected sectors. In result, this suggests that firms operating in connected industries had less incentives to avoid taxation prior to reform where as those in non-connected sectors did.

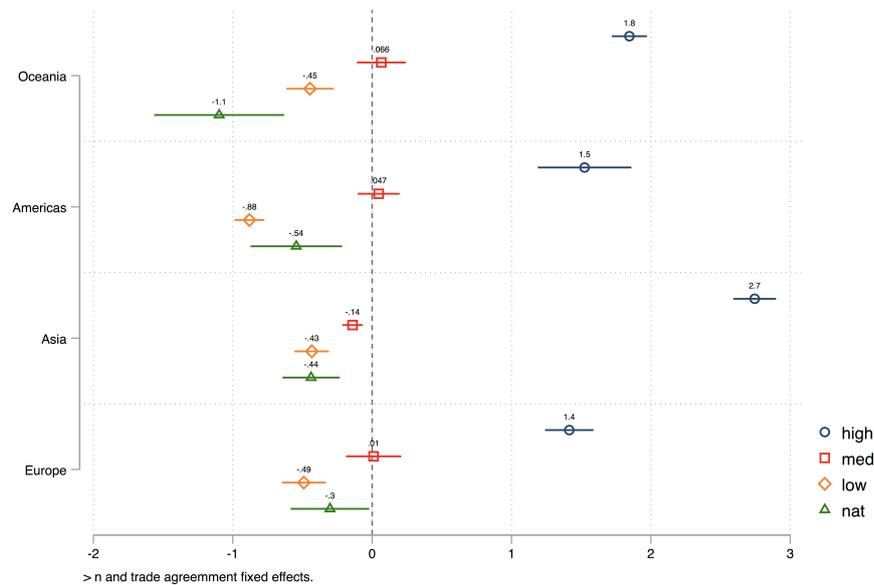
Finally, if I control separately for the impact of this reform and its interaction with under-reporting as in column (4), my estimates show that there connected industries did increase import flows to their sectors as compared to non-connected sectors. The variability of whether one group gained from this reform was highly dependent on trends in under-reporting and tariff evasion that simultaneously impacted the measure flow of imports. In the regression results, it is notable that although controlling form tax evasion trends by treatment status (connected, after reforms) changes the direction of the overall treatment effect, under-reporting had a smaller impact in magnitude after the reform (19.5%) as compared to before the reform (34.6%). Jointly, this finding suggests that those in connected industries participated more in tariff evasion prior to reforms, and while imports may increase more for non-connected industries, they also grow in connected industries when we account for changes in patterns of tax evasion.

3.8.2 Understanding economic complexity of imports

While testing an import substitution industrialization hypothesis within the context of cronyism is difficult to test, one can at least hypothesize on the elasticity of demand for imports based on the economic complexity of sectoral outputs. The higher the complexity the more it is likely that import goods would be important for firms' production needs and the more likely that reductions in tariffs would result in increases. The UNCTAD and Lall technological classification places goods in a level of technological advancement that is produced as an output of each industry (Lall, 2000). The system classifies economic activities into 7 categories: commodities, natural resource-based manufacturing, low-technology manufacturing, medium-technology manufacturing, high-technology manufacturing and other.

Separately estimating the propensity of belonging to a connected industry by technological level of goods production provides us with a more detailed understanding of the likelihood of belonging to a connected industry and producing a different levels of goods (Figure 3.7). There is a positive association between the propensity of belonging to a connected industry and imports belonging to the high technological complexity group. This association is strongest when imports originate from Asia. At the same time, there is a negative association of belonging to a connected industry and belonging to the group of industries in natural resources classification. This particularly strong when imports come from Oceania.

FIGURE 3.7: Propensity to belong to a connected industry, by level of technology



Sources: Egypt Import-Export Database and Diwan, Keefer, and Schiffbauer (2014)

So far I have separately estimated changes in the prior and post reform period for the two groups. It is also possible to look at subgroups within each group by a characteristic of interest. The propensity to belong to a connected industry suggests that there is variability by the level of technological complexity of the industries. Table 3.4 compares the separate impact of the reform associated with the technological complexity of goods produced by industry groupings. The interpretation of the outcomes are as follows, a positive coefficient of the interaction term (connected * Post-2008 Reform) indicates that imports increased for connected industries in the technological category, as compared to non-connected industries. Inversely, a negative coefficient of the interaction term and the log of imports suggests that after

reforms, imports increased to non-connected industries (as compared to connected industries) in the separate technological categories.

The findings in Table 3.4 show heterogeneity in outcomes. If imports are considered competition for firm in connected industries, then there is potential evidence of import-substitution behaviour in low-technology and high-technology goods. Prior to the reform, sectors with firms that produce high-technology goods faced the strongest restrictions. Imports to firms in non-connected sectors producing low-technology goods also increased, but the magnitude was lower. On the other hand, in some cases where the trade reform may have improved outcomes for connected sectors more than non-connected sectors. In these sectors, trends in import values are less suggestive of import substitution strategy but net increases in imports. Indeed, for firms in operating in processing natural commodities and in medium-technology goods (Table 3.4, column (2) and (4)), the reduction of trade barriers led to a substantial increase in inputs for connected sectors. The natural commodities sector is a highly politicized and strategic sector for Egypt, as such, this trend is was *expected*. Connected firms operating in natural commodities sectors saw substantially higher increases to inputs than non-connected firms in this sector. This finding is the single (but relevant) evidence suggesting that while reforms may have increased overall inflows, it disproportionately increased imports for natural resource sectors.

Summary of hypothesis testing. The initial findings suggest that trade liberalization encourages an augmentation of import values for sectors where connected firms do not exist. There is evidence that supports the tax evasion hypotheses, and some basis to start an analysis on import substitution strategy of crony behaviours. They separately explain why firms in connected industries may have benefited from the previous *status quo* and provide plausible hypothesis for understand the "black box" of the impact of reforms.

In the tariff-evasion hypothesis, the joint findings suggests that differences between connected and non-connected industries were at least partially accounted for by better administrative anti-tariff evasion practices after the reforms. There is more evidence to suggest that firms in connected sectors participated in tax evasion before reforms were put into place. This finding is in line with the findings of Sequeira, 2016; Bensassi and Jarreau, 2019 who argues that tariff liberalization is associated with less incentives to participate in tax evasion.

However, heterogenous trends by level of technological complexity of sectors also suggest that there may have been different strategies between sectors. Most importantly, it is notable that while trade reforms reduced the relative margin of imports

TABLE 3.4: Impact of Reducing Red Tape on Connected and Non-Connected Industries

	(1)	(2)	(3)	(4)	(5)
Log of Import Values	Full	Nat	LowM	MedM	HighM
Connected *	-0.445*** [0.0621]	0.223* [0.0979]	-0.237*** [0.0461]	0.207** [0.0600]	-0.329*** [0.0343]
Post-2008 Reform					
Connected Industries	0.129 [0.0827]	1.711*** [0.105]	1.940*** [0.167]	-0.321*** [0.0659]	-1.132*** [0.0638]
2008 Reforms	2.891*** [0.526]	-17.73*** [1.279]	-16.18*** [1.129]	-17.73*** [1.218]	-15.09*** [1.234]
Tariffs	-0.0161** [0.00445]	-0.0191*** [0.00501]	-0.0139** [0.00466]	-0.0178*** [0.00391]	-0.0356*** [0.00486]
Non-tariff measures	0.948*** [0.0687]	0.444*** [0.0491]	0.247*** [0.0328]	0.422*** [0.0565]	0.409*** [0.0423]
Comparative Advantage	0.00259*** [0.000442]	0.00215*** [0.000207]	0.00139*** [0.000136]	0.00224*** [0.000248]	0.00178*** [0.000187]
Gain in value added	0.0940*** [0.00907]	0.0288*** [0.00400]	0.0261*** [0.00288]	0.0315*** [0.00522]	0.0404*** [0.00500]
Log of Missing Imports (under-reporting)		0.341*** [0.0131]	0.340*** [0.0120]	0.345*** [0.0132]	0.332*** [0.00994]
SD of Missing Imports (under-reporting)		-0.954*** [0.0962]	-0.919*** [0.104]	-0.970*** [0.108]	-0.976*** [0.0985]
Constant	190.5*** [44.82]	-2333.0*** [148.4]	-1580.2*** [104.0]	-1705.5*** [110.2]	-1479.2*** [113.9]
Observations	249747	110381	110381	110381	110381
Controls	Yes	Yes	Yes	Yes	Yes

Standard errors are clustered on the trader level and reported in brackets. All regressions include Industry, Region, Year and Trade Agreement fixed effects, and controls associated with the augmented gravity model. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

for connected industries (as compared to non-connected), this was not the case in the natural resource nor the medium-technological level sectors.

3.9 Conclusions and Policy Implications

The role of elite families, and those connected to ruling regimes, is arguably both a catalyst and a hindrance to the development of industries. Families and friends with considerable wealth and connections may push for privatization or increased restriction on activities as it suits them. However, external pressures to reform internal market behaviours can level the playing ground for firms and are arguably void of preferential treatments. They can act as an equalizing force that disrupts latent privilege structures. In this case, I argue that reducing trade barriers and aligning with international standards is such a case.

Until now, the theoretical and empirical literature on trade and cronyism has suggested a non-linear relationship between trade policy and corruption. In the case of Egyptian trade in the manufacturing industry, the occurrence of reforms that reduced time and financial burdens seems to have unhinged the underlying anti-competitive advantages that some industries may have experienced. My paper adds value to this discussion by exploring how the reduction of barriers can not only increase trade flows, but also some of the mechanisms through which firms may have participated in anti-competitive advantages. The results remain robust to placebo tests, the inclusion of an array of control variables, and the exclusion of sensitive sectors. Interestingly, accounting for an estimate of tariff evasion, suggests that one of the important mechanisms through which the reform may have leveled the playing field is through the reduction of incentives to evade tariff and non-tariff barriers. Secondly, testing how this impacted different industrial activities, in particular in the natural resource sector, with different technological levels of production also shed light on potential avenues for import substitution strategies.

The analysis drawn in this chapter can be taken further to measure the impact of anti-corruption policy reforms on labor market outcomes as well as national accounts and fiscal stability. Such work may support the introduction of policies that not only ease the atmosphere for development in the private sector, but also level the playing field among industries and firms.

Conclusions

The previous three chapters have provided the reader with three arguments for considering the political economy as a priority in the growth literature. If one were to resume the joint arguments of the thesis, I would argue that all three papers demonstrate that the political economy has the potential to hinder desirable socio-economic outcomes. Each paper provides a different example to support this thesis.

The first paper, co-authored with Gunes Asik, Ulas Karakoc, and Mohamed Ali Marouani, is a comparative paper that explores historical institutions and how they may either enable or hinder the impact of a skilled workforce on productivity and growth. The message from this paper is that the labor force, and its skills, can be important determinants of productivity, if the political economy of the country is relatively open to trade and allows the private sector to absorb high skilled workers, as is the case in Turkey. In Tunisia, the absorption of skills to the public sector meant that high skilled workers were not contributing to growth in the private sector. Furthermore, pro-growth policies that increase opening to trade creates an environment where skills are valued. The potential for skills to impact productivity, therefore, depends on the institutional context, the opportunities the economy provides in growing sectors, and whether or not the public sector hinders the absorption of skills into more productive activities.

The second paper co-authored with Mohamed Ali Marouani gives an example of how firm subsidies may be used as a tool to extend control over the private sector rather than a pro-growth tool. In Tunisia, what was advertised as a firm-level subsidy targeting industries with export activities, in the end, resembled more of the same policies from before. The Industrial Upgrading program aimed to prepare the Tunisian industry and firms for competition with international firms as Tunisia opened its markets. However, when the subsidies were administered to large firms, there was no observable benefit to labor (neither in wages nor, for the most part, in terms of jobs). The program only really benefited labor in small firms, yet even in this case, no observable gains to the quality of jobs was captured. The program's impact suggests that the program was implemented as a mechanism to extend control of the government over the private sector rather than focusing on increasing the

competitiveness of firms and labor. In the political economy context of reforms in Tunisia, this type of policy, targeted towards modernization and export orientation, may be used to extend the agency of elites in government as the economy opens up to markets, rather than letting the private sector grow organically.

My last paper gives an example of how reducing administrative and tariff burdens may help understand how to avoid public favoritism, and encourage more effective tariff collection. In Egypt, the exogenous implementation of national tariff and non-tariff standards demonstrates how tariffs and non-tariff measures were being used prior to the reform by firms in industries with strong connections to the state. Because of the pre-existing arrangements, removing barriers to trade helped non-connected firms more than connected firms on an economy-wide level. Part of this reason was because of changes in tariff evasion practices. Sectors with connected firms had higher trends of evading tariffs before the removal of trade barriers. Once this was accounted for, connected sectors did benefit from reductions in trade barriers. A second observation is that reforms did not have the same impact on the historically protected natural resources industries and medium-level of technological complexities. Those with ties to the ruling Mubarak family who worked in these two types of industrial production activities also benefited from the removal of tariff and non-tariff barriers.

Shall we move towards complete liberalization of markets to avoid rent capture, or shall we place more interventions on business and government to ensure that the political economy of reforms does not benefit one special interest group over the other? I argue that neither is the right answer nor is a mix of the two. Understanding the political economy before choosing the path for development is the answer. If there are very strong relations between government and business, then increasing regulations will likely result in adverse outcomes for everyone else. In this case, reducing regulatory burdens and increasing competition from service providers is a better approach to disentangling the grip of government cronies. However, if there is an adequate separation of government and business, increasing regulations should have no direct differential benefit for special interest groups and may ensure the longevity of clean governance. The new answer to the question "*where all the growth has gone*" is, unfortunately, that it has gone to the pockets of interest groups with close ties to the government. Moving forward, policymakers and economists should fully understand these interests as they seek solutions to inefficient and unfair allocation of resources within the economy.

A Appendix: Chapter 1

Further explanation of variables.

Revealed Comparative Advantage (Tunisia and Turkey to the rest of the world, in 2010 USD.)

$$RCA_{i,k} = 1000 * \frac{W_k}{YPPA_i} \left[\frac{X_{i,k} - M_{i,k}}{W_k} - \frac{X_i - M_i}{W} \right] \quad (A.1)$$

where W represents world exports; $YPPA$ is GDP measured in thousands; X represents exports; and M represents imports for each good k and country i .

In using this measure, we rely on the assumptions that *i*) both Turkey and Tunisia are small, price-taker countries whose supply of goods do not significantly impact world demand, or significantly pose any dumping or anti-competitive risks, and *ii*) that world trends are exogenously determined outside of Turkish and Tunisian internal industrial and educational trends.

TABLE A.1: Classification of goods in value chains from CEPII-CHELEM

Level in Supply Chain	Types of Goods
Primary Goods	Agricultural products; all types of extractive resources (minerals; carbon, gas and petrol, etc)
Basic Manufacturing	Cement, ceramics, and glass; Iron and metal; Basic and organic chemicals
Intermediate Goods	Transformed iron goods; Textiles; Wood work and paper; Metal work, wood work, motors, electronic work, car parts; Fertilizer, paint, plastics and rubber articles
Equipment	Agricultural, material, machines, building material, telecommunication material, transport equipment, etc.
Mixed Goods	Leather; Furniture; Printed goods; Plastic articles; Refined petroleum and electricity; Meat, fish and edible greasy substances
Consumption Goods	Clothing, garments, and carpets; Manufactured articles (like toys, etc); Watches, clockwork, cameras and optical and electronic equipment for public consumption; Household appliances, cars and automobiles; Sanitary and pharmaceutical goods; Cereal-based products, animal products, vegetable products, drinks and tobacco.

TABLE A.2: OLS Estimations for Sectoral Productivity (Value-Added per worker), Turkey

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Skill Upgrading	-0.011 [0.096]	0.077 [0.093]	0.074 [0.095]						
Skill Upgrading Between		-0.095 [0.172]			0.008 [0.167]	0.007 [0.173]			
Skill Upgrading Within							0.022 [0.132]	0.162 [0.131]	0.162 [0.134]
Real exchange rate (% change)		-0.235** [0.092]	-0.236** [0.109]		-0.250** [0.091]	-0.247** [0.108]		-0.245*** [0.088]	-0.251** [0.102]
Average rainfall (mm)		-2.133** [0.839]	-2.133** [0.994]		-2.265** [0.829]	-2.235** [0.994]		-2.226*** [0.801]	-2.277** [0.936]
Capital stock growth (2011 national prices, in logs)		8.354** [3.035]	8.324** [3.534]		8.867*** [3.003]	8.731** [3.533]		8.677*** [2.931]	8.821** [3.353]
Human capital stock (% change)		-18.083*** [6.161]	-18.004** [7.143]		-19.059*** [6.033]	-18.770** [7.061]		-18.596*** [5.996]	-18.860** [6.825]
Comparative advantage of EU exports (% change)			-0.010 [0.022]			-0.012 [0.023]			-0.007 [0.021]
Comparative advantage of TR exports (% change)			-0.004 [0.005]			-0.004 [0.005]			-0.004 [0.005]
Constant	-84.776*** [9.868]	18.307 [39.906]	18.272 [48.459]	-85.066*** [9.492]	26.223 [38.886]	24.590 [47.874]	-85.148*** [10.393]	20.439 [37.356]	22.994 [44.731]
Observations	50	45	45	50	45	45	50	45	45
R-squared	0.970	0.977	0.977	0.970	0.976	0.976	0.970	0.977	0.978
Sector specific Time Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Productivity growth refers to annualized growth of value-added per worker.

TABLE A.3: OLS Estimations for Sectoral Productivity (Value-Added per worker), Tunisia

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Skill Upgrading	-0.212** [0.084]	-0.212** [0.084]	-0.187* [0.092]						
Skill Upgrading Between				-0.262** [0.109]					
Skill Upgrading Within					-0.262** [0.109]	-0.237* [0.124]	-0.561* [0.327]	-0.561* [0.327]	-0.498 [0.410]
Real x-rate growth	0.007 [0.005]	0.007 [0.005]	0.007 [0.005]		0.007 [0.005]	0.006 [0.005]		0.008 [0.005]	0.008 [0.006]
Rainfall (mm)	0.025** [0.011]	0.024* [0.013]	0.024* [0.013]		0.024** [0.011]	0.022 [0.013]		0.028** [0.012]	0.026* [0.015]
Capital stock growth (2011 national prices, in logs)		-1.476*** [0.504]	-1.464** [0.523]		-1.492*** [0.498]	-1.481*** [0.510]		-1.372** [0.539]	-1.375** [0.558]
Human capital stock (% change)		-0.206 [0.857]	-0.252 [0.861]		-0.170 [0.845]	-0.204 [0.834]		-0.327 [0.908]	-0.400 [0.965]
Comparative advantage of EU exports (% change)			0.008 [0.015]			0.010 [0.014]			0.006 [0.018]
Comparative advantage of TN exports (% change)			0.001 [0.001]			0.001 [0.001]			0.001 [0.001]
Constant	-17.034* [8.591]	-16.844* [8.669]	-16.484* [8.841]	-17.478* [8.511]	-17.268* [8.596]	-16.770* [8.643]	-17.147* [8.852]	-17.040* [8.920]	-16.594* [9.211]
Observations	40	40	40	40	40	40	40	40	40
R-squared	0.981	0.981	0.982	0.981	0.981	0.982	0.980	0.980	0.981
Sector specific Time Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Productivity growth refers to annualized growth of value-added per worker.

