Econometric Analyses for the Labor Market in Egypt

Der Fakultät Wirtschaftswissenschaften

der Leuphana Universität Lüneburg

zur Erlangung des Grades

Doktor der Wirtschafts- und Sozialwissenschaften (Dr. rer. pol.)

vorgelegte

Dissertation

von

Ahmed Fayez Abdelgouad

Aus

Lüneburg

Zusammenfassung

Neben einer kurzen Einführung beinhaltet diese Arbeit insgesamt fünf Kapitel. Diese fünf Kapitel fokussieren sich zum einen auf den ägyptischen Arbeitsmarkt im Allgemeinen, aber insbesondere im empirischen Teil dieser Arbeit auf das verarbeitende Gewerbe Ägyptens. Einleitend wird in Kapitel eins der institutionelle Rahmen des ägyptischen Arbeitsmarkts erläutert, sowie die relevante Literatur aufgezeigt. Insbesondere wird dabei im Zuge dieser Literaturrecherche auf bereits genutzte Datensätze und vorhandene empirische Ergebnisse eingegangen. Für den empirischen Teil dieser Arbeit (Kapitel zwei bis fünf) werden die von der Weltbank zur Verfügung gestellten Firmendaten für Ägypten für das verarbeitende Gewerbe genutzt und mit einer Reihe von mikroökonometrischen Methoden Fragestellungen zum ägyptischen Arbeitsmarkt betrachtet. Kapitel zwei analysiert hierbei Determinanten befristeter Arbeitsverträge im verarbeitenden Gewerbe Ägyptens, wohingegen in Kapitel drei die Determinanten der Beschäftigung von Frauen in ägyptischen Unternehmen des verarbeitenden Gewerbes näher untersucht werden. Auf die Eigentümerstruktur und die Produktivität ägyptischer Unternehmen des verarbeitenden Gewerbes wird in Kapitel vier der Fokus gelegt. Kapitel fünf schließt die empirische Betrachtung des ägyptischen Arbeitsmarktes, indem das Exportverhalten von ägyptischen Unternehmen des verarbeitenden Gewerbes analysiert wird und im Speziellen ein Fokus auf den Faktor Fachkräfteeinsatz gelegt wird und inwiefern dieser das Exportverhalten beeinflussen kann.

Abstract

In addition to a short introduction, this thesis contains five chapters that discuss various topics in the context of labor economics in general and the manufacturing sector in Egypt in particular. Chapter one presents the institutional framework of the Egyptian labor market and the different datasets that could be used by researchers and summarizes some previous empirical studies.

Then, different microeconometric methods are applied in the subsequent four chapters, using the World Bank firm-level data for the manufacturing sector in Egypt to get an empirical evidence for the following issues: determinants of using fixed-term contracts in the Egyptian labor market in the manufacturing sector in chapter two, determinants of female employment in Egyptian manufacturing firms in chapter three, ownership structure and productivity in the Egyptian manufacturing firms in chapter four and, finally, exporting behavior of the Egyptian manufacturing firms is analyzed with a special focus on the impact of workforce skills-intensity in chapter five.

Keywords: labor economics, labor market research, microeconometrics, industrial economics

Table of Contents

List of Figures

List of Tables

Acknowledgement

First of all, I would like to thank my doctoral advisor, Prof. Dr. Christian Pfeifer for his great support, help, patience and inspiration. It was my pleasure to learn from his experience and to work with him in two joint papers. Secondly, I would like to thank my co-advisors, Prof. Dr. Joachim Wagner and Prof. Dr. Mario Mechtel for their valuable discussions and comments on the entire thesis. I would like also to thank other professors and all my current and former colleagues at the Institute of Economics in Lüneburg for their cooperation and the wonderful time I spent with them which I will never forget.

Of course, I would like also to thank the DAAD and the Ministry of Higher Education in Egypt for funding my scholarship, and all the participants in conferences, workshops and research seminars. Special acknowledgements can be found in each chapter.

Last but not least, I would like to present this thesis to my kids, my wife, my brothers and my parents who always encouraged me.

Introduction

Motivation and an Overview

Most of the prior empirical evidence that were extracted from the Egyptian labor market before was extracted using macro level data. Only few published papers are available using micro-level data in the Middle East and North Africa (MENA) region in general and in Egypt in particular (Atiyas, 2011) and (Martinez-Zarzoso, 2012). The uniqueness of this thesis is that it does not only address various issues associated with the Egyptian labor market but it concentrates also on the manufacturing sector in Egypt, using the World Bank Enterprise Surveys (WBES).