TABLE A.4: OLS and 2SLS Estimations of Sectoral Productivity, Turkey

	(A) OLS : Log of value added per worker			(B) 2SLS : Log of value added per worker		
	Total Skill Upgrading	Between Upgrading	Within Upgrading	Total Skill Upgrading	Between Upgrading	Within Upgrading
Skill Upgrading	0.074 [0.095]			0.122* [0.074]		
Skill Upgrading Between		0.007 [0.173]			0.259* [0.144]	
Skill Upgrading Within			0.162 [0.134]			0.163 [0.169]
Real x-rate growth	-0.236** [0.109]	-0.247** [0.108]	-0.251** [0.102]	-0.237*** [0.077]	-0.214** [0.086]	-0.259*** [0.070]
Average rainfall (mm)	-2.133** [0.994]	-2.235** [0.994]	-2.277** [0.936]	-2.150*** [0.699]	-1.939** [0.782]	-2.348*** [0.637]
Capital stock growth (2011 national prices, in logs)	8.324** [3.534]	8.731** [3.533]	8.821** [3.353]	8.354*** [2.505]	7.617*** [2.787]	9.073*** [2.297]
Human capital stock (% change)	-18.004** [7.143]	-18.770** [7.061]	-18.860** [6.825]	-18.099*** [5.082]	-16.858*** [5.597]	-19.363*** [4.694]
Comp. advantage of TR exports (% change)	-0.004 [0.005]	-0.004 [0.005]	-0.004 [0.005]	-0.003 [0.004]	-0.002 [0.005]	-0.004 [0.004]
Constant	18.272 [48.459]	24.590 [47.874]	22.994 [44.731]	18.5 [33.352]	11.696 [36.837]	26.634 [30.326]
Observations	45	45	45	45	45	45
R-squared	0.977	0.976	0.978	0.976	0.974	0.977
Controls	YES	YES	YES	YES	YES	YES
FIRST STAGE AND IDENTIFICATION for 2SLS Estimations						
Coefficients of Instruments						
L5. Share of College Grad. in Tot. Emp.				-38.420*** [7.606]	-24.410*** [3.760]	-14.145** [6.370]
L5. Total Skill Upgrading				-0.372 [0.138]		
L5. Between Skill Upgrading					-0.390*** [0.130]	
L5. Within Skill Upgrading						-0.342 [0.212]
Sanderson-Windmeijer F Statistic				13.04 pval(0.000)	22.92 pval(0.000)	2.74 pval(0.0837)
Hansen J Statistic				0.003 pval(0.955)	0.708 pval(0.400)	0.913 pval(0.339)

(1) Newey West standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

(2) Null hypothesis for S.-Windmeijer weak identification test is that *the particular endogenous regressor in question is unidentified.*

(3) Null for Hansen's J statistic is that *the instruments are uncorrelated with the error term.*

TABLE A.5: OLS 2SLS Estimations of Sectoral Productivity, Tunisia

	(A) OLS : Log of value added per worker			(B) 2SLS : Log of value added per worker		
	Total Skill Upgrading	Between Upgrading	Within Upgrading	Total Skill Upgrading	Between Upgrading	Within Upgrading
Skill Upgrading	-0.187* [0.092]			-0.037 [0.239]		
Skill Upgrading Between		-0.237* [0.124]			-0.238 [0.551]	
Skill Upgrading Within			-0.498 [0.410]			0.590 [0.517]
Real x-rate growth	0.007 [0.005]	0.006 [0.005]	0.008 [0.006]	0.019*** [0.005]	0.017*** [0.006]	0.019*** [0.005]
Average rainfall (mm)	0.024* [0.013]	0.022 [0.013]	0.026* [0.015]	0.051*** [0.014]	0.045** [0.018]	0.054*** [0.013]
Capital stock growth (2011 national prices, in logs)	-1.464** [0.523]	-1.481*** [0.510]	-1.375** [0.558]	0.221 [0.329]	0.254 [0.331]	0.184 [0.312]
Human capital stock (% change)	-0.252 [0.861]	-0.204 [0.834]	-0.400 [0.965]	-0.900 [0.906]	-0.670 [1.056]	-0.990 [0.820]
Comp. advantage of TN exports (% change)	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	-0.003*** [0.001]	-0.004** [0.002]	-0.004** [0.002]
Observations	40	40	40	35	35	35
R-squared	0.982	0.982	0.981	0.983	0.984	0.979
Controls	YES	YES	YES	YES	YES	YES
FIRST STAGE AND IDENTIFICATION for 2SLS Estimations						
Coefficients of Instruments						
Lagged Share of College Graduates in Tot. Emp.				-12.2** [4.71]	-5.89 [4.39]	-8.051*** [2.690]
Lagged Total Skill Upgrading				0.009 [0.123]		
Lagged Between Skill Upgrading					0.019 [0.150]	
Lagged Within Skill Upgrading						-0.115 [0.110]
Sanderson-Windmeijer F Statistic				3.42 pval(0.056)	1.05 pval(0.373)	6.34 pval(0.009)
Hansen J Statistic				7.08 pval(0.008)	6.84 pval(0.009)	2.65 pval(0.104)

(1) Newey West standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

(2) Null hypothesis for S.-Windmeijer weak identification test is that *the particular endogenous regressor in question is unidentified*.

(3) Null for Hansen's J statistic is that *the instruments are uncorrelated with the error term*.

FIGURE A.1: Sectoral Composition of Value Added

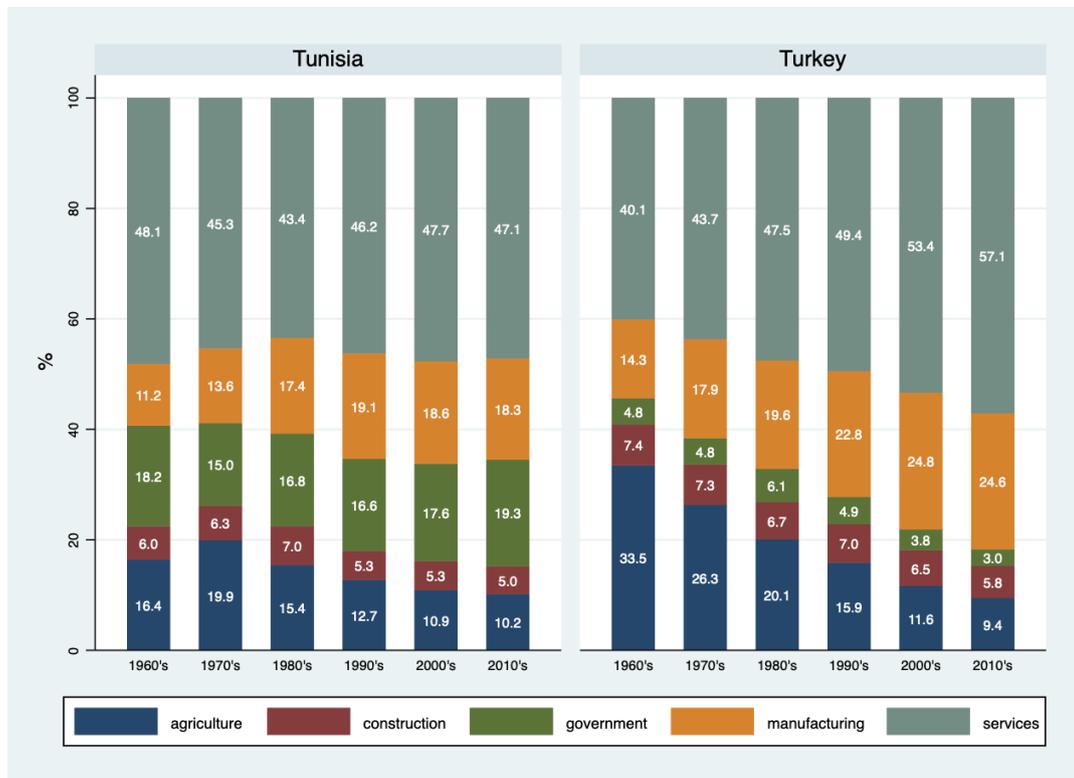


FIGURE A.2: Sectoral Composition of Employment

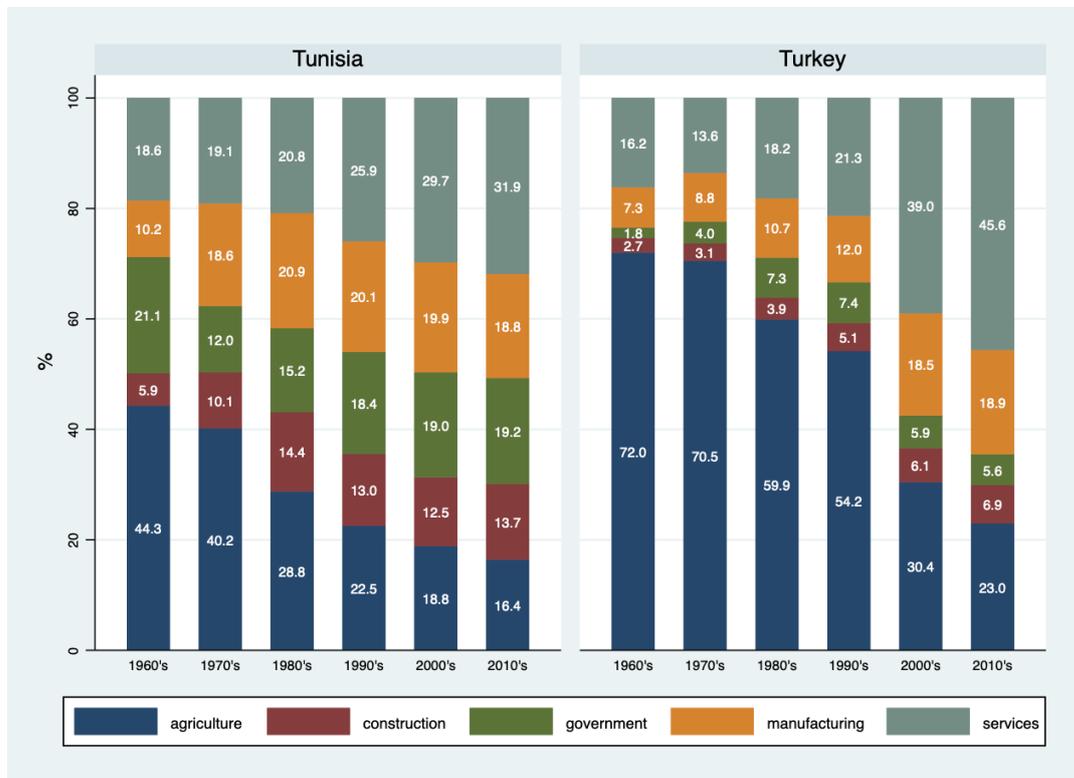


FIGURE A.3: Composition of Education

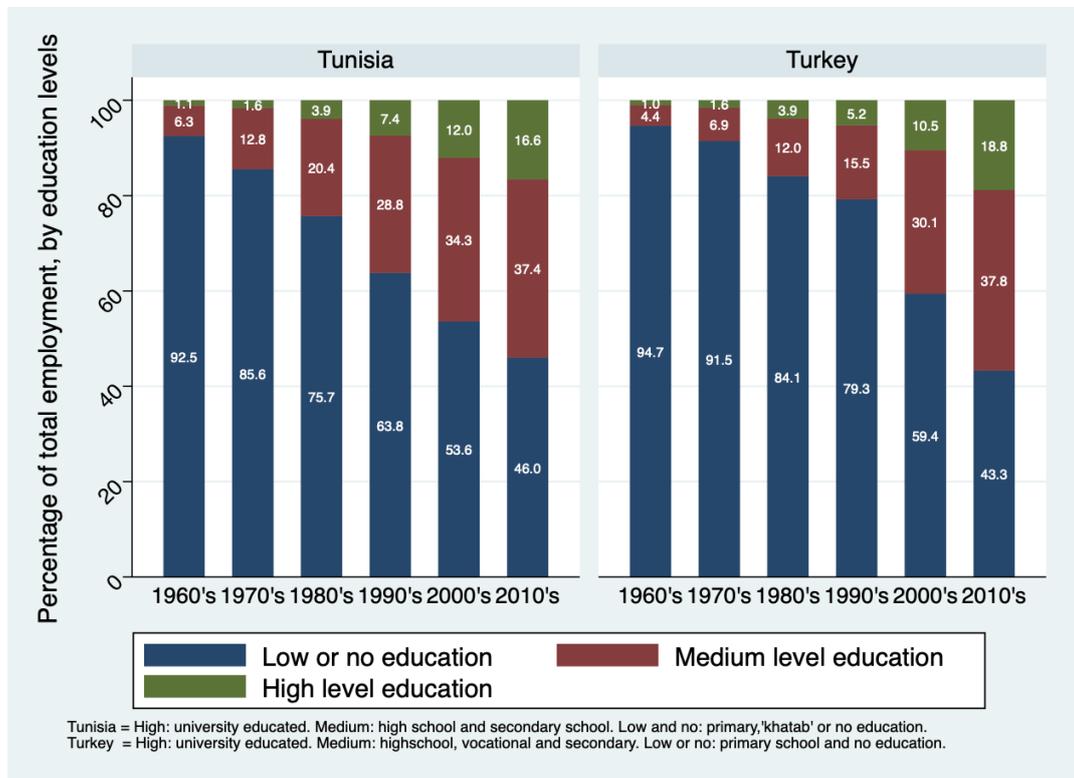


FIGURE A.4: Government Employment

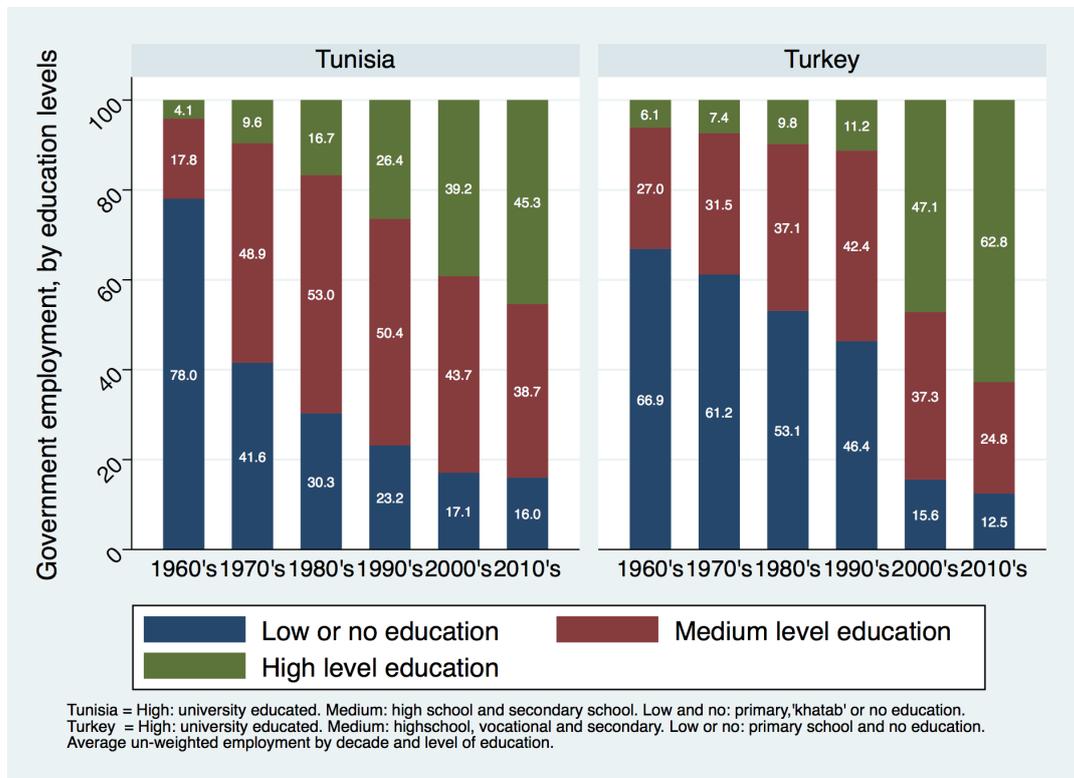


FIGURE A.5: Total Government Employment

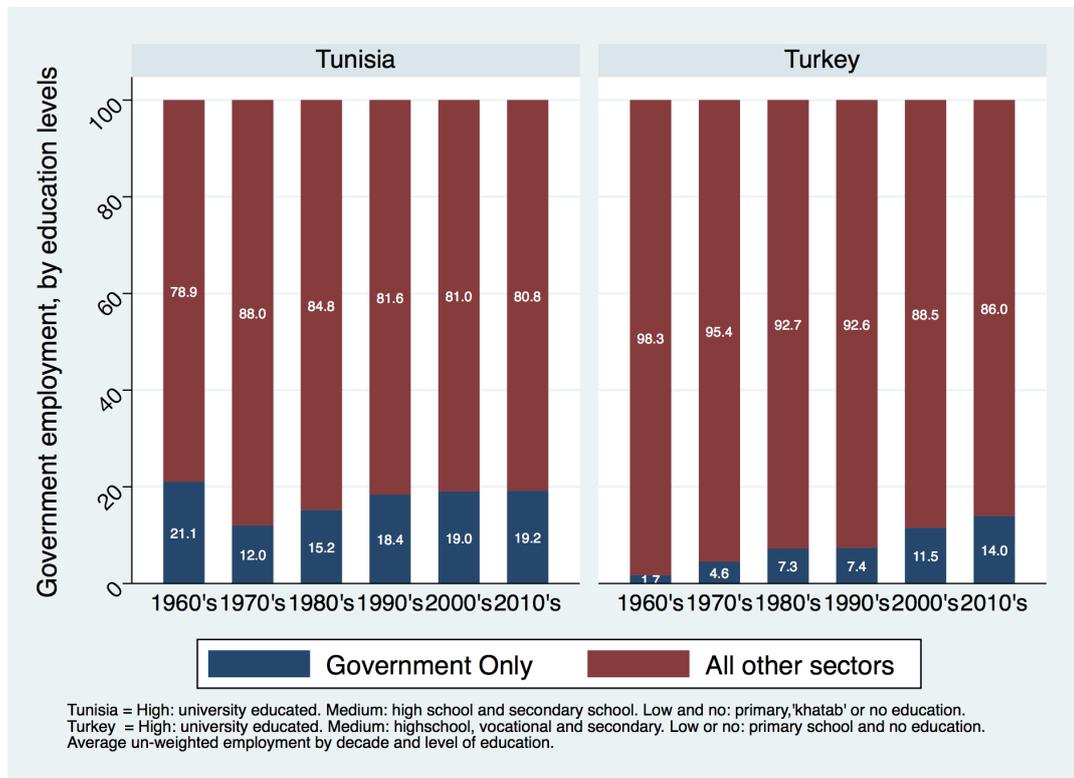


FIGURE A.6: Total High Skilled Government Employment

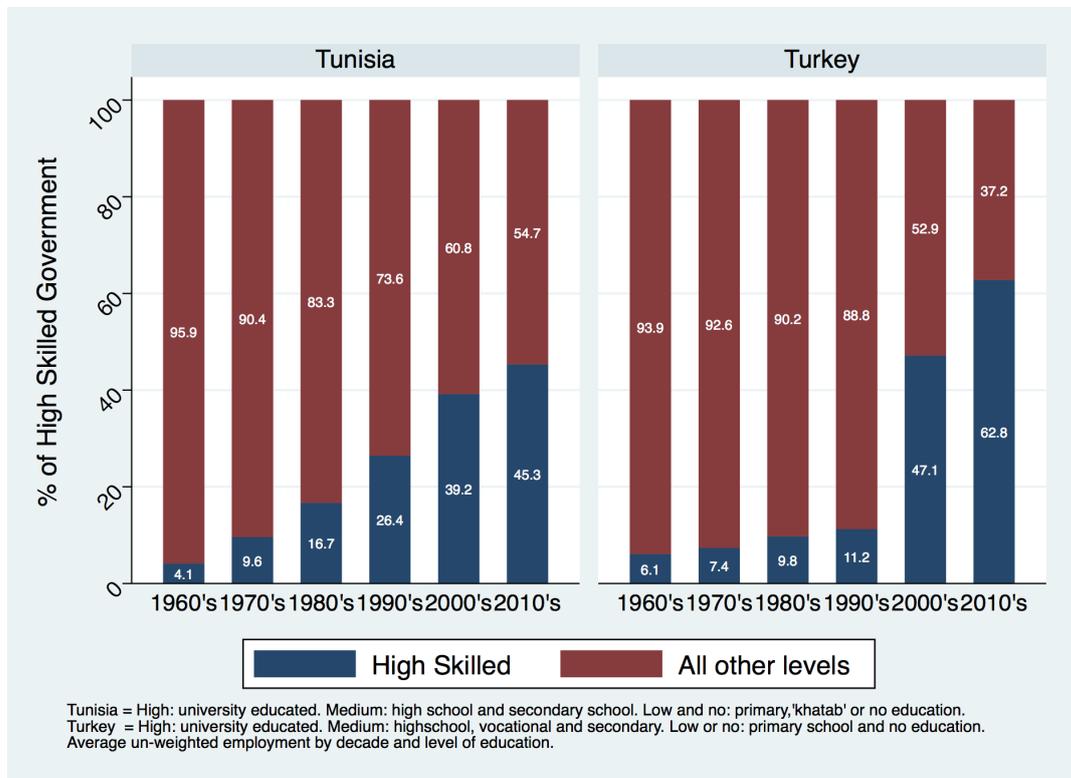


FIGURE A.7: Cross-correlations for Productivity and Skills Decomposition

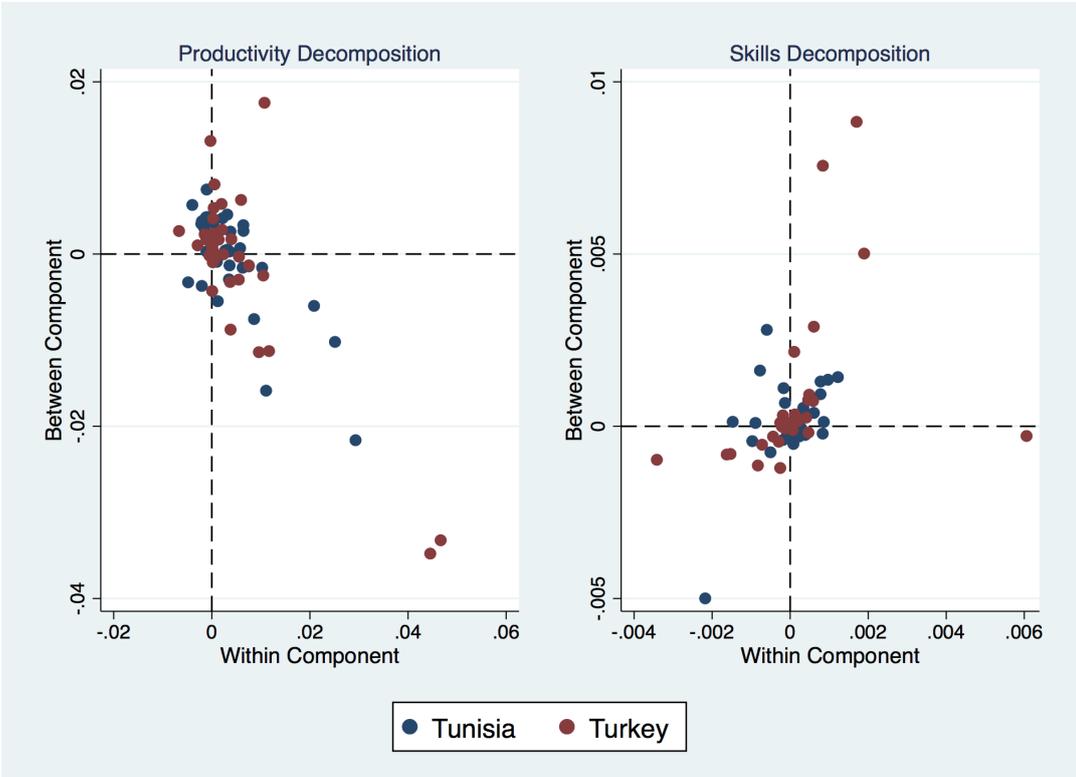


FIGURE A.8: Cross-correlations for Productivity and Skills Decomposition

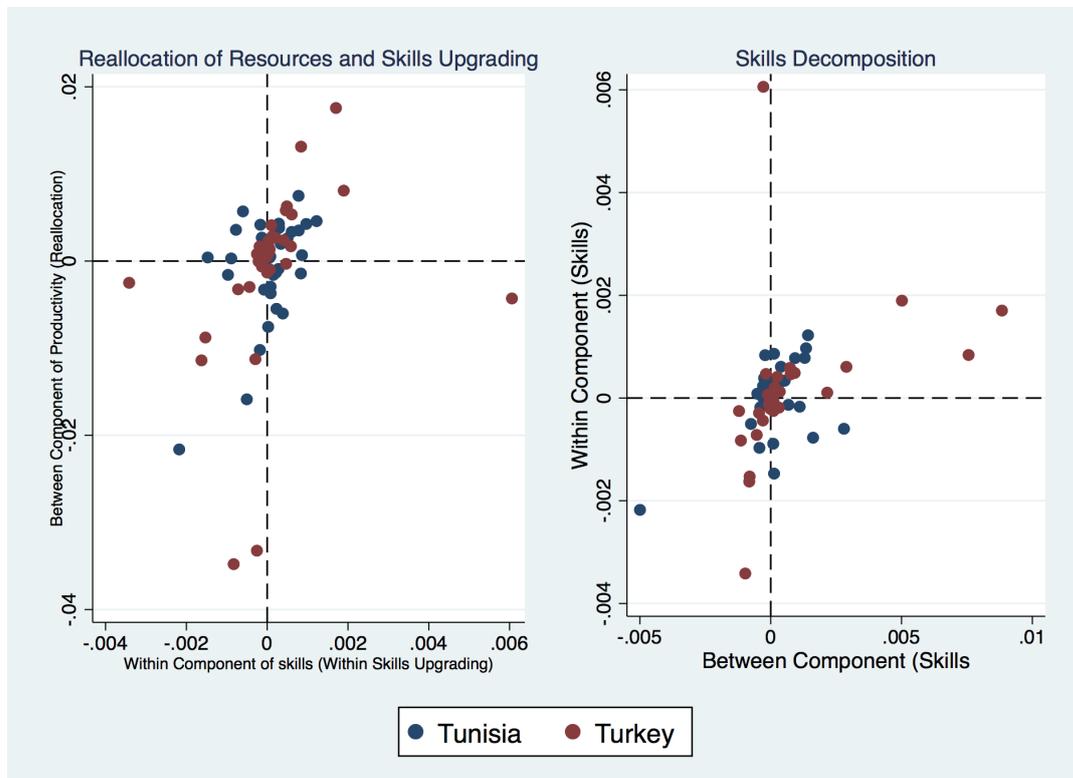


FIGURE A.9: Correlations for Productivity and Skills Decomposition

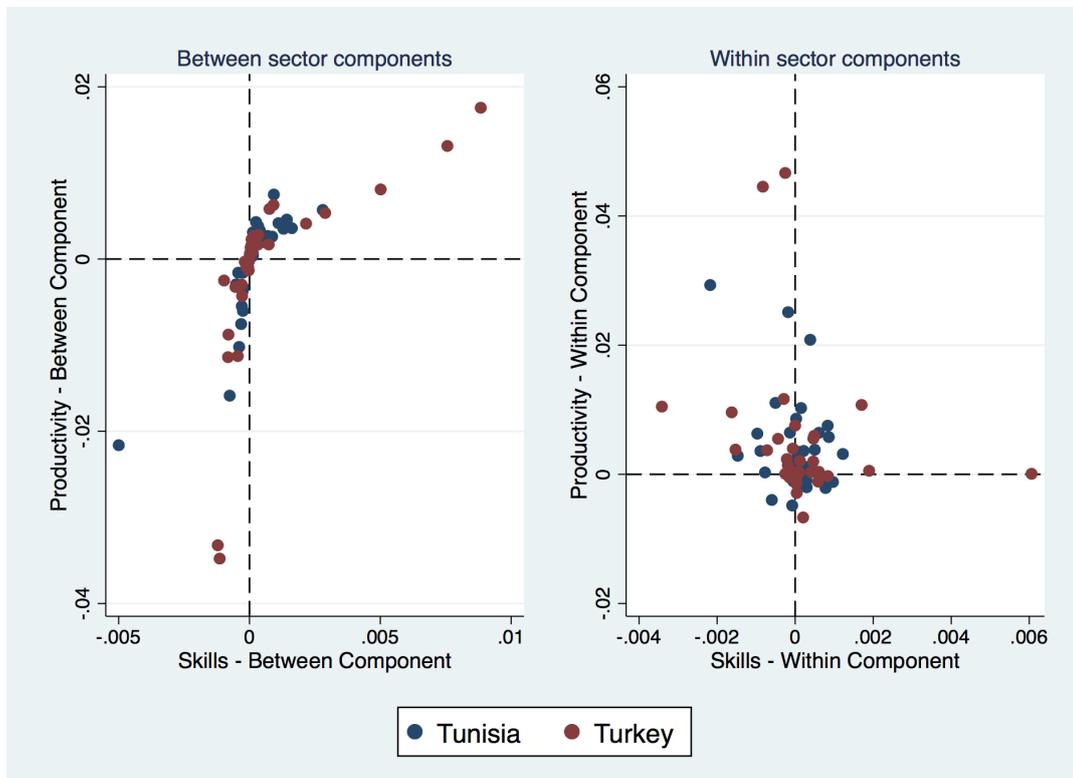


FIGURE A.10: Productivity Decomposition Correlations, by sector

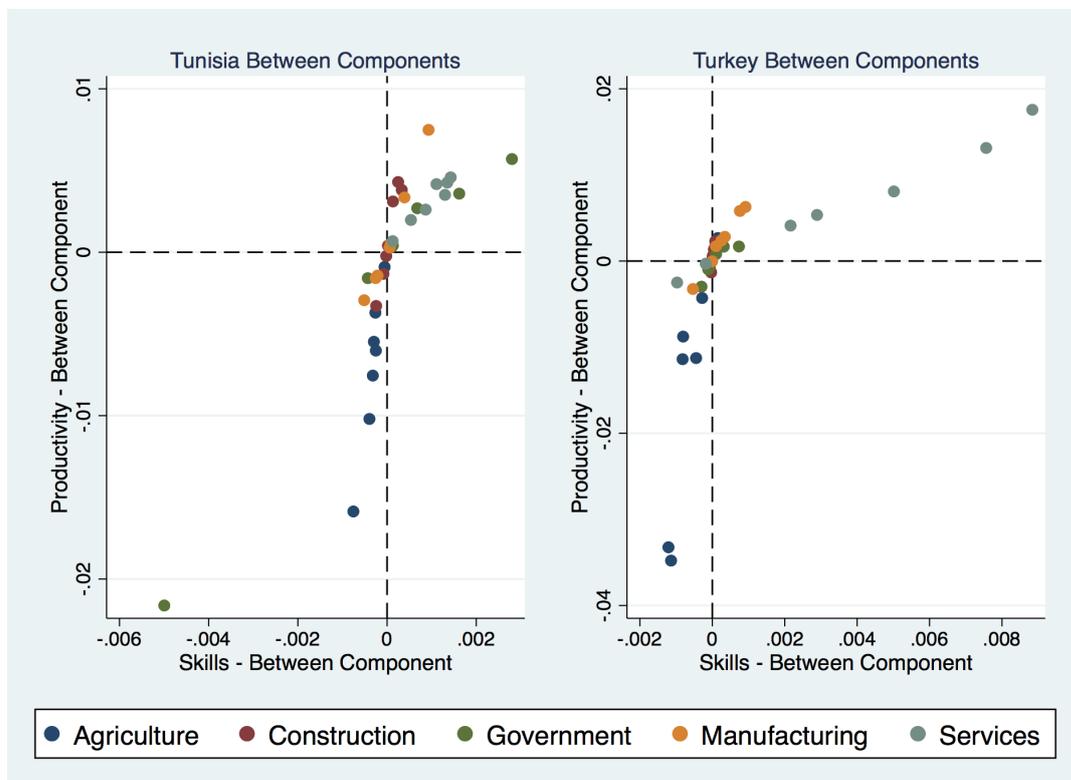


FIGURE A.11: Turkey : Productivity Decomposition Correlations by sector

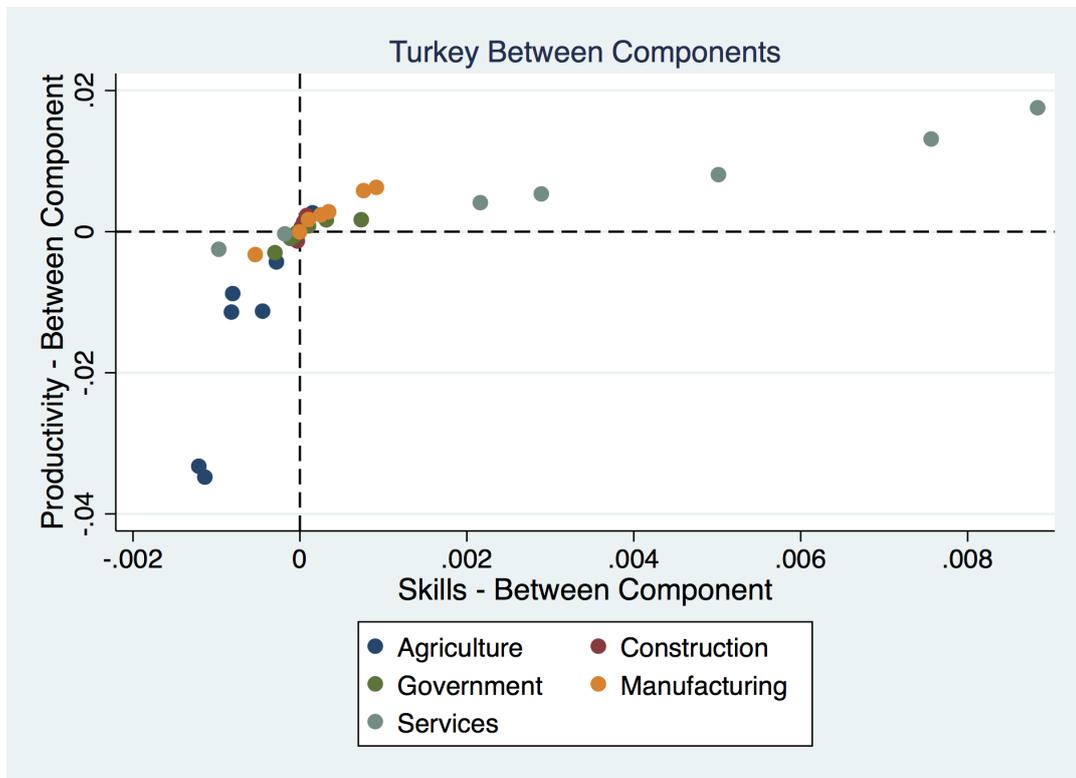
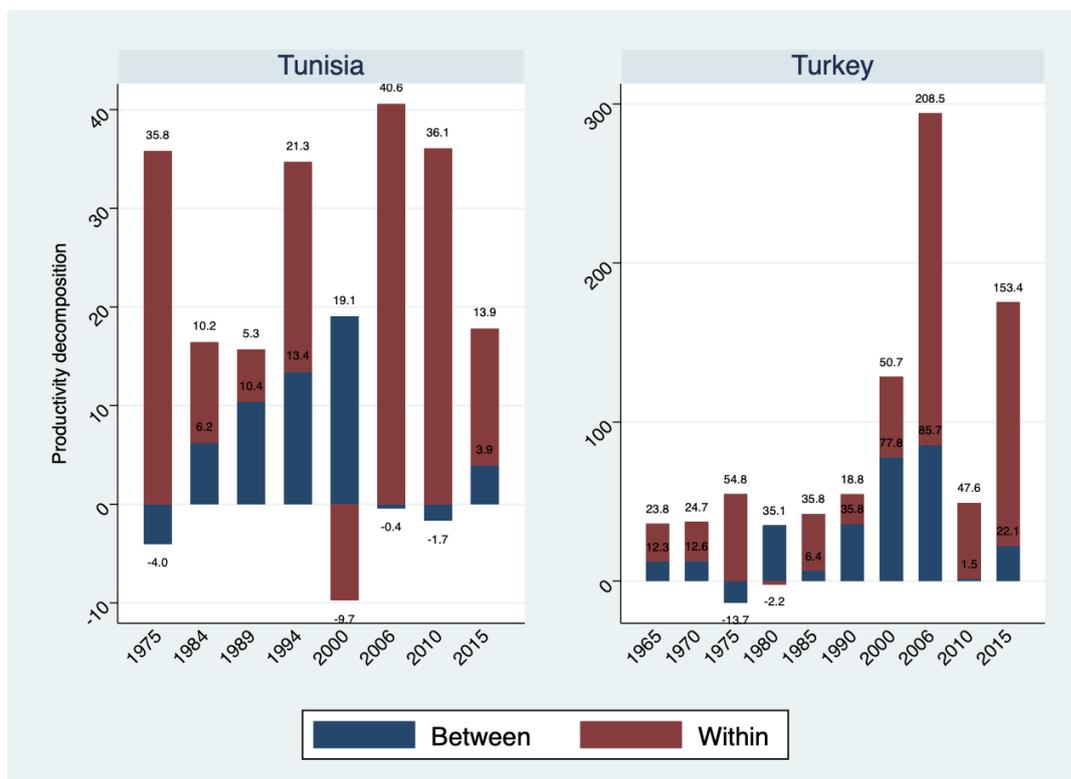
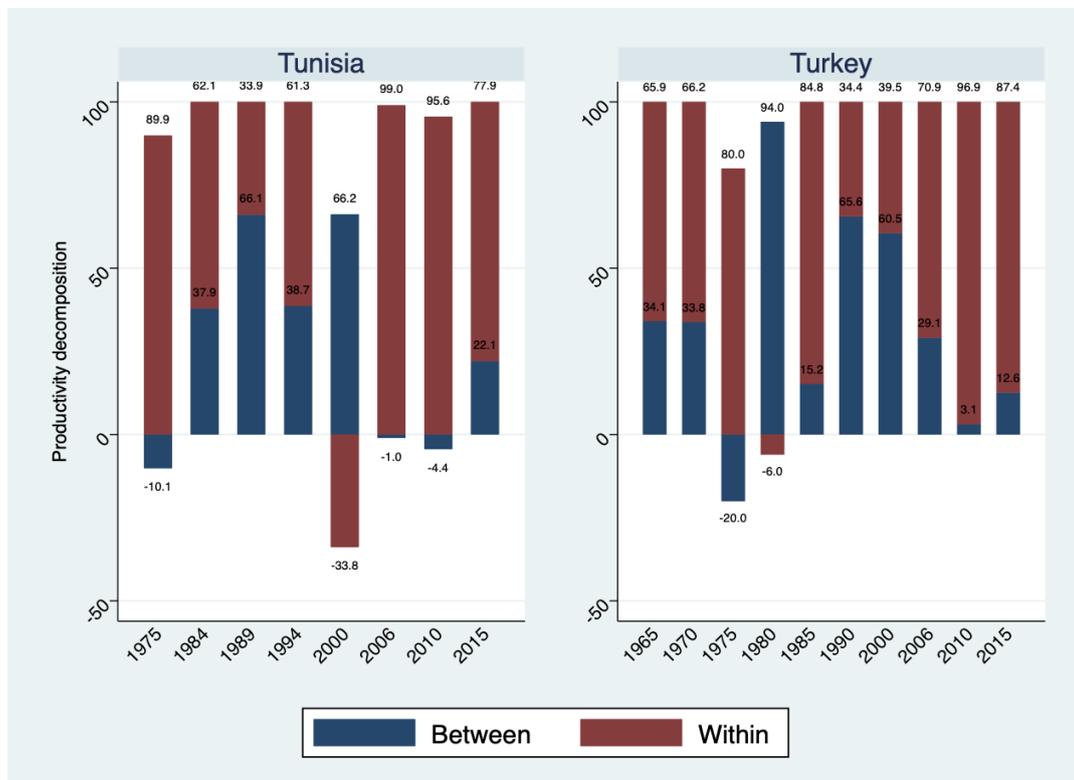


FIGURE A.12: Total Productivity Decomposition



Note: The bars should be interpreted as representing the change between the current year and the prior year (annualized). For Tunisia, the prior year for 1975 is 1967. For Turkey, the prior year is 1960.

FIGURE A.13: Structural Change and Within Component (as a % of total skills upgrading)



Note: The bars should be interpreted as representing the change between the current year and the prior year (annualized). For Tunisia, the prior year for 1975 is 1967. For Turkey, the prior year is 1960.

FIGURE A.14: Productivity in Tunisia

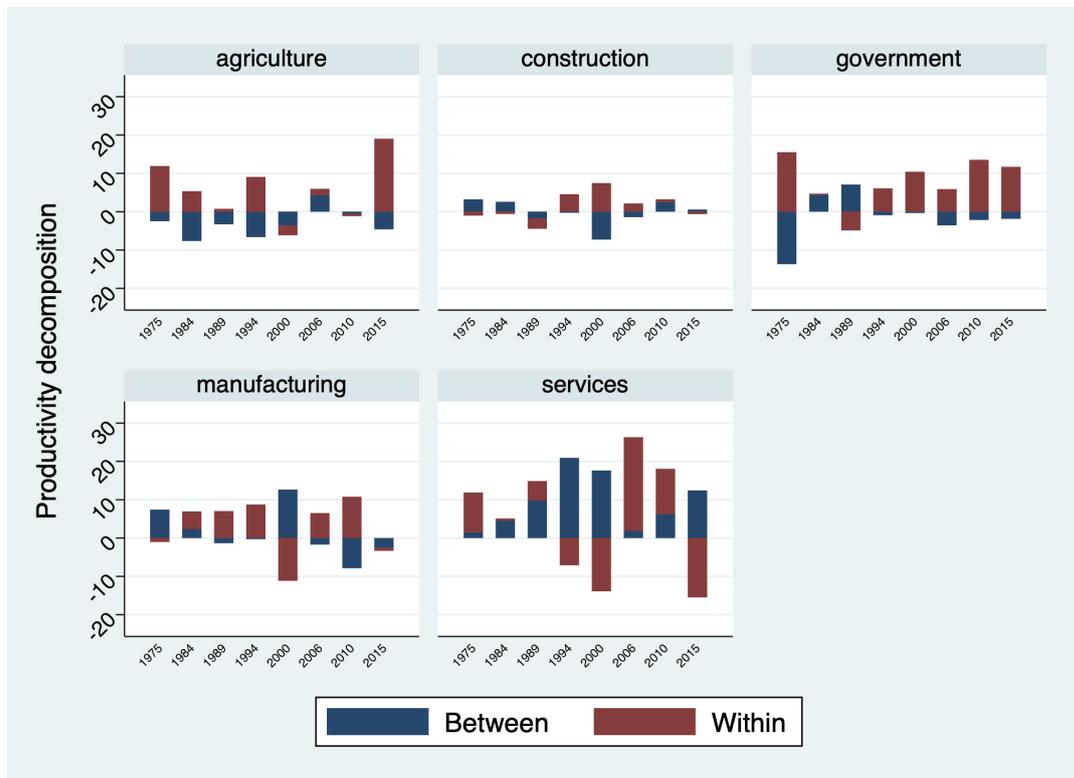


FIGURE A.15: Productivity in Turkey



FIGURE A.16: Productivity (levels) and Share of Employment (Tunisia)