My PhD thesis is titled "Econometric Analyses for the Labor Market in Egypt" and is divided into 5 chapters as follows. The first chapter informs the reader how the Egyptian labor market is regulated by discussing the institutional framework of the Egyptian labor market and the main reasons behind enacting the most recent labor law in Egypt. Moreover, this chapter shows the main datasets that can be used to address different topics in the labor market in Egypt. It also presents a group of previous empirical studies and the methods used in addition to summarizing the main findings.

Chapter two examines the determinants of using fixed-term contracts (FTCs) in the manufacturing sector in Egypt. The probit and the Tobit models were used to estimate the probability and intensity of using this kind of contract respectively, using the World Bank Enterprise Surveys for years 2004, 2007 and 2008. The empirical results revealed that no evidence was found that employers in the manufacturing firms use FTCs to adjust the level of employment to the profit maximizing level in case of demand changes. A package of policies is provided at the end of this chapter in the light of knowing the determinants of using FTCs

that might help lower both the increasing numbers of the unemployed in Egypt and the growing numbers of those who are already working but in the informal labor market.

It is important, and may be interesting also, to extract evidence in the gender context from Egypt. That is why chapter three, jointly with Christian Pfeifer, is devoted to investigating the main determinants of female employment in the manufacturing sector in Egypt by estimating pooled and random effects probit and Tobit regressions for the probability that a firm employs any female workers and for the female employment share. The main findings suggest that female employment at the firm-level is more likely and more intense if the firm is led by a top manager with a university degree and with foreign experience in management jobs, if the firm is an exporter with more export experience, and if the firm does not employ unionized workers.

Then, chapter four, jointly with Christian Pfeifer and John P. Weche Gelübcke, investigates the correlation between the ownership structure (private vs. public, Egyptian vs. Arab foreign vs. non-Arab foreign) and firm performance in terms of productivity is studied and important results were found that refer to the concrete distinction between domestic and foreign ownership that might help shape the relevant investment and employment policies in Egypt in the future.

The last chapter in my thesis is chapter five in which I study the link between the workforce's skills-intensity and the characteristics of exporting firms, and the determinants of the exporting behavior in general by estimating the probability and intensity of exporting in the Egyptian manufacturing sector. Different models and specifications are used including fractional logit models for estimations. The main findings indicate that firms in the manufacturing sector in Egypt whose workforce are characterized by higher levels of skills-intensity are more likely to export compared to other firms with lower levels of skills-intensity. Firms that hire female workers are more likely to export than other firms which do

not employ women. Furthermore, firms that are larger in their size, have R&D departments, and are owned by foreigners are more likely to export than others and they have statistically significant effects on export intensity as well. The results suggest also that firms that are larger in their size are more likely to start to export than others.

References

Atiyas, I. (2010). Firm-Level Data in the MENA region: Research Questions, Data Requirements and Possibilities. Middle East Development Journal 3, 2, 159-190.

Martinez-Zarzoso, I. (2012). Exporting and productivity: Evidence for Egypt and Morocco. Center for European, governance and economic development research. *Discussion Paper Number 136*. https://ssrn.com/abstract=2045538 or http://dx.doi.org/10.2139/ssrn.2045538.

Chapter 1

Labor Law Reforms and Labor Market Performance in Egypt[1]

Abstract

This chapter introduces a review of the institutional framework in the Egyptian labor market to show how it is regulated by discussing extensively the most recent labor law regulations and the main reasons behind the enactment of this law. The chapter also guides its reader to different data sources that can be used and highlights a number of empirical studies about the labor market in Egypt. Finally, it concludes that further reforms are still required to improve the labor market performance in Egypt.

Based on an extensive review of the Egyptian labor law and a survey of previous studies that discussed the same law, further changes are still required in the legislative framework for this law to be more effective. Although some progress in labor regulations especially in terms of hiring and firing, further reforms such as reducing the social security contribution by employers and workers may help create and formalize jobs. Furthermore, policymakers must recognize that labor regulation is only one part of the broader economic policy framework.

Keywords: labor law, reforms, labor market flexibility, Egypt

JEL classification: J31, J41, J51

[1] I'd like to thank the DAAD and the Egyptian Ministry of Higher Education for funding my scholarship. I'm also grateful to Christian Pfeifer and Joachim Wagner for their comments and suggestions. Any shortcomings in the paper are entirely mine. This chapter was presented in the Colloquium of the Institute of Economics, Leuphana University on 31.05.2013.