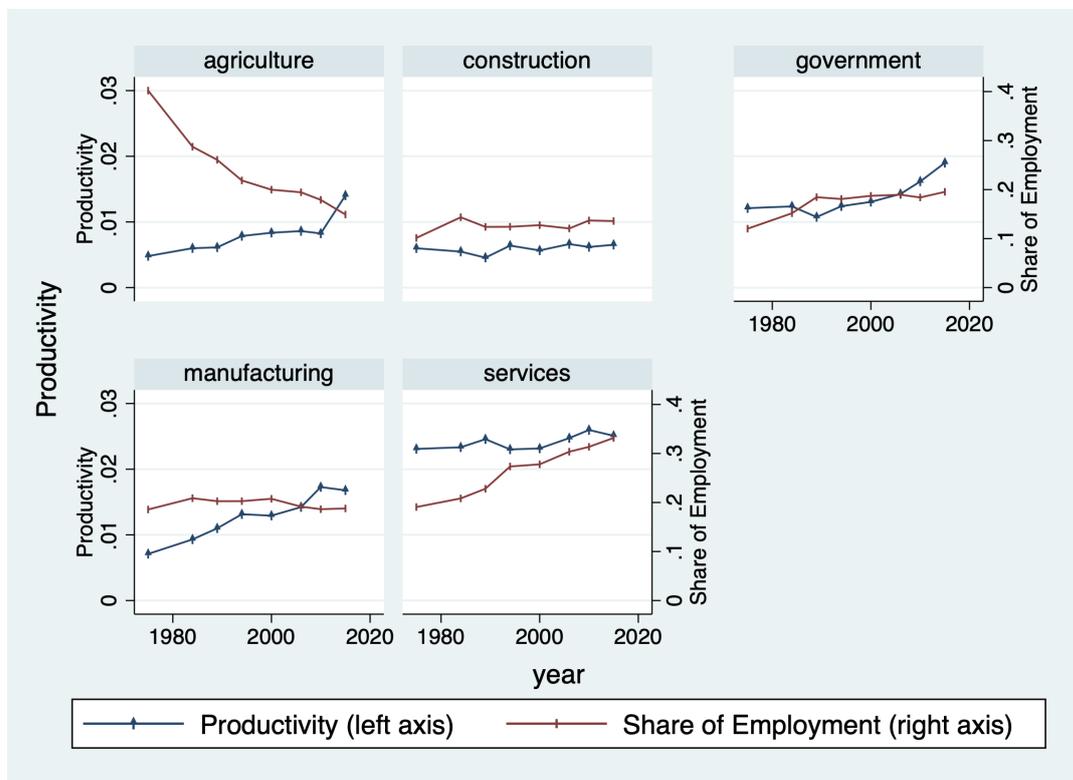


FIGURE A.17: Share of Productivity (levels) and Share of Employment (Turkey)

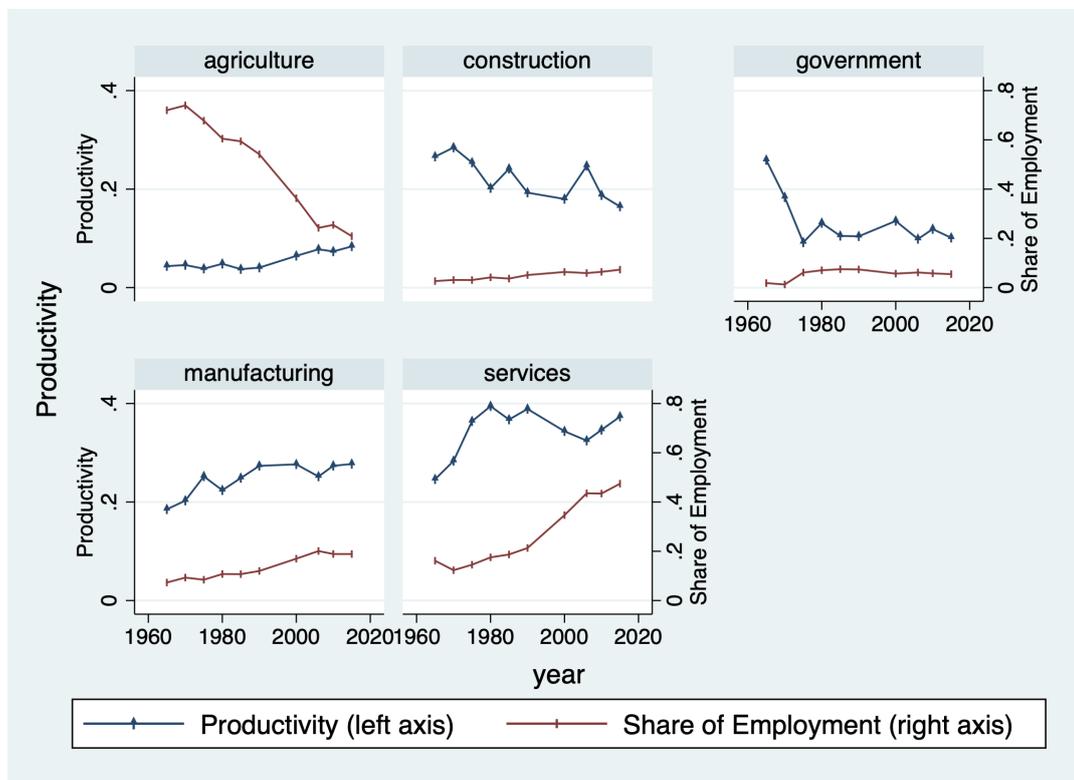


FIGURE A.18: Skills Decomposition

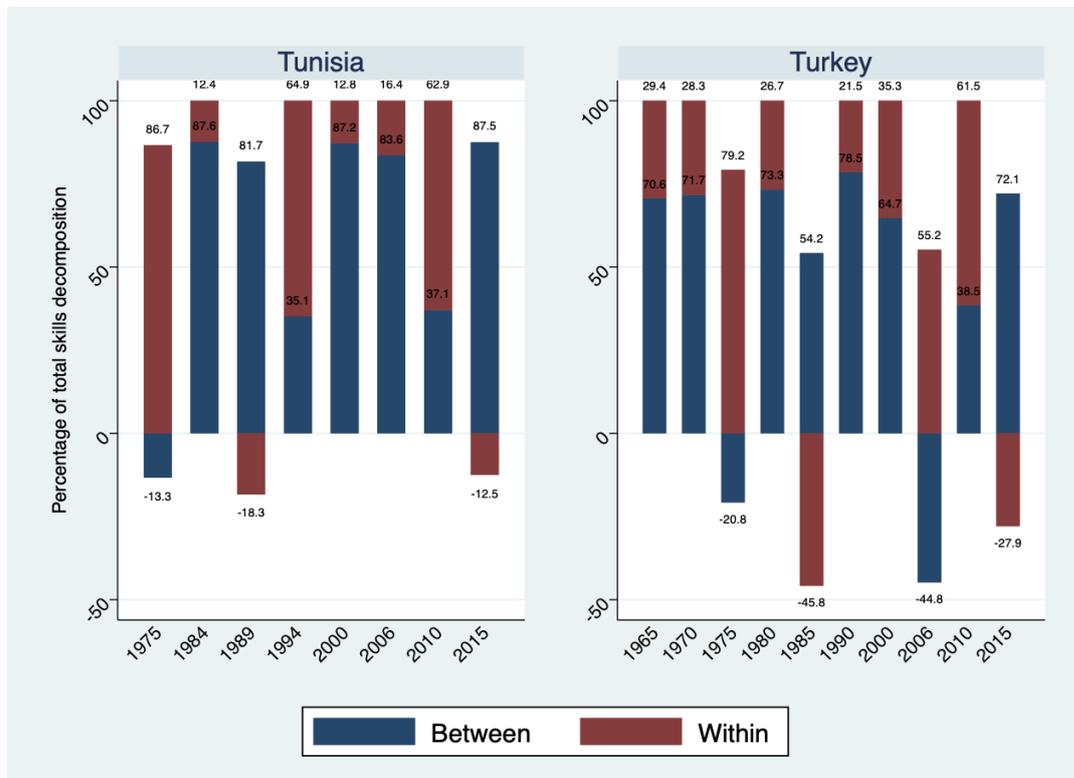


FIGURE A.19: Turkey: Fitted versus Actual Productivity Estimates

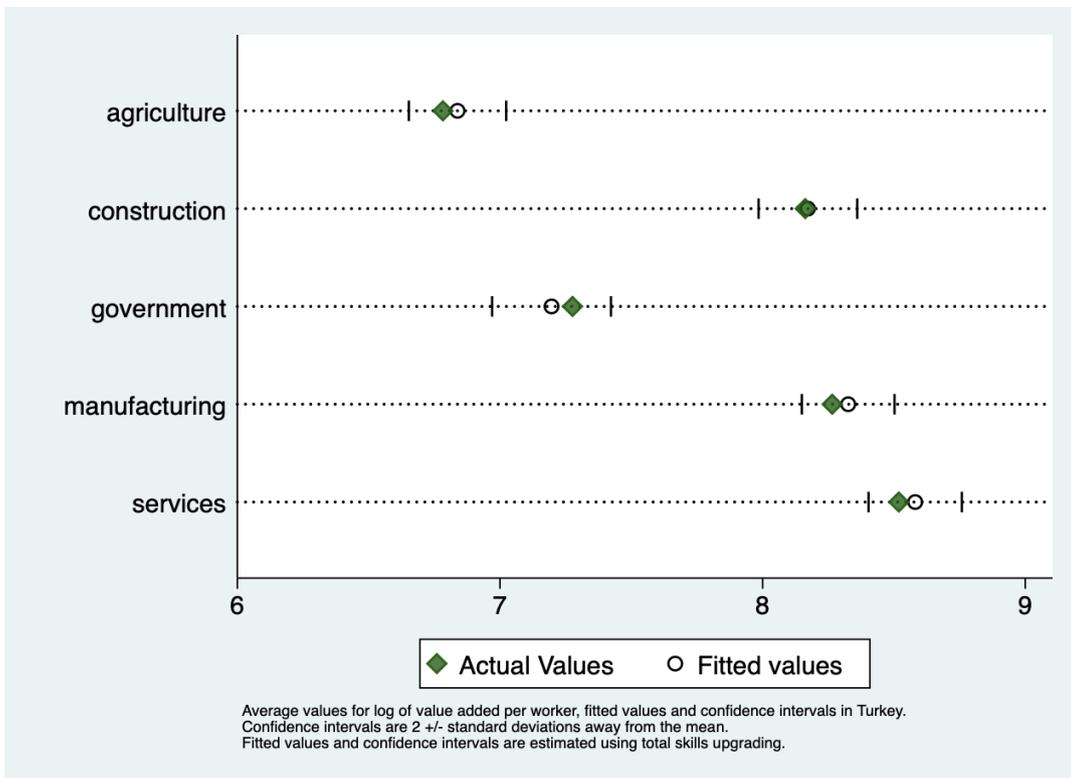
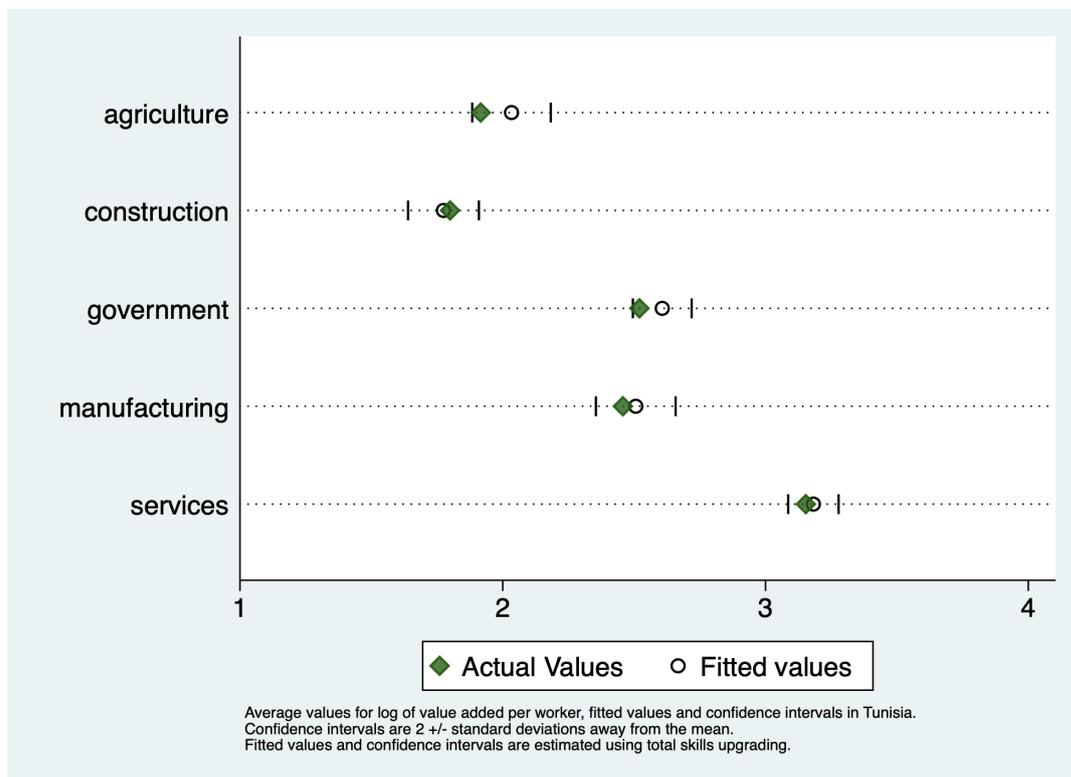
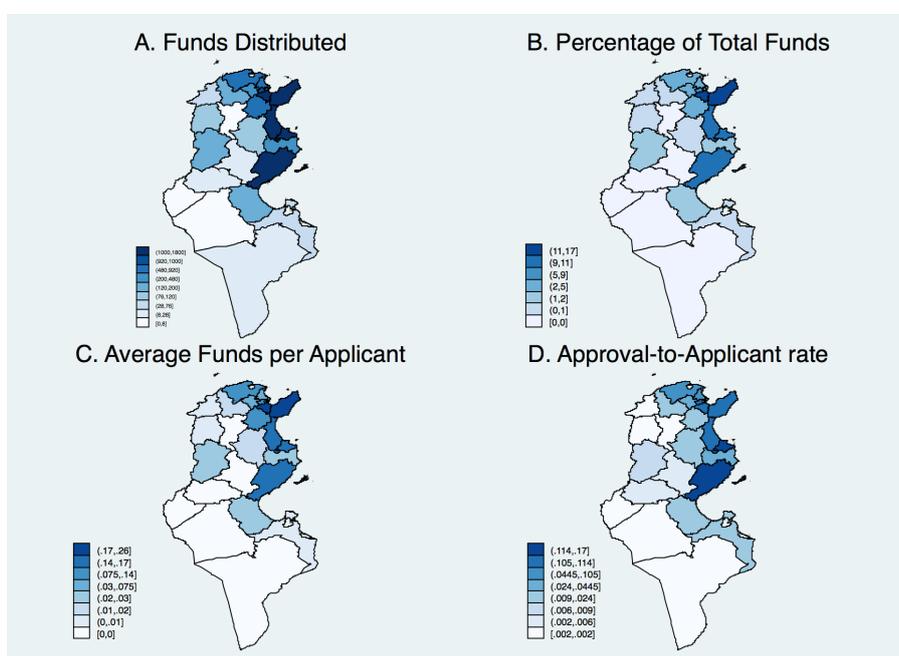


FIGURE A.20: Tunisia: Fitted versus Actual Productivity Estimates



B Appendix: Chapter 2

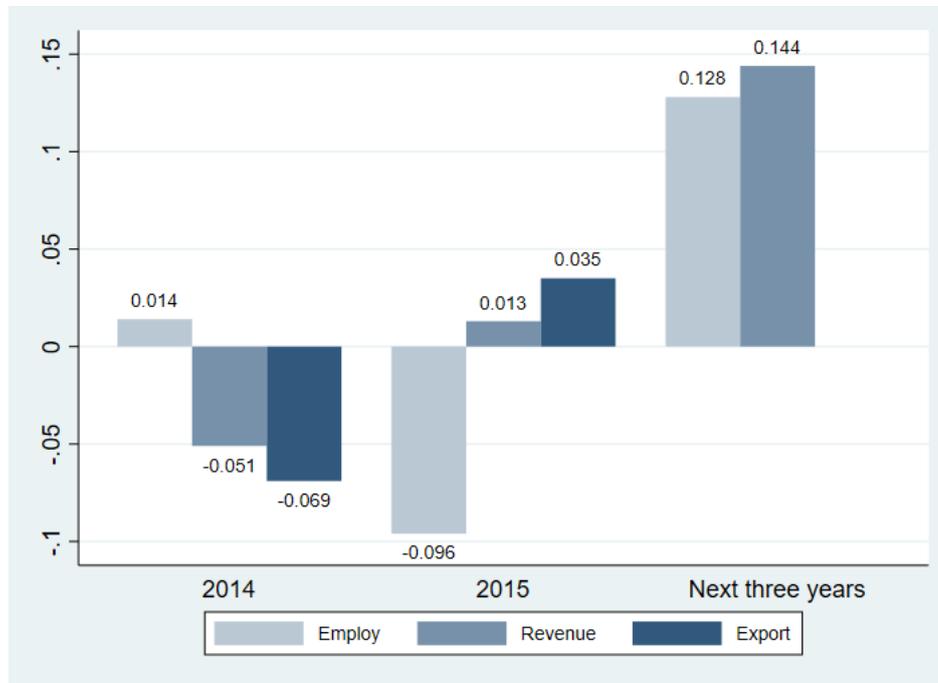
FIGURE B.1: Distribution and rejection rates of IUP funds by region



Source: Bureau de Mise à Niveau

Note: Rates are weighed by total applicants per region. Total and average funds are in current millions of Tunisian Dinars.

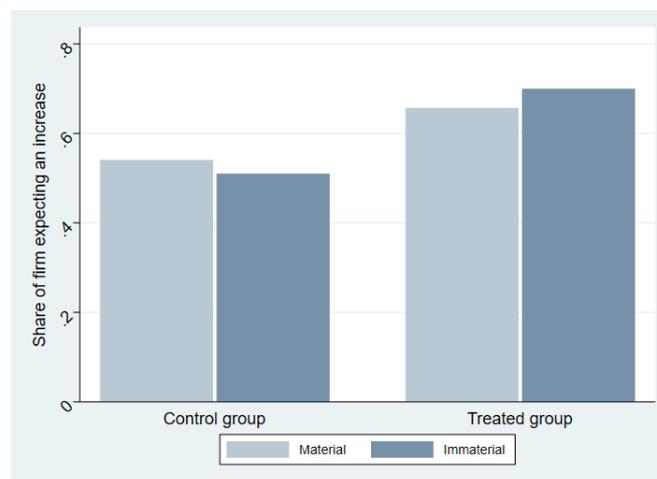
FIGURE B.2: Differences in Reported Increases in Employment, Profitability and Export outcomes



Source: ITCEQ

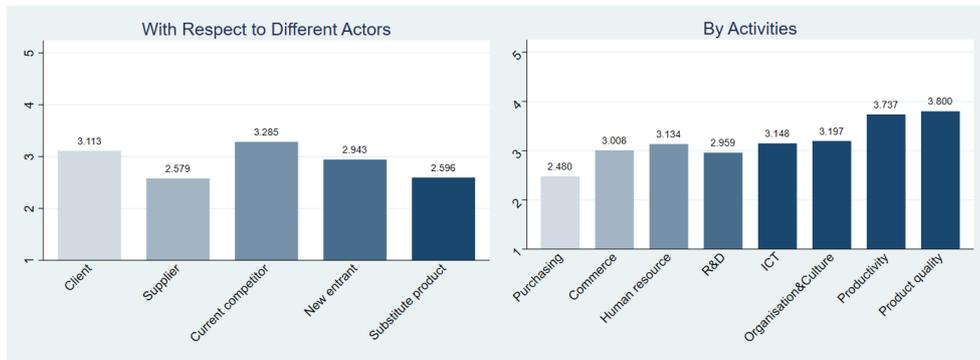
Note: Figure reports percentage of firms reporting any type of increase of each outcome. A positive percentage indicates higher reported outcomes for treated firms.

FIGURE B.3: Decomposition of expected investment



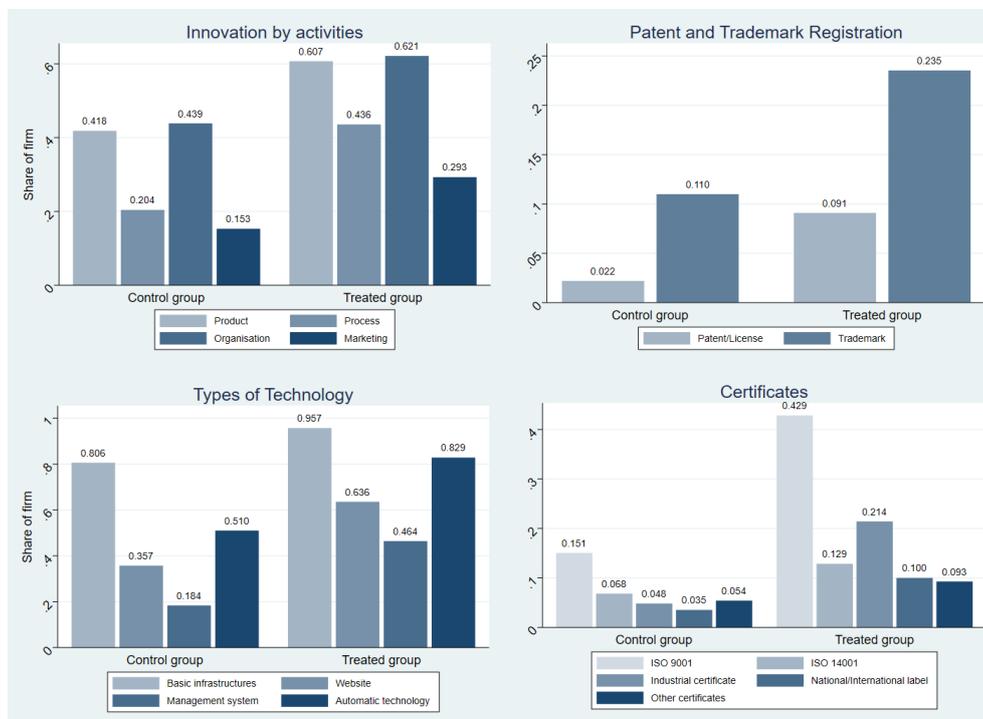
Source: ITCEQ

FIGURE B.4: Competitiveness



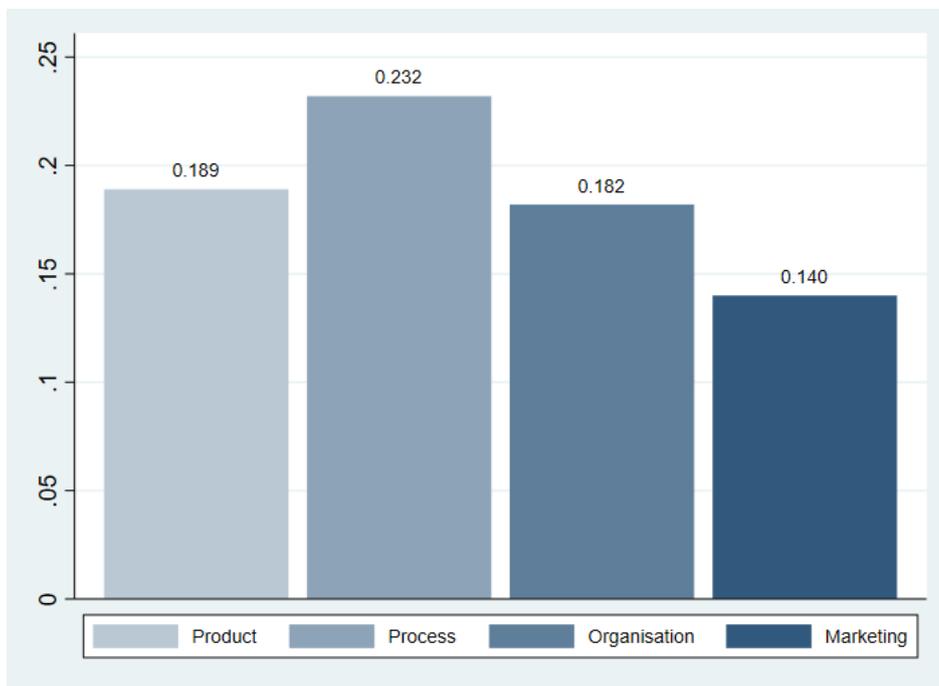
Source: ITCEQ

FIGURE B.5: Technological Level



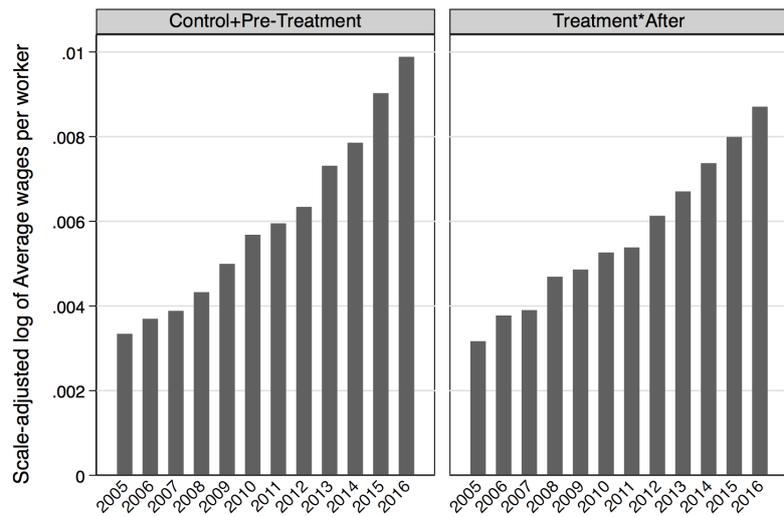
Source: ITCEQ

FIGURE B.6: Innovation

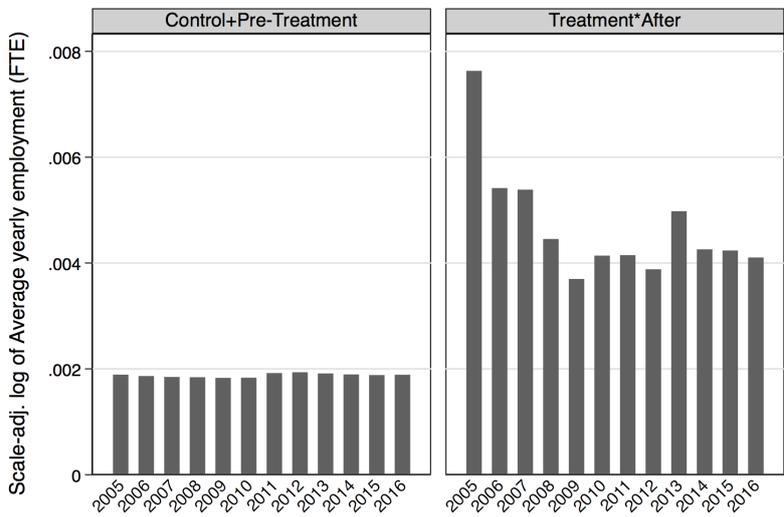


Source: ITCEQ

FIGURE B.7: Wages and Employment, by treatment status (after)



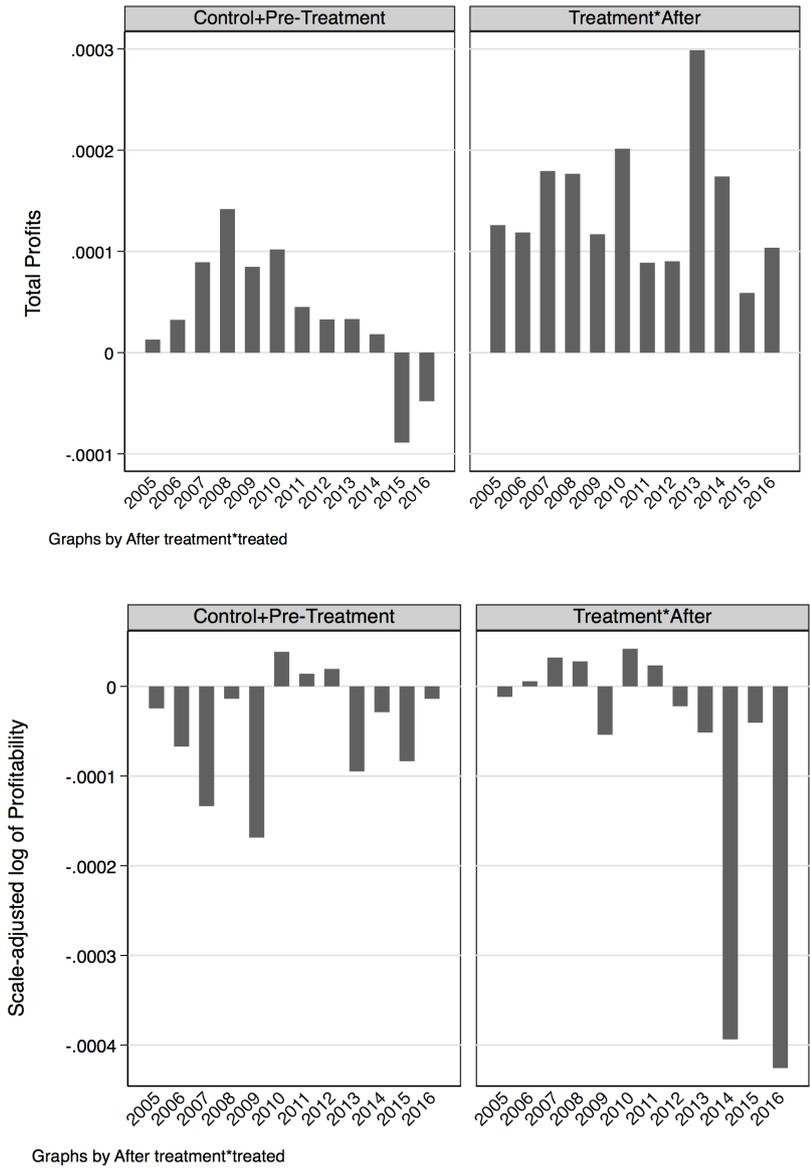
Graphs by After treatment*treated



Graphs by After treatment*treated

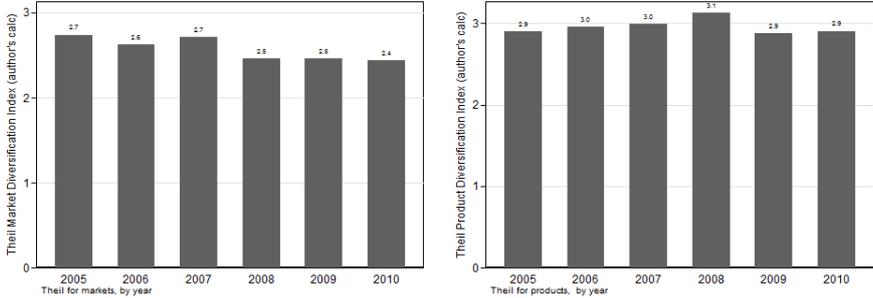
Source: RNE

FIGURE B.8: Profits and Profitability, by treatment status (after)



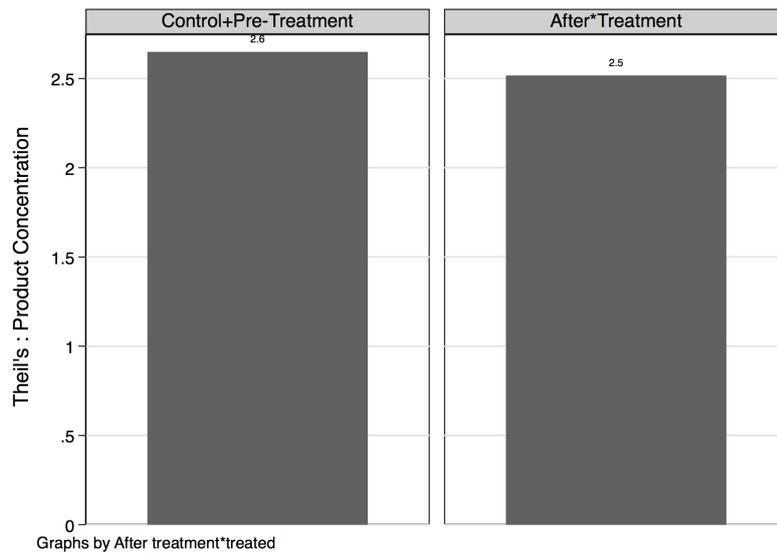
Source: RNE

FIGURE B.9: Thiel’s Generalized Entropy Index for Market and Product Concentration

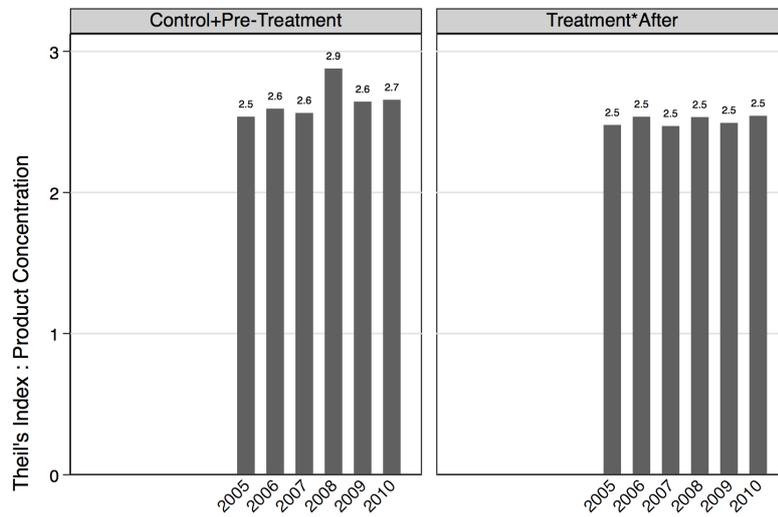


Source: RNE

FIGURE B.10: Thiel's Generalized Entropy Index for Product Concentration



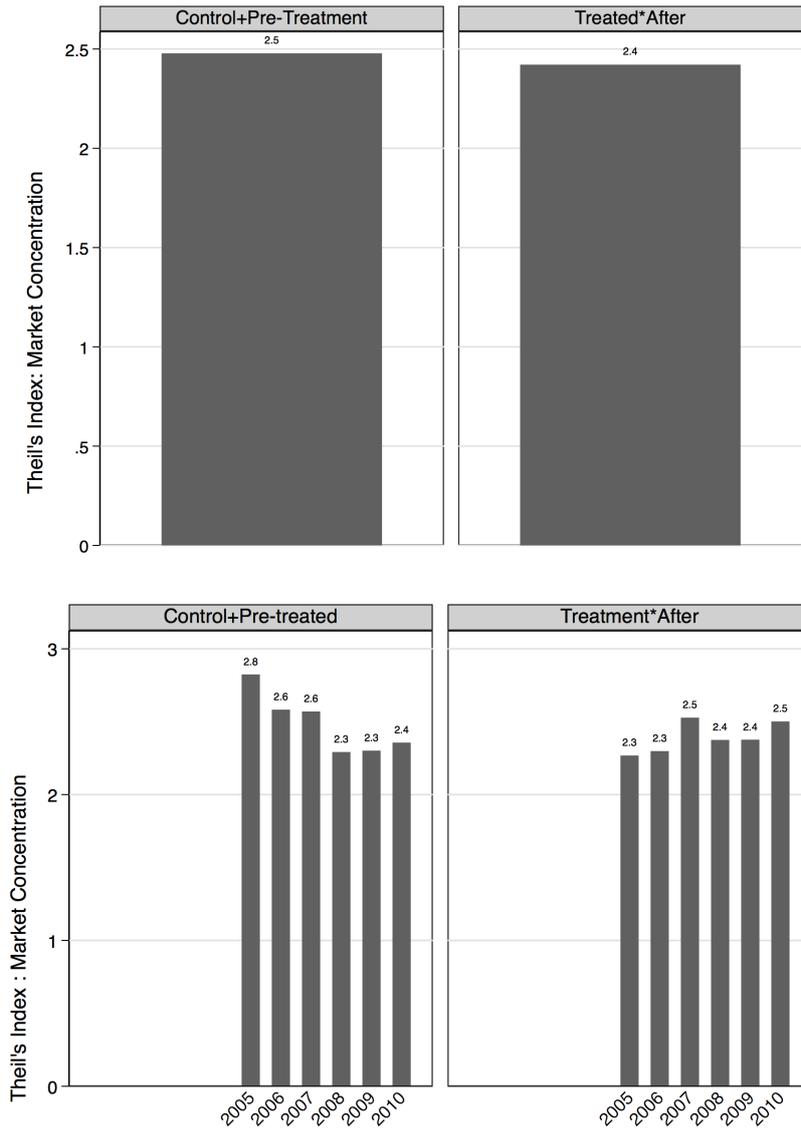
Graphs by After treatment*treated



Graphs by After treatment*treated

Source: RNE

FIGURE B.11: Thiel's Generalized Entropy Index for Product Concentration



Graphs by After treatment*treated

Source: RNE

TABLE B.1: Description of main variables

	Variable Description
Average Employment	The average yearly number of persons employed in full-time equivalent.
Net Job Creation	Total yearly jobs creation minus jobs destruction.
Wages (per worker)	Total wages and benefits paid by firms divided by number of employees.
Sales	Total turnover reported.
Sales per worker	Total turnover reported divided by total employed
Exports	The value of yearly exports
Profits	Total value of profits reported.
Profits per worker	The value of total profits divided by employees. Also referred to as Profitability.
Value per unit	The total value of exports per unit exported. Only available from 2005-2010.
Number of Products	Number of exported products. Only available from 2005-2010.
Number of Markets	Number of exported markets. Only available from 2005-2010.
Size group	Categories of firms by size groups. This varies between the tables as indicated.
Restrictiveness	Ordinal variable capturing how restrictive foreign direct investment rules are within the firm's sector (Rijkers, Baghdadi, and Raballand, 2015).
Firm origin	A dummy variable for whether a firm is foreign or national.
Firm type	A variable for whether the firm is public or private.
Age	The age of firm from registration date.
Exporter status	A variable measuring whether a firm is an export-only form, partially export-oriented, or completely national.
Distance to ports	A variable capturing the distance from any of the nearest 2 ports to the city center where the firm is located.

TABLE B.2: Sample T-test for difference between treatment and control group.

	Treated	Control
Firm Survival	0.9911	0.9845
Log of Average Employment	0.0084	0.0070
Log of Net Job Creation	-0.0003	-0.0003
Log of Wages (per worker)	0.0046	0.0059
Log of Sales	0.0007	0.0015
Log of Sales per worker	0.0001	0.0001
Log of Export Values	0.0013	0.0018
Log of Profits per worker	0.0000	0.0000

TABLE B.3: Indicators of Market Concentration

Gini, Theil's Entropy Index, and Thiel's Decomposition by treatment				
	GINI	GE(0)	GE(1)	GE(2)
2005	0.94533	4.35877	2.81526	16.16555
2006	0.93121	4.15509	2.61318	14.26525
2007	0.93743	4.43142	2.68034	15.1502
2008	0.92082	4.29535	2.40485	11.13297
2009	0.92128	4.08576	2.43914	11.96958
2010	0.92602	4.26168	2.53751	13.98232
	Between GE(1)	Within GE(1)	Between GE(2)	Within GE(2)
2005	0.05812	2.75714	0.0496168	16.11593
2006	0.06834	2.54484	0.0587316	14.20652
2007	0.1156	2.56474	0.0973379	15.05287
2008	0.10392	2.30093	0.08647	11.0465
2009	0.12832	2.31081	0.1092649	11.86031
2010	0.16404	2.37347	0.1377527	13.84457
	Control GE (1)	Treated GE (1)	Control GE (2)	Treated GE (2)
2005	2.823694	2.267654	15.12076	6.041585
2006	2.581956	2.298398	13.05273	6.724458
2007	2.569899	2.527124	12.75224	8.651509
2008	2.291784	2.374496	9.4886	7.440495
2009	2.301099	2.376101	9.80148	8.054179
2010	2.356615	2.501273	10.89955	9.322504

TABLE B.4: Indicators of Product Concentration

Gini, Theil's Entropy Index, and Theil's Decomposition by treatment				
	GINI	GE(0)	GE(1)	GE(2)
2005	0.91884	3.57383	2.53157	16.72343
2006	0.92318	3.64043	2.58605	16.81002
2007	0.92229	3.66823	2.55396	15.28146
2008	0.93196	3.82093	2.84752	25.48601
2009	0.92217	3.68656	2.62719	18.51141
2010	0.92532	3.79645	2.65414	19.10999
	Between GE(1)	Within GE(1)	Between GE(2)	Within GE(2)
2005	0.0018	2.52978	0.00189	16.72154
2006	0.00002	2.58604	0.00002	16.81
2007	0.00195	2.55201	0.00186	15.2796
2008	0.00713	2.84039	0.00656	25.47945
2009	0.00287	2.62418	0.00302	18.50855
2010	0.01018	2.64396	0.00928	19.10071
	Control GE (1)	Treated GE (1)	Control GE (2)	Treated GE (2)
2005	2.53672	2.47872	17.42568	11.98901
2006	2.59353	2.53629	16.95802	15.83962
2007	2.56319	2.47047	15.44652	13.2552
2008	2.87848	2.53394	26.10005	14.15124
2009	2.64373	2.49276	18.86863	14.48558
2010	2.65729	2.54283	19.02241	15.63286

TABLE B.5: Technology-intensiveness of goods (Lall 2000)

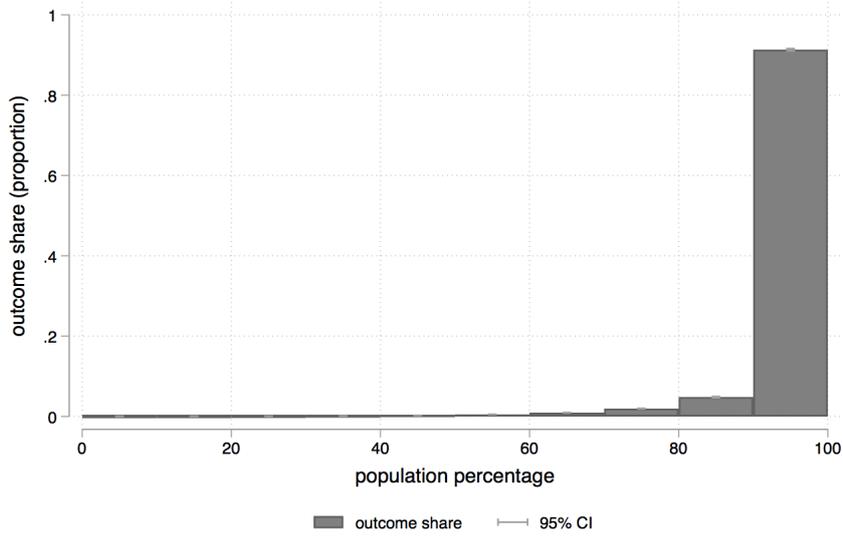
CATEGORY	EXAMPLES	Standard International Trade Classification (SITC) rev. 2
		A. COMMODITIES
Commodities	Fresh fruit, meat, rice, cocoa, tea, coffee, timber, coal, crude petroleum, gas, ore concentrates and scrap.	001, 011, 022, 025, 034, 036, 041, 042, 043, 044, 045, 054, 057, 071, 072, 074, 075, 081, 091, 121, 211, 212, 222, 223, 232, 244, 245, 246, 261, 263, 268, 271, 273, 274, 277, 278, 281, 286, 287, 289, 291, 292, 322, 333, 341.
		B. MANUFACTURES
Natural resource-based manufactures	Prepared meats/fruits, beverages, wood products, vegetable oils, base metals (except steel), petroleum products, cement, gems, glass.	012, 014, 023, 024, 035, 037, 046, 047, 048, 056, 058, 061, 062, 073, 098, 111, 112, 122, 233, 247, 248, 251, 264, 265, 269, 423, 424, 431, 621, 625, 628, 633, 634, 635, 641, 282, 288, 323, 334, 335, 411, 511, 514, 515, 516, 522, 523, 531, 532, 551, 592, 661, 662, 663, 664, 667, 681, 682, 683, 684, 685, 686, 687, 688, 689.
Low-technology manufactures	Textile fabrics, clothing, footwear, leather manufactures, travel goods pottery, simple metal structures, furniture, jewellery, toys, plastic products.	611, 612, 613, 651, 652, 654, 655, 656, 657, 658, 659, 831, 842, 843, 844, 845, 846, 847, 848, 851, 642, 665, 666, 673, 674, 675, 676, 677, 679, 691, 692, 693, 694, 695, 696, 697, 699, 821, 893, 894, 895, 897, 898, 899.
Medium-technology manufactures	Passenger vehicles and parts, commercial vehicles, motorcycles and parts, synthetic fibres, chemicals and paints, fertilizers, plastics, iron and steel, pipes and tubes, engines, motors, industrial machinery, pumps, ships, watches.	781, 782, 783, 784, 785, 266, 267, 512, 513, 533, 553, 554, 562, 572, 582, 583, 584, 585, 591, 598, 653, 671, 672, 678, 786, 791, 882, 711, 713, 714, 721, 722, 723, 724, 725, 726, 727, 728, 736, 737, 741, 742, 743, 744, 745, 749, 762, 763, 772, 773, 775, 793, 812, 872, 873, 884, 885, 951.
High-technology manufactures	Data processing and telecommunications equipment, television sets, transistors, turbines, power generating equipment, pharmaceuticals, aerospace, optical and instruments, cameras.	716, 718, 751, 752, 759, 761, 764, 771, 774, 776, 778, 779, 871, 712, 792, 871, 874, 881.
		C. OTHER TRANSACTIONS
Other	Electricity, cinematograph film, printed matter, special transactions, gold, coins, pets, works of art.	351, 883, 892, 896, 911, 931, 941, 961, 971.

Source: Lall, 2000

C Appendix: Chapter 3

FIGURE C.1: Distribution of Value of Imports

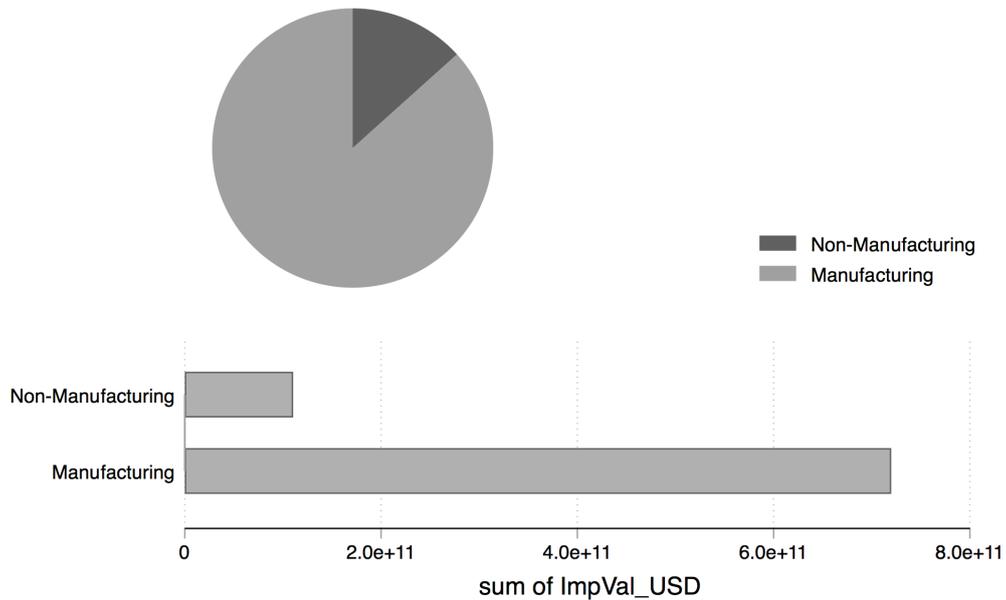
(2004-2014)



Sources: Egypt Import-Export Database)

FIGURE C.2: Total and Average Imports to Manufacturing Industry

(2004-2014)



Pie : Average by category
Bar graph: Sum by category

Sources: Egypt Import-Export Database

TABLE C.1: Selected 4-digit industries and types of political connections

ISIC Rev3.1	ISIC Rev4	Description	CEO	Owner	Any Type	Used in Study
5510	5510	Short term accommodation activities	5	29	35	
4520	4100	Construction of buildings	4	16	21	
7229	6201	Computer programming activities	1	14	18	
5239	4773	Other retail sale in specialized stores	0	11	16	
6712	6612	Security and commodity contracts brokerage	1	10	15	
7020	6820	Real estate activities on a fee or contract basis	3	10	15	
2330	2100	Manufacture of pharmaceuticals	0	2	13	
5139	4663	Wholesale of construction materials, hardware	0	12	13	
1920	2220	Manufacture of plastics products	0	8	12	X
3190	2930	Manufacture of parts for motor vehicles	2	8	11	X
4010	3510	Electric power generation, transmission & distr.	0	7	10	X
7010	6810	Real estate activities own or leased property	1	8	10	
7421	910	Support activities for petroleum & natural gas	0	1	9	X
2694	2394	Manufacture of cement, lime and plaster	1	7	8	X
1810	1410	Manufacture of wearing apparel	2	5	7	X
2710	2410	Manufacture of basic iron and steel	2	7	7	X
5030	4530	Sale of motor vehicle parts and accessories	1	7	7	
1512	1020	Processing and preserving of fish	0	0	0	X
2022	1622	Manufacture of builders' carpentry	0	0	0	X
2029	1629	Manufacture of other products of wood	0	0	0	X
2101	1701	Manufacture of pulp, paper and paperboard	0	0	0	X
2511	2211	Manufacture of rubber tyres and tubes	0	0	0	X
2893	2593	Manufacture of cutlery, hand tools & hardware	0	0	0	X
3238	2670	Manufacture of optical instruments	0	0	0	
2930	2750	Manufacture of domestic appliances	0	0	0	X
2921	2821	Manufacture of agricultural machinery	0	0	0	X
3599	3100	Manufacture of furniture	0	0	0	
5239	4741	Retail sale of computers, software in stores	0	0	0	
5231	4772	Retail sale of pharmaceuticals	0	0	0	
6302	5210	Warehousing and storage	0	0	0	
6420	6110	Wired telecommunications activities	0	0	0	
7412	6920	Accounting, bookkeeping and auditing activities	0	0	0	
7412	7410	Specialized design activities	0	0	0	
7020	8110	Combined facilities support services	0	0	0	

Source: Diwan, Keefer and Schiffbauer, 2014; Chekir and Diwan, 2012

TABLE C.2: Description of main variables

	Variable Descriptions
Import values	The total value of imports per good, per year, per trader.
Connected	A dummy equal to one if imports flow into sectors that are identified as containing at least one government crony.
Reform	A dummy equal to one if the period is after the trade reform in 2008.
Tariffs	Average most favour nation tariff rates per good.
Comparative Advantage	The weighted competitiveness (in terms of prices) of each good on global trade markets, from CEPII and Saint Vaulry (2008b).
Gain in value added	The difference between the value of imports for each good and year, subtracted by the value of the exports for that good and year. This is aggregated on an HS4 level (Harmonized system for goods classification).
Trader ID	Identification number of trader recorded by import authorities.
Industry	ISIC classification of matched goods to industry of import.
Trader groups	The Export-Import Authority's classification of type of traders.
Technological levels	Categorical values corresponding to classification of the technological level of products by Lall (2000).
Gravity model	A common model in trade economics incorporates the fact that trading costs are not empirically null and augment as partners increase in distance (economic and physical). Other characteristics that often augment the model include shared colonial heritage, language or ethnic groups and whether countries are bordering.

Note : The database is a transaction level database where each transaction is recorded with trader id, by goods (HS6), and per observation. As described in the text I convert HS6 into Industry level classifications based on the World Banks correspondence tables.

TABLE C.3: Impact of Reducing Trade Barriers on Connected and Non-Connected Industries on import values (Panel Model)

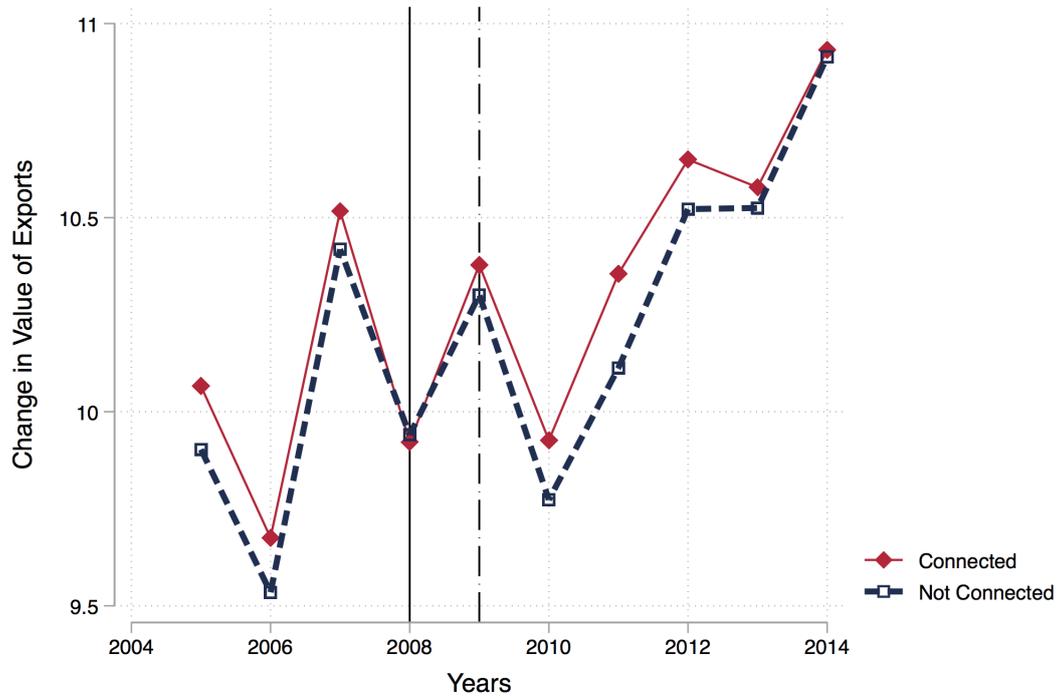
	(1)	(2)	(3)	(4)
Log of Import Value	OLS	OLS	OLS	OLS
Connected *	-0.157***	-0.150***	-0.0282	-0.0251
Post-2008 Reform	(0.0197)	(0.0204)	(0.0213)	(0.0215)
2008 Reforms	0.614***	0.957***	1.044***	-3.894***
	(0.0150)	(0.0222)	(0.0231)	(0.257)
Tariffs		0.0136***	0.00988***	0.0103***
		(0.00169)	(0.00210)	(0.00211)
Non-tariff measures			-0.189**	-0.189**
			(0.0703)	(0.0706)
Comparative Advantage			-0.00111***	-0.00111***
			(0.0000543)	(0.0000610)
Gain in value added				0.0116***
				(0.00319)
Constant	8.751***	8.412***	8.555***	-396.8***
	(0.00697)	(0.0358)	(0.0442)	(22.51)
Observations	282430	263215	252266	249747
Controls	Yes	Yes	Yes	Yes
SE	Trader	Trader	Trader	Industry

Standard errors in parentheses

Basic controls include Industry, Region and Year

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

FIGURE C.3: Change in Egyptian Export Values
(2004-2014)



Sources: Egypt Import-Export Database and Diwan et al. (2014)

TABLE C.4: Changes in Log of Import Values (USD): 1-year lagged results

	(1)	(2)	(3)	(4)
Log of Import Values	OLS	OLS	OLS	OLS
Connected *	-0.269**	-0.218*	-0.218*	-0.473***
Post-2008 Reform +1	(0.0820)	(0.0899)	(0.0917)	(0.0913)
Connected Industries	0.120	0.326***	0.236**	0.0885
	(0.147)	(0.0799)	(0.0764)	(0.0942)
2008 Reforms, 1 year later	0.799***	1.123***	1.020***	2.788***
	(0.0345)	(0.0469)	(0.0519)	(0.527)
Tariffs			-0.0173***	-0.0161***
			(0.00294)	(0.00445)
Non-tariff measures				0.952***
				(0.0677)
Comparative Advantage				0.00261***
				(0.000423)
Gain in value added				0.0933***
				(0.00946)
Constant	8.682***	11.99***	12.39***	180.6***
	(0.173)	(0.111)	(0.134)	(43.57)
Observations	282430	274341	263215	249747
Controls	No	Yes	Yes	Yes + Gravity
SE	Trader	Trader	Trader	Trader

Standard errors in parentheses

Basic controls include Industry, Region Year and Trade Agreements.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.5: Placebo test outcomes on Log of Import Values

	(1)	(2)	(3)	(4)
Log of Import Values	OLS	OLS	OLS	OLS
Connected * Placebo	-0.0598 [0.0549]	-0.0718 [0.0535]	-0.0292 [0.0534]	-0.0561 [0.0424]
Connected Industries	0.146 [0.147]	0.315*** [0.0675]	-0.0517 [0.0766]	-0.151* [0.0677]
Placebo Reforms	-0.161** [0.0549]	0.458*** [0.0527]	0.0424 [0.0711]	-0.0535 [0.0438]
Tariffs			-0.0157** [0.00467]	-0.0105 [0.00517]
Comparative Advantage			0.00380*** [0.000541]	0.00434*** [0.000513]
Gain in value added				0.0818*** [0.0104]
Constant	8.761*** [0.153]	12.35*** [0.148]	12.98*** [0.219]	-30.30*** [3.308]
Observations	129874	123926	111922	110727
Controls	No	Yes	Yes	Yes + Gravity
SE	Trader	Trader	Trader	Trader

Standard errors in brackets

Basic controls include Industry, Region and Year.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.6: Impact of Reducing Trade Barriers on Connected and Non-Connected Industries (Export values)

	(1)	(2)	(3)	(4)
Log of Export Values	OLS	OLS	Panel	Panel
Connected *	-0.0345	-0.0345	-0.0355	-0.0355
Post-2008 Reform	(0.0711)	(0.0270)	(0.0575)	(0.0263)
Connected Industry	0.177***	0.177*	0.177***	0.177*
	(0.0421)	(0.0769)	(0.0518)	(0.0763)
2008 Reforms	0.277	0.277***	0.282***	0.282***
	(0.145)	(0.0309)	(0.0693)	(0.0317)
Constant	10.01***	10.01***	10.01***	10.01***
	(0.101)	(0.0490)	(0.0717)	(0.0488)
Observations	39566	39566	39566	39566
Basic Controls	Yes	Yes	Yes	Yes
SE	Trader	Industry	Trader	Industry

Standard errors in parentheses

Controls include Industry, Country, Year and Trade Agreements.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.7: Impact of Reducing Trade Barriers on Connected and Non-Connected Industries, without imports from "Free Zones."

	(1)	(2)	(3)	(4)
	OLS	OLS	IV	No FZ
Connected * Post-2008 Reform	-0.136 (0.0728)	-0.457*** (0.0644)	-0.447*** (0.0686)	-0.456*** (0.0644)
Connected Industry	0.299*** (0.0750)	0.136 (0.0841)	0.148 (0.0762)	0.136 (0.0841)
2008 Reforms	1.073*** (0.0437)	2.775*** (0.512)	2.803*** (0.491)	2.774*** (0.514)
Tariffs		-0.0163*** (0.00444)	-0.0107*** (0.00188)	-0.0163*** (0.00444)
Non-tariff measures		0.947*** (0.0685)	0.958*** (0.0610)	0.948*** (0.0685)
Comparative Advantage		0.00260*** (0.000440)	0.00258*** (0.000413)	0.00260*** (0.000440)
Gain in value added		0.0948*** (0.00934)	0.0985*** (0.0119)	0.0948*** (0.00934)
Log of Bilateral Distance (-)		-0.200* (0.0795)	-0.197** (0.0748)	-0.200* (0.0794)
Log of GDP (EGY, 2010 USD)		-6.136** (1.700)	-6.154*** (1.675)	-6.135** (1.704)
Log of GDP (2010 USD)		-0.417*** (0.0532)	-0.417*** (0.0521)	-0.417*** (0.0531)
Log of GDP per worker (2010 USD)		-0.214*** (0.0320)	-0.212*** (0.0306)	-0.214*** (0.0320)
Adjacency=1		0.870** (0.266)	0.868*** (0.260)	0.870** (0.265)
Constant	12.01*** (0.107)	180.2*** (43.43)	180.7*** (42.80)	180.2*** (43.55)
Observations	274341	249747	249747	249881
Controls	No	Yes	Yes	Yes
SE	Trader	Trader	Trader	Trader

Standard errors in parentheses

Basic controls include Industry, Region and Year

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.8: Impact of Reducing Trade Barriers on Connected and Non-Connected Industries, by relatively high and low numbers of connections per industry.

	(1)	(2)	(3)
Log of Import Values	Full	High	Low
Connected *	-0.102*	-1.144***	0.799***
Post-2008 Reform	(0.0447)	(0.0457)	(0.0339)
Connected Industry	-0.338***	-0.0944	-0.576***
	(0.0574)	(0.0625)	(0.0432)
2008 Reforms	-16.41***	-15.84***	-18.80***
	(1.347)	(1.376)	(1.204)
Tariffs	-0.0223***	-0.0253***	-0.0244***
	(0.00474)	(0.00469)	(0.00484)
Non-tariff measures	0.459***	0.427***	0.394***
	(0.0533)	(0.0440)	(0.0470)
Comparative Advantage	0.00241***	0.00196***	0.00193***
	(0.000244)	(0.000217)	(0.000211)
Gain in value added	0.0350***	0.0327***	0.0355***
	(0.00582)	(0.00564)	(0.00506)
Log of Missing Imports (under)	0.343***	0.339***	0.349***
	(0.0119)	(0.0118)	(0.0114)
SD of Missing Imports (under)	-1.003***	-0.929***	-0.950***
	(0.101)	(0.0959)	(0.0986)
Constant	-1600.2***	-1559.7***	-1771.9***
	(123.3)	(125.5)	(109.2)
Observations	110636	110636	110636
Controls	Yes	Yes	Yes
SE	Trader	Trader	Trader

Standard errors in parentheses.

Controls include Industry, Region, Year, Trade Agreement and Gravity.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

FIGURE C.4: Distribution of log of differences (under-reporting), by year

Distribution by group, base EID

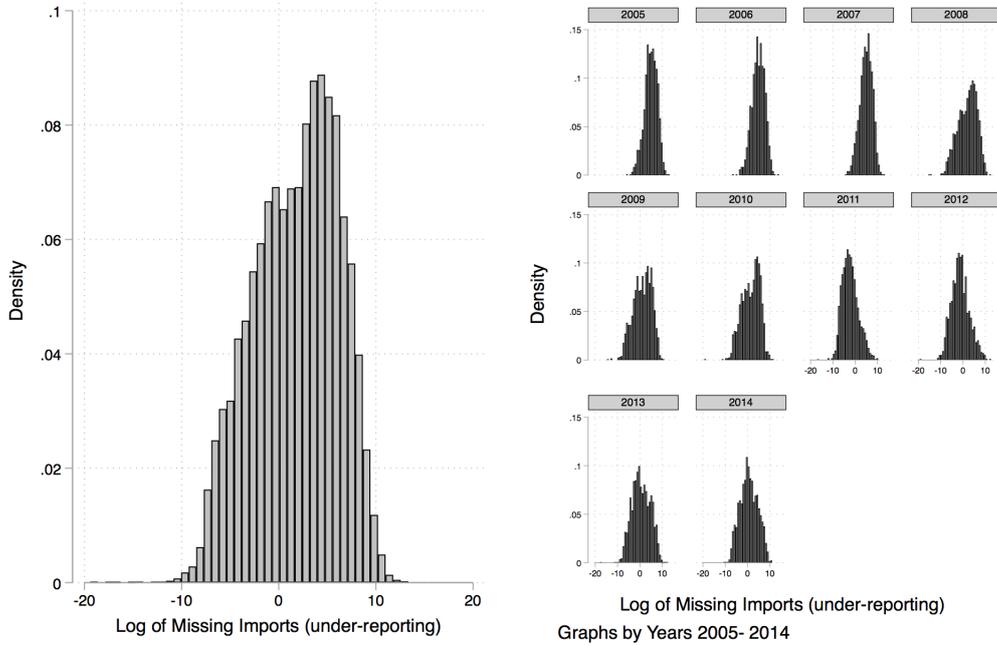
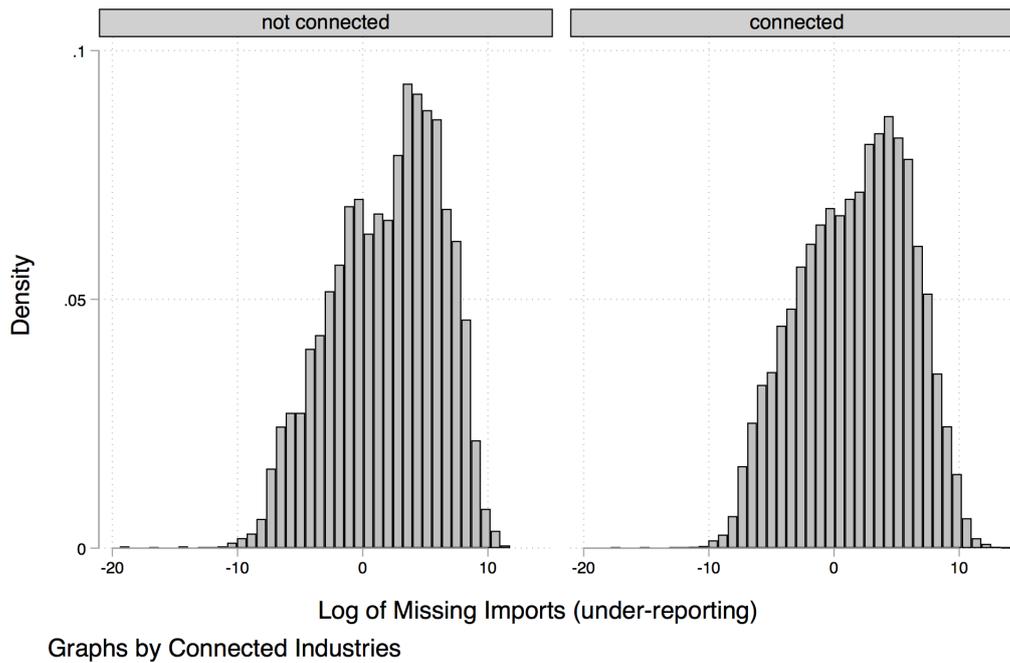


FIGURE C.5: Distribution of log of differences (under-reporting), by group

Distribution by group, base EID



Source: TRAINS and EID

FIGURE C.6: Distribution of log of differences (under-reporting), by industry

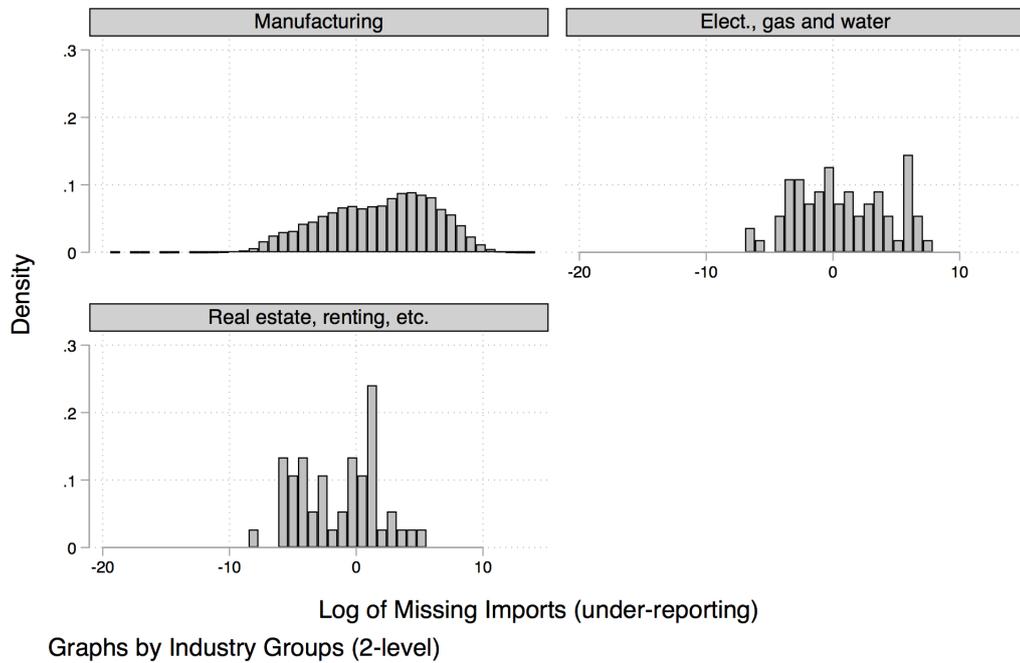
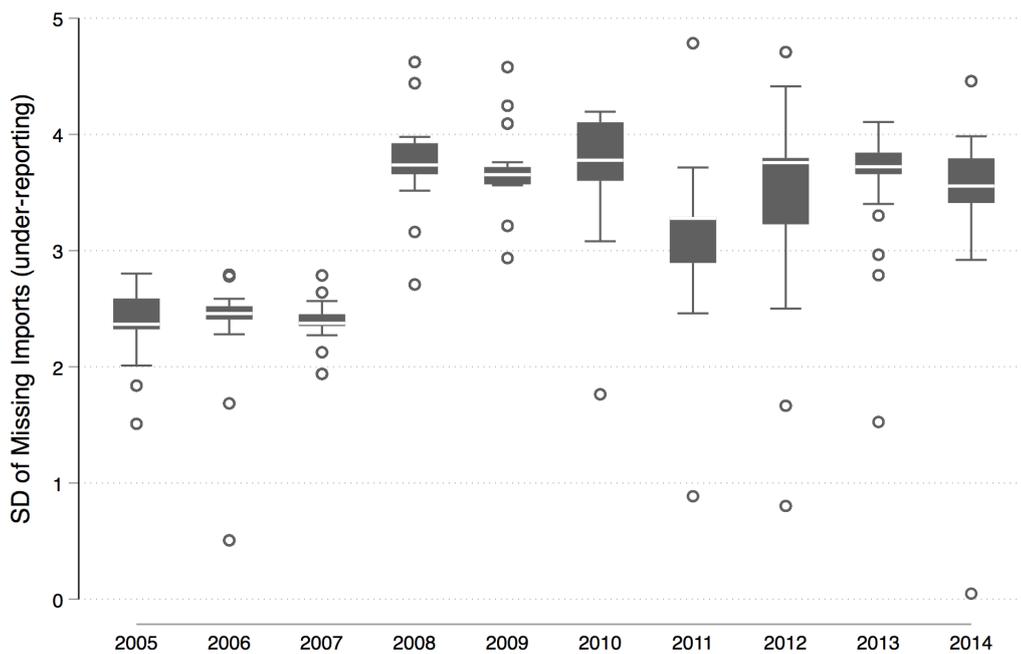
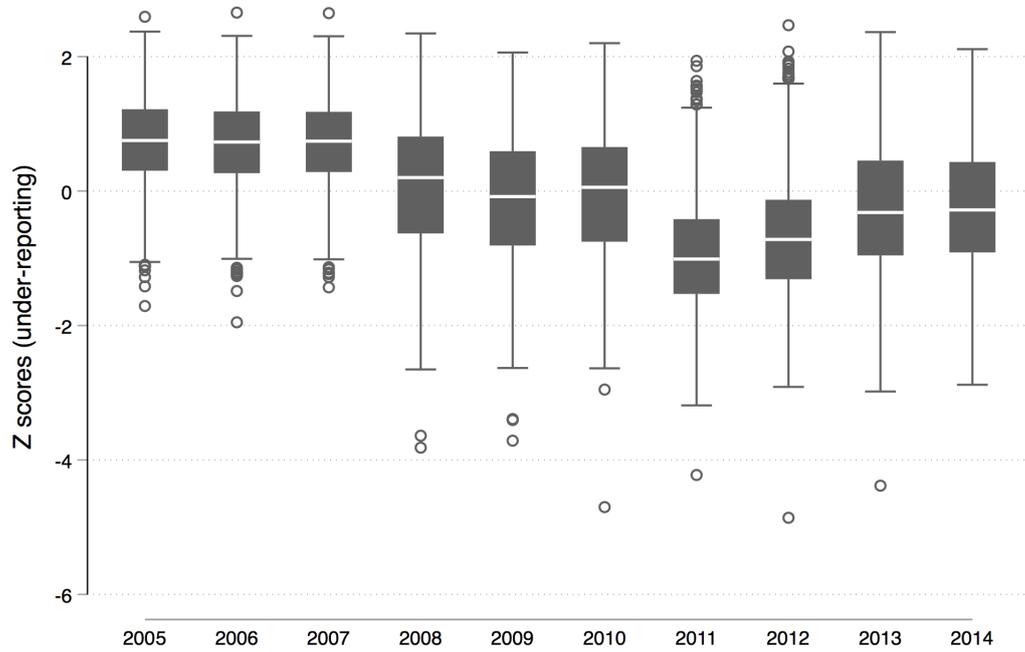


FIGURE C.7: Distribution of standard deviation of the log differences, by year



Source: TRAINS and EID

FIGURE C.8: Distribution of z-scores of the log differences, by year



Source: TRAINS and EID

FIGURE C.9: Log of Differences, by Trade Agreement

Distribution by group

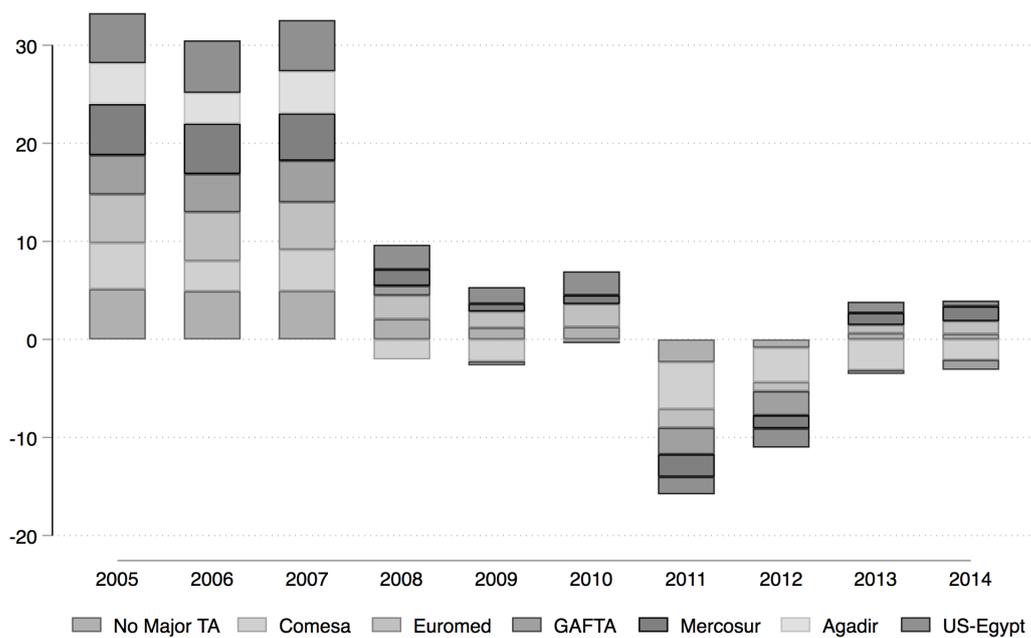


FIGURE C.10: **Log of Differences, by Year**
Distribution by group

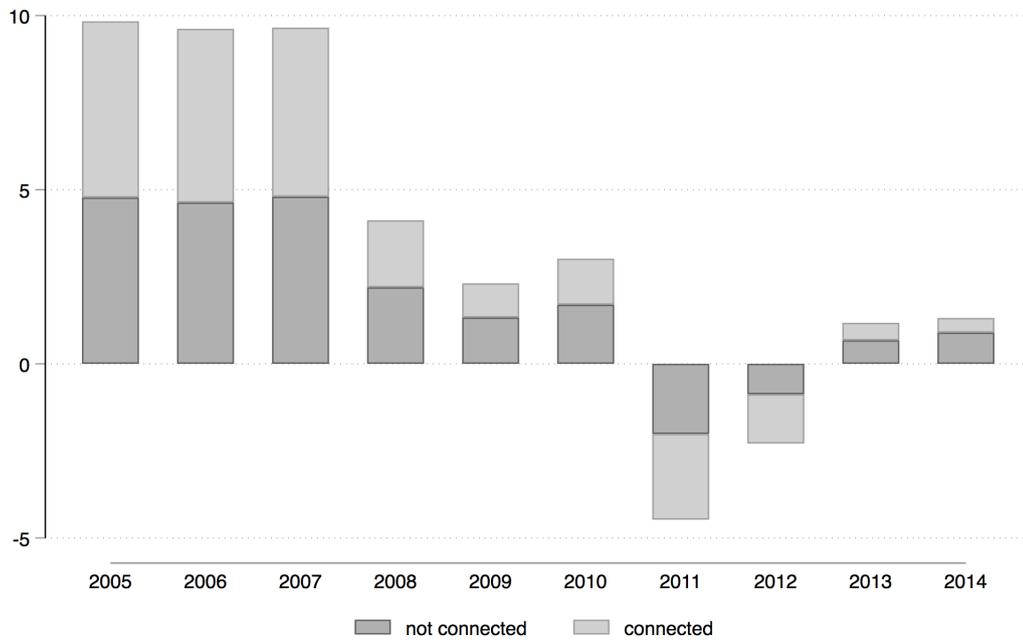
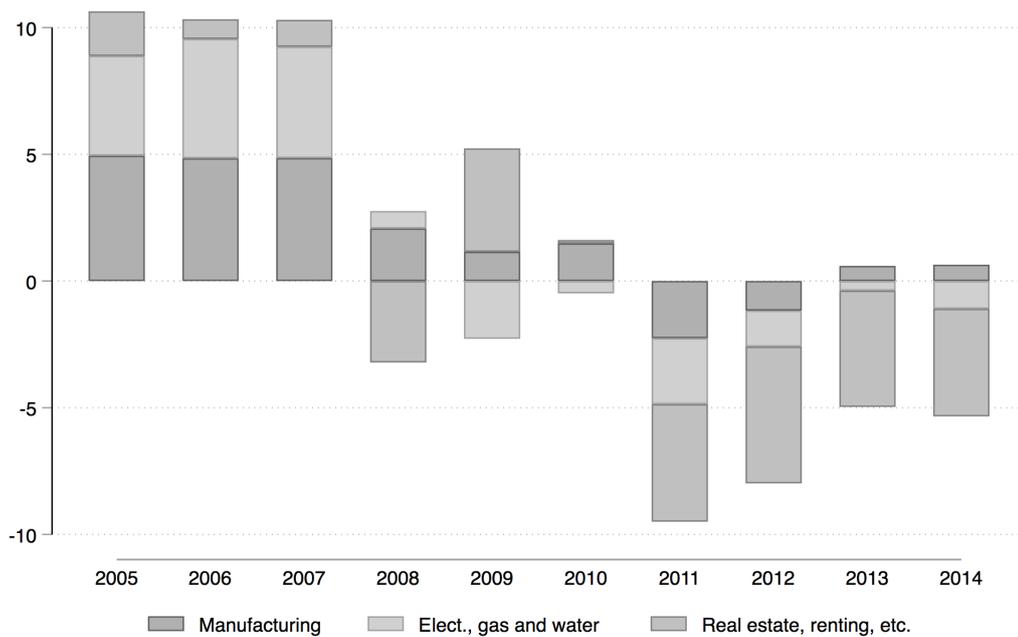


FIGURE C.11: **Log of Differences, by Industry Groups**
Distribution by group



Source: TRAINS and EID

Bibliography

- Abadie, Alberto and Guido W Imbens (2006). "Large sample properties of matching estimators for average treatment effects". In: *econometrica* 74.1, pp. 235–267.
- Acemoglu, Daron and David Autor (2011). "Skills, tasks and technologies: Implications for employment and earnings". In: *Handbook of labor economics*. Vol. 4. Elsevier, pp. 1043–1171.
- Acemoglu, Daron, Simon Johnson, and James A Robinson (2005). "Institutions as a fundamental cause of long-run growth". In: *Handbook of economic growth* 1, pp. 385–472.
- Acemoglu, Daron and Pascual Restrepo (2018). "The race between man and machine: Implications of technology for growth, factor shares, and employment". In: *American Economic Review* 108.6, pp. 1488–1542.
- Acemoglu, Daron and James A Robinson (2008). "Persistence of power, elites, and institutions". In: *American Economic Review* 98.1, pp. 267–93.
- Altug, Sumru, Alpay Filiztekin, and Şevket Pamuk (2008). "Sources of long-term economic growth for Turkey, 1880–2005". In: *European Review of Economic History* 12.3, pp. 393–430.
- Amara, Meftah (2016). *Travaux de la Commission Nationale de préparation du débat sur la Productivité: l'amélioration de la productivité et le développement de la Compétitivité du secteur industriel*. Tech. rep.
- Angel-Urdinola, Diego F, Antonio Nucifora, and David Robalino (2015). "Labor Policy to Promote Good Jobs in Tunisia". In: *Revisiting Labor Regulation, Social Security, and Active Labor Market Programs (Directions in Development Human Development)*, Washington, DC.
- Augier, Patricia et al. (2012). "Non-tariff measures in the MNA region: Improving governance for competitiveness". In: *MENA Region World Paper* 56.
- Bárány, Zsófia L and Christian Siegel (2018). "Job polarization and structural change". In: *American Economic Journal: Macroeconomics* 10.1, pp. 57–89.

- Barro, Robert J and Jong Wha Lee (2013). "A new data set of educational attainment in the world, 1950–2010". In: *Journal of development economics* 104, pp. 184–198.
- Bellin, Eva Rana (2002). *Stalled democracy: Capital, labor, and the paradox of state-sponsored development*. Cornell University Press.
- Ben Khalifa, Adel (2017). *Une analyse de l'impact du Programme de Mise à Niveau sur la diffusion des TIC dans les entreprises tunisiennes*. Tech. rep. ITCEQ.
- Bensassi, Sami and Joachim Jarreau (2019). "Price discrimination in bribe payments: Evidence from informal cross-border trade in West Africa". In: *World Development* 122, pp. 462–480.
- Berg, Gerard J van den and Johan Vikström (2019). "Long-Run Effects of Dynamically Assigned Treatments: A New Methodology and an Evaluation of Training Effects on Earnings". In:
- Berman, Eli, John Bound, and Stephen Machin (1998). "Implications of skill-biased technological change: international evidence". In: *The Quarterly Journal of Economics* 113.4, pp. 1245–1279.
- Bernini, Cristina, Augusto Cerqua, and Guido Pellegrini (2017). "Public subsidies, TFP and efficiency: A tale of complex relationships". In: *Research Policy* 46.4, pp. 751–767.
- Bertrand, Marianne et al. (2016). "The costs of bureaucratic rigidity: Evidence from the Indian Administrative Service". In: *Unpublished working paper*. University of Chicago.
- Besley, Timothy, Jose G Montalvo, and Marta Reynal-Querol (2011). "Do educated leaders matter?" In: *The Economic Journal* 121.554.
- Bibi, Sami and Mustapha K Nabli (2009). "Income inequality in the Arab region: Data and measurement, patterns and trends". In: *Middle East Development Journal* 1.02, pp. 275–314.
- Buera, Francisco J, Joseph P Kaboski, and Richard Rogerson (2015). *Skill biased structural change*. Tech. rep. National Bureau of Economic Research.
- Cadot, Olivier, Céline Carrère, and Vanessa Strauss-Kahn (2011). "Export diversification: What's behind the hump?" In: *Review of Economics and Statistics* 93.2, pp. 590–605.
- Cadot, Olivier, Ana M. Fernandes, et al. (2015). "Are the benefits of export support durable? Evidence from Tunisia". In: *Journal of International Economics* 97.2, pp. 310–324. ISSN: 0022-1996. DOI: <https://doi.org/10.1016/j.jinteco.2015.05.001>.

- 1016/j.jinteco.2015.07.005. URL: <https://www-sciencedirect-com.proxy.bu.dauphine.fr/science/article/pii/S0022199615001208>.
- Caliendo, Marco and Sabine Kopeinig (2008). "Some practical guidance for the implementation of propensity score matching". In: *Journal of economic surveys* 22.1, pp. 31–72.
- Cammett, Melani (2007). "Business–government relations and industrial change: The politics of upgrading in Morocco and Tunisia". In: *World development* 35.11, pp. 1889–1903.
- Caselli, Francesco and Wilbur John Coleman II (2001). "The US structural transformation and regional convergence: A reinterpretation". In: *Journal of political Economy* 109.3, pp. 584–616.
- CEPII and Alix de Saint Vaulry (2008a). *Base de données CHELEM-commerce international du CEPII*. CEPII.
- (2008b). *Base de données CHELEM-commerce international du CEPII*. CEPII.
- Chakravarty, Shubha et al. (2019). "Vocational training programs and youth labor market outcomes: Evidence from Nepal". In: *Journal of Development Economics* 136, pp. 71–110. ISSN: 0304-3878. DOI: <https://doi.org/10.1016/j.jdeveco.2018.09.002>. URL: <http://www.sciencedirect.com/science/article/pii/S0304387818304796>.
- Chattopadhyay, Raghavendra and Esther Duflo (2004). "Women as policy makers: Evidence from a randomized policy experiment in India". In: *Econometrica* 72.5, pp. 1409–1443.
- Chekir, Hamouda and Ishac Diwan (2014a). "Crony capitalism in Egypt". In: *Journal of Globalization and Development* 5.2, pp. 177–211.
- (2014b). "Crony capitalism in Egypt". In: *Journal of Globalization and Development* 5.2, pp. 177–211.
- Claessens, Stijn, Erik Feijen, and Luc Laeven (2008). "Political connections and preferential access to finance: The role of campaign contributions". In: *Journal of financial economics* 88.3, pp. 554–580.
- Coase, Ronald H (1937). "The nature of the firm". In: *economica* 4.16, pp. 386–405.
- Corruption Perceptions Index* (2018). URL: <https://www.transparency.org/research/cpi/overview>.
- Coulomb, Renaud and Marc Sangnier (2014). "The impact of political majorities on firm value: Do electoral promises or friendship connections matter?" In: *Journal of Public Economics* 115, pp. 158–170.

- Criscuolo, Chiara et al. (2019). "Some causal effects of an industrial policy". In: *American Economic Review* 109.1, pp. 48–85.
- Davies, Ronald B (2013). "The silver lining of red tape". In: *Journal of Public Economics* 101, pp. 68–76.
- Dehejia, Rajeev H and Sadek Wahba (2002). "Propensity score-matching methods for nonexperimental causal studies". In: *Review of Economics and Statistics* 84.1, pp. 151–161.
- Diwan, Ishac, Philip Keefer, and Marc Schiffbauer (2014). "On top of the Pyramids: Cronyism and Private Sector Growth in Egypt". In: *World Bank mimeo*.
- Diwan, Ishac and El Mouhoub Mouhoud (2016). "The Economies of the Middle East and North Africa". In: ed. by Ishac Diwan and Ahmad Galal. Palgrave, London. Chap. Regional and Global Integration in the Middle east and North Africa.
- Dix-Carneiro, Rafael and Brian K Kovak (2015). "Trade liberalization and the skill premium: A local labor markets approach". In: *American Economic Review* 105.5, pp. 551–57.
- Dixit, Avinash (2003). "Trade expansion and contract enforcement". In: *Journal of Political Economy* 111.6, pp. 1293–1317.
- Djankov, Simeon, Edward Glaeser, et al. (2003). "The new comparative economics". In: *Journal of comparative economics* 31.4, pp. 595–619.
- Djankov, Simeon, Rafael La Porta, et al. (2002). "The regulation of entry". In: *The Quarterly Journal of Economics* 117.1, pp. 1–37.
- Dreher, Axel, Jan-Egbert Sturm, and James Raymond Vreeland (2009). "Development aid and international politics: Does membership on the UN Security Council influence World Bank decisions?" In: *Journal of Development Economics* 88.1, pp. 1–18.
- Duarte, Margarida and Diego Restuccia (2010). "The role of the structural transformation in aggregate productivity". In: *The Quarterly Journal of Economics* 125.1, pp. 129–173.
- Dutt, Pushan and Daniel Traca (2010). "Corruption and bilateral trade flows: extortion or evasion?" In: *The Review of Economics and Statistics* 92.4, pp. 843–860.
- Eibl, Ferdinand and Adeel Malik (2016). "The Politics of Partial Liberalization: Cronyism and Non-Tari Protection in Mubarak's Egypt". In:

- Einiö, Elias (2014). "R&D subsidies and company performance: Evidence from geographic variation in government funding based on the ERDF population-density rule". In: *Review of Economics and Statistics* 96.4, pp. 710–728.
- Faccio, Mara, Ronald W Masulis, and John J McConnell (2006). "Political connections and corporate bailouts". In: *The Journal of Finance* 61.6, pp. 2597–2635.
- Fan, Joseph PH, Tak Jun Wong, and Tianyu Zhang (2007). "Politically connected CEOs, corporate governance, and Post-IPO performance of China's newly partially privatized firms". In: *Journal of financial economics* 84.2, pp. 330–357.
- Feenstra, Robert C, Robert Inklaar, and Marcel P Timmer (2015a). "The next generation of the Penn World Table". In: *American Economic Review* 105.10, pp. 3150–82.
- (2015b). "The next generation of the Penn World Table". In: *American Economic Review* 105.10, pp. 3150–82.
- Ferguson, Thomas and Hans-Joachim Voth (2008). "Betting on Hitler—the value of political connections in Nazi Germany". In: *The Quarterly Journal of Economics* 123.1, pp. 101–137.
- Fernandes, Ana M., Caroline Freund, and Martha Denisse Pierola (2016). "Exporter behavior, country size and stage of development: Evidence from the exporter dynamics database". In: *Journal of Development Economics* 119, pp. 121–137. ISSN: 0304-3878. DOI: <https://doi.org/10.1016/j.jdeveco.2015.10.007>. URL: <http://www.sciencedirect.com/science/article/pii/S0304387815001182>.
- Filiztekin, Alpay (2000). "Openness and productivity growth in Turkish manufacturing". In: *Yale University (Australia)*.
- Fisman, Raymond (2001). "Estimating the value of political connections". In: *The American economic review* 91.4, pp. 1095–1102.
- Fisman, Raymond and Shang-Jin Wei (2004). "Tax rates and tax evasion: evidence from "missing imports" in China". In: *Journal of political Economy* 112.2, pp. 471–496.
- (2009). "The smuggling of art, and the art of smuggling: Uncovering the illicit trade in cultural property and antiques". In: *American Economic Journal: Applied Economics* 1.3, pp. 82–96.

- Franck, Raphael and Ilia Rainer (2012). "Does the leader's ethnicity matter? Ethnic favoritism, education, and health in sub-Saharan Africa". In: *American Political Science Review* 106.2, pp. 294–325.
- Freund, Caroline (2016). *Rich People Poor Countries: The Rise of Emerging-Market Tycoons and their Mega Firms*. Peterson Institute for International Economics.
- Freund, Caroline and Martha Denisse Pierola (2015). "Export Superstars". In: *The Review of Economics and Statistics* 97.5, pp. 1023–1032. DOI: 10.1162/REST_a_00511. eprint: https://doi.org/10.1162/REST_a_00511. URL: https://doi.org/10.1162/REST_a_00511.
- Gatti, Roberta et al. (2013). *Jobs for shared prosperity: Time for action in the Middle East and North Africa*. World Bank Publications.
- Ghali, Sofiane et al. (2013). "Effects of NTMs on the Extensive and Intensive Margins to Trade: The Case of Tunisia and Egypt". In: *ERF Working Paper Series*, 820.
- Gollin, Douglas, David Lagakos, and Michael E Waugh (2013). "The agricultural productivity gap". In: *The Quarterly Journal of Economics* 129.2, pp. 939–993.
- Hall, Robert E and Charles I Jones (1999). *Why do some countries produce so much more output per worker than others?* Tech. rep. National bureau of economic research.
- Hansen, Bent (1991). *Egypt and Turkey: Political Economy of Poverty, Equity and Growth*. World Bank.
- Hanushek, Eric A and Ludger Woessmann (2008). "The role of cognitive skills in economic development". In: *Journal of economic literature* 46.3, pp. 607–68.
- Hassine, Nadia Belhaj (2014). *Economic inequality in the Arab region*. The World Bank.
- Hausman, Jerry A and Gregory K Leonard (2002). "The competitive effects of a new product introduction: A case study". In: *The Journal of Industrial Economics* 50.3, pp. 237–263.
- Hendricks, Lutz (2010). "Cross-country variation in educational attainment: structural change or within-industry skill upgrading?" In: *Journal of economic growth* 15.3, pp. 205–233.
- Hendy, Rana and Chahir Zaki (2014). "Trade Facilitation and Firms Exports: The Case of Egypt". In: *Economic Research Forum (ERF), Working Paper 843*.

- Herrendorf, Berthold and Akos Valentinyi (2012). "Which sectors make poor countries so unproductive?" In: *Journal of the European Economic Association* 10.2, pp. 323–341.
- Hertog, Steffen (2011). *Princes, brokers, and bureaucrats: Oil and the state in Saudi Arabia*. Cornell University Press.
- Hirano, Keisuke, Guido W Imbens, and Geert Ridder (2003). "Efficient estimation of average treatment effects using the estimated propensity score". In: *Econometrica* 71.4, pp. 1161–1189.
- Hirschman, Albert O (1970). *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states*. Vol. 25. Harvard university press.
- Hottenrott, Hanna, Cindy Lopes-Bento, and Reinhilde Veugelers (2017). "Direct and cross scheme effects in a research and development subsidy program". In: *Research Policy* 46.6, pp. 1118–1132.
- Hsieh, Chang-Tai and Benjamin A Olken (2014). "The missing "missing middle"". In: *Journal of Economic Perspectives* 28.3, pp. 89–108.
- Imbens, Guido W and Jeffrey M Wooldridge (2009). "Recent developments in the econometrics of program evaluation". In: *Journal of economic literature* 47.1, pp. 5–86.
- Issawi, Charles (1982). *An Economic History of the Middle East and North Africa*. Columbia University Press.
- Johnson, Simon and Todd Mitton (2003). "Cronyism and capital controls: evidence from Malaysia". In: *Journal of financial economics* 67.2, pp. 351–382.
- Jones, Benjamin and Benjamin Olken (2005). "Do leaders matter? National leadership and growth since World War II". In: *The Quarterly Journal of Economics* 120.3, pp. 835–864.
- Karakoç, Ulaş, Şevket Pamuk, and Laura Panza (2017). "Industrialization in Egypt and Turkey, 1870-2010". In: *The Spread of Modern Industry to the Periphery since 1871*. Oxford University Press, pp. 142–65.
- Karray, Zouhour (June 2016). *Boosting World Trade in Tunisia and Egypt by Cutting Non-tariff Barriers: Better Imports for Better Exports*. ERF Policy Briefs 14. Economic Research Forum.
- Khwaja, Asim Ijaz and Atif Mian (2005). "Do lenders favor politically connected firms? Rent provision in an emerging financial market". In: *The Quarterly Journal of Economics* 120.4, pp. 1371–1411.

- King, Gary and Richard Nielsen (2016). "Why propensity scores should not be used for matching". In: *Copy at [http://j. mp/1sexgVw](http://j.mp/1sexgVw) Download Citation BibTex Tagged XML Download Paper 378*.
- Lall, Sanjaya (2000). "The Technological structure and performance of developing country manufactured exports, 1985-98". In: *Oxford development studies* 28.3, pp. 337-369.
- Loewe, Markus (2013). "Industrial policy in Egypt 2004-2011". In: *Deutsches Institut für Entwicklungspolitik Discussion Paper* 13.
- Lui, Francis T (1985). "An equilibrium queuing model of bribery". In: *Journal of political economy* 93.4, pp. 760-781.
- Malik, Adeel and Bassem Awadallah (2013). "The economics of the Arab Spring". In: *World Development* 45, pp. 296-313.
- Marouani, Mohamed Ali and Rim Mouelhi (2015). "Contribution of structural change to productivity growth: Evidence from Tunisia". In: *Journal of African Economies* 25.1, pp. 110-132.
- McKenzie, David, Nabila Assaf, and Ana Paula Cusolito (2017). "The additional impact of a matching grant programme for small firms: experimental evidence from Yemen". In: *Journal of Development Effectiveness* 9.1, pp. 1-14.
- McMillan, Margaret S and Dani Rodrik (2011). *Globalization, structural change and productivity growth*. Tech. rep. National Bureau of Economic Research.
- McMillan, Margaret, Dani Rodrik, and Íñigo Verduzco-Gallo (2014). "Globalization, structural change, and productivity growth, with an update on Africa". In: *World Development* 63, pp. 11-32.
- Mercier, Marion (2016). "The return of the prodigy son: Do return migrants make better leaders?" In: *Journal of Development Economics* 122, pp. 76-91.
- Mishra, Prachi, Arvind Subramanian, and Petia Topalova (2008). "Tariffs, enforcement, and customs evasion: Evidence from India". In: *Journal of public Economics* 92.10, pp. 1907-1925.
- MOF (Dec. 2010). *Egyptian Economic Monitor*. Tech. rep. 2. Arab Republic of Egypt, Ministry of Finance. URL: http://www.mof.gov.eg/mofgallerysource/english/pdf/monitor_dec_web.pdf.
- Mouhoud, El Mouhoub (2012). "Political economy of Arab revolutions: Analysis and prospects for North-African countries". In: *Mondes en développement* 2, pp. 35-50.

- Murphy, Emma C (2006). "The Tunisian Mise à Niveau programme and the political economy of reform". In: *New Political Economy* 11.4, pp. 519–540.
- Naccache, Sonia (2009). "The Political Economy of Trade Policy in Tunisia". In: *Middle East Development Journal* 1.1, pp. 31–58.
- Ngai, L Rachel and Christopher A Pissarides (2007). "Structural change in a multisector model of growth". In: *American economic review* 97.1, pp. 429–443.
- North, Douglass C (1990). *Institutions, institutional change and economic performance*. Cambridge university press.
- Business Climate Development Strategy: Phase 1 Policy Assessment* (July 2010). Organisation for Economic Co-operation and Development.
- Olken, Benjamin A and Patrick Barron (2009). "The simple economics of extortion: evidence from trucking in Aceh". In: *Journal of Political Economy* 117.3, pp. 417–452.
- Owen, E. R. J. and Sevkett Pamuk (1998). *A history of Middle East economies in the twentieth century*. Harvard University Press.
- Pemstein, Daniel et al. (2018). "The V-Dem measurement model: latent variable analysis for cross-national and cross-temporal expert-coded data". In: Pritchett, Lant (2001). "Where has all the education gone?" In: *The world bank economic review* 15.3, pp. 367–391.
- Rajan, Raghuram G and Luigi Zingales (2003). "The great reversals: the politics of financial development in the twentieth century". In: *Journal of financial economics* 69.1, pp. 5–50.
- Restuccia, Diego, Dennis Tao Yang, and Xiaodong Zhu (2008). "Agriculture and aggregate productivity: A quantitative cross-country analysis". In: *Journal of monetary economics* 55.2, pp. 234–250.
- Richards, Alan et al. (2013). *A political economy of the Middle East*. Westview Press.
- Rijkers, Bob, Hassen Arouri, and Leila Baghdadi (2017). "Are Politically Connected Firms More Likely to Evade Taxes? Evidence from Tunisia". In: *The World Bank Economic Review* 30.Supplement_1, S166–S175.
- Rijkers, Bob, Hassen Arouri, Caroline Freund, et al. (2014). "Which firms create the most jobs in developing countries? Evidence from Tunisia". In: *Labour Economics* 31, pp. 84–102.

- Rijkers, Bob, Leila Baghdadi, and Gael Raballand (2015). "Political Connections and Tariff Evasion Evidence from Tunisia". In: *The World Bank Economic Review*, lhv061.
- Rijkers, Bob, Caroline Freund, and Antonio Nucifora (2017a). "All in the family: state capture in Tunisia". In: *Journal of development economics* 124, pp. 41–59.
- (2017b). "All in the family: state capture in Tunisia". In: *Journal of development economics* 124, pp. 41–59.
- Rodrik, Dani (2008). "Normalizing industrial policy". In:
- Roll, Stephan (2010). "'Finance matters!' The influence of financial sector reforms on the development of the entrepreneurial elite in Egypt". In: *Mediterranean Politics* 15.3, pp. 349–370.
- Rosenbaum, Paul R and Donald B Rubin (1983). "The central role of the propensity score in observational studies for causal effects". In: *Biometrika* 70.1, pp. 41–55.
- Rougier, Eric (2016). "'Fire in Cairo': Authoritarian–Redistributive Social Contracts, Structural Change, and the Arab Spring". In: *World Development* 78, pp. 148–171.
- Saint Vulry, Alix de (2008). *Base de données CHELEM - Commerce international du CEPII*. Working Papers 2008-09. CEPII. URL: <http://www.cepii.fr/CEPII/fr/publications/wp/abstract.asp?NoDoc=1081>.
- Scott, James C (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press.
- Sequeira, Sandra (2016). "Corruption, trade costs, and gains from tariff liberalization: evidence from Southern Africa". In: *The American Economic Review* 106.10, pp. 3029–3063.
- Sequeira, Sandra and Simeon Djankov (2014). "Corruption and firm behavior: Evidence from African ports". In: *Journal of International Economics* 94.2, pp. 277–294.
- Sfakianakis, John (2004). "The whales of the Nile: Networks, businessmen, and bureaucrats during the era of privatization in Egypt". In: *Networks of Privilege in the Middle East: The politics of economic reform revisited*. Springer, pp. 77–100.
- Shapiro, Carl (1983a). "Optimal pricing of experience goods". In: *The Bell Journal of Economics*, pp. 497–507.

- (1983b). “Premiums for high quality products as returns to reputations”. In: *The quarterly journal of economics* 98.4, pp. 659–679.
- Sheng, Liugang and Dennis Tao Yang (2016). “Expanding export variety: The role of institutional reforms in developing countries”. In: *Journal of Development Economics* 118, pp. 45–58.
- Shleifer, Andrei and Robert W Vishny (1993). “Corruption”. In: *The quarterly journal of economics* 108.3, pp. 599–617.
- Sianesi, Barbara and John Van Reenen (2003). “The returns to education: Macroeconomics”. In: *Journal of economic surveys* 17.2, pp. 157–200.
- Teixeira, Aurora AC and Anabela SS Queirós (2016). “Economic growth, human capital and structural change: A dynamic panel data analysis”. In: *Research Policy* 45.8, pp. 1636–1648.
- Theil, Henry (1972). *Statistical decomposition analysis; with applications in the social and administrative sciences*. Tech. rep.
- Tilly, Charles (1978). *From mobilization to revolution*. McGraw-Hill College.
- Topalova, Petia and Amit Khandelwal (2011). “Trade liberalization and firm productivity: The case of India”. In: *Review of economics and statistics* 93.3, pp. 995–1009.
- V-dem (country-year/country-date) dataset v8. *Varieties of Democracy (V-Dem) Project*. (2017). DOI: <https://doi.org/10.23696/vdemcy18>.
- Wallsten, Scott J (2000). “The effects of government-industry R&D programs on private R&D: the case of the Small Business Innovation Research program”. In: *The RAND Journal of Economics*, pp. 82–100.
- Wolfram, Catherine D (1999). “Measuring duopoly power in the British electricity spot market”. In: *American Economic Review* 89.4, pp. 805–826.
- World Bank Development Indicators (2019). URL: <http://data.worldbank.org>.

RÉSUMÉ

Les succès et les échecs des politiques publiques sont, en large partie, influencés par le contexte politique et institutionnel des économies. Cette thèse analyse la manière dont les résultats socio-économiques des pays de la région MENA sont déterminées par l'environnement institutionnel et politique des différents pays. Trois essais sont proposés. Le premier étudie l'impact des qualifications sur la productivité à l'aide d'une comparaison entre deux pays, la Turquie et la Tunisie. Le second analyse l'impact des subventions sur les performances des firmes. Le troisième étudie l'effet de l'ouverture commerciale sur les importations des biens manufacturés selon que les firmes font partie des secteurs connectés au pouvoir politique ou pas, dans le cas de l'Égypte.

L'étude comparative Turquie-Tunisie, montre que les compétences des travailleurs ont bien un impact mesurable sur la productivité de la Turquie, mais pas en Tunisie. En Turquie, l'industrialisation par substitution aux importations a été démantelée relativement tôt, alors qu'en Tunisie la politique postcoloniale a abandonné sa politique d'industrialisation par substitution aux importations relativement tard. En conséquence, le haut niveau des compétences de la main-d'œuvre en Tunisie n'a pas pu contribuer à la productivité à la différence de la Turquie. Ensuite, l'étude de l'intervention gouvernementale sous forme de subvention auprès des firmes en Tunisie, montre que, comme attendu, les subventions permettent aux gouvernements d'étendre leur contrôle sur les entreprises privées. Cette politique a produit des effets contrastés sur les entreprises tunisiennes. Elle a favorisé l'emploi dans les petites entreprises, tandis que dans les grands entreprises, c'est le capital qui en a bénéficié. Enfin, le dernier essai concernant l'économie égyptienne montre que la réduction des barrières commerciales a davantage bénéficié aux firmes présentes dans les secteurs dans lesquels on n'observe pas de lien de connexion entre l'Etat et les entreprises. La réduction de l'évasion fiscale-douanière favorise les firmes plus compétitives.

MOTS CLÉS

Politique économique; Productivité; Firmes; Commerce International; Changement Structurel; Compétence; Emploi; MENA

ABSTRACT

The political economy is an important determinant of the successes and failures of public policies. This dissertation explores how the political economy has shaped socio-political outcomes. I use a comparative study, a study of a fiscal subsidy, and a case study of trade liberalization to elaborate this point. In the comparative study on Turkey and Tunisia, I observe that workforce skills have a measurable impact on productivity in Turkey, a country that abandoned import substitution industrialization at a relatively early stage. Whereas the post-colonial institutional setting of the economy and relatively later import substitution industrialization in Tunisia is not amenable to harnessing the skills of the workforce for productivity — even if levels of education were historically higher than in Turkey. A case study on government intervention in the form of firm subsidies in Tunisia suggests that governments can use firm subsidies to extend its influence over the private sector, while still having measurable and observable positive benefits to the economy. Lastly, a case study on trade liberalization demonstrated in Egypt that reforms to remove administrative and tariff barriers disproportionately helped firms in industries with no known government cronies and reduced tariff evasion. However, government cronies operating in the historically important natural resource sector still reaped benefits from liberalization reforms.

KEYWORDS

Political Economy; Productivity; Firms; Trade; Structural Change; Skills; Employment; MENA