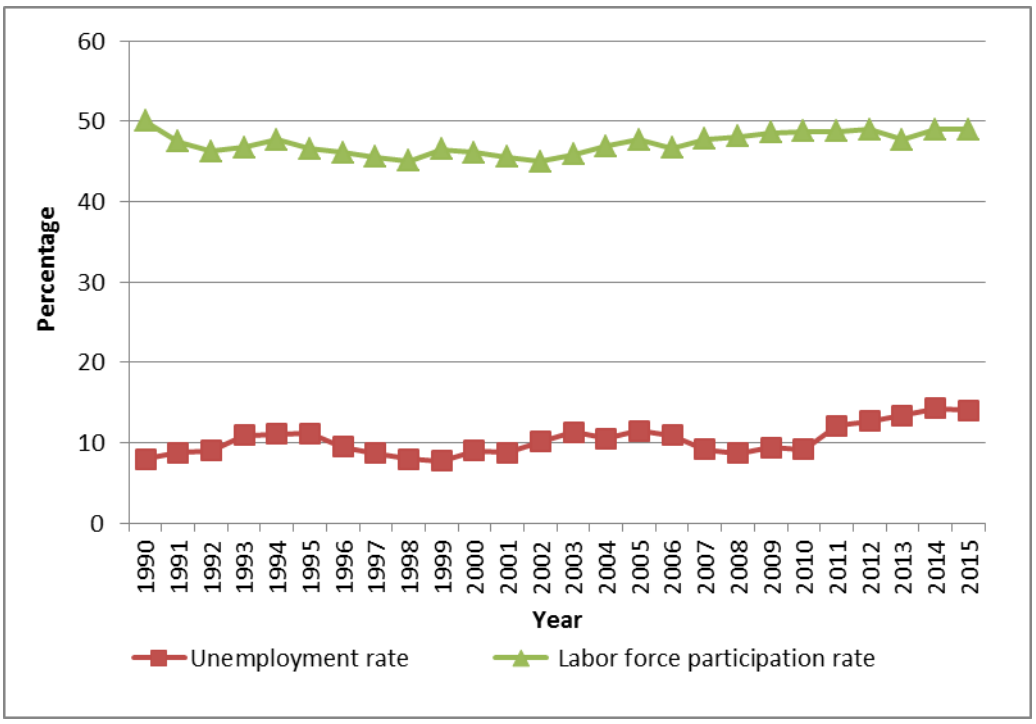
1. Introduction

Labor laws and regulations determine the level of labor market performance. Governments usually enact these laws to protect workers' rights. First, most governments provide workers with some basic rights to reduce exploitation or increase welfare (i.e., maternity leaves, minimum wages, etc.). Second, labor laws protect the employment relationship by specifying hiring and firing regulations. In addition, they empower labor unions in defending workers' rights. Finally, governments provide social insurance against illness, unemployment and retirement. However, such protection for workers results in increasing costs of formal labor and may negatively affect labor market flexibility (Caballero et al., 2013; Ahsan and Pages, 2009; Djankov and Ramalho, 2009). Specifically, it affects the speed with which labor markets adapt to fluctuations in the economy. Hence, the ability to adjust the labor force, given any economic shock, positive or negative, at either the firm or sectoral levels, is hindered. Labor market rigidity results in firms hiring fewer employees during economic upturns to avoid layoffs and associated costs during downturns or negative shocks. Hence, the overly protective hiring and firing regulations designed to protect workers have, instead, discouraged firms from formal recruitment, which weakens the demand for labor and reduces firms' abilities to properly allocate and employ human resources (Sharma, 2009).

In Egypt, despite the introduction of the unified labor law number 12 in 2003, with the aim of addressing the shortcomings of the previous law, labor market rigidity is still a major problem that constrains the flexibility of firms' performance. According to the recent Global Competitiveness Report for 2013/2014, Egypt fell behind a number of MENA (Middle East and North African) regional countries, only having a rank of labor market efficiency of 146 out of 148 countries. Furthermore, Egypt ranked 120 out of 148 countries in hiring and firing practices in the same year (i.e., high social security payments, severance payments and notice payment requirements, pressure for higher wages through strikes or other channels).

This indicates the deteriorating performance of the Egyptian labor market (Global Competitiveness Report for 2013/2014). According to the local official statistics issued by CAPMAS[2] (The Central Agency for Public Mobilization and Statistics), the unemployment rate[3] in Egypt is high and persistent; it stayed above 8 percent for the last two decades, reaching 12.4 percent in December 2012, and it reached 12.77 percent in December 2015 (8.90 percent among males and 25.85 percent among females). Of course, these statistics show there is discrimination against females in employment in Egypt in general and in the manufacturing sector in particular. Chapter three is devoted to giving a complete explanation for the causes and consequences of female employment discrimination in Egypt in general and the determinants of female employment in the manufacturing sector in particular.

Figure 1: Unemployment* and Labor Force Participation rates during the period 1990-2015**



* World Economic Outlook

**http://data.worldbank.org/country/egypt-arab-republic

[2] Website :www.capmas.gov.eg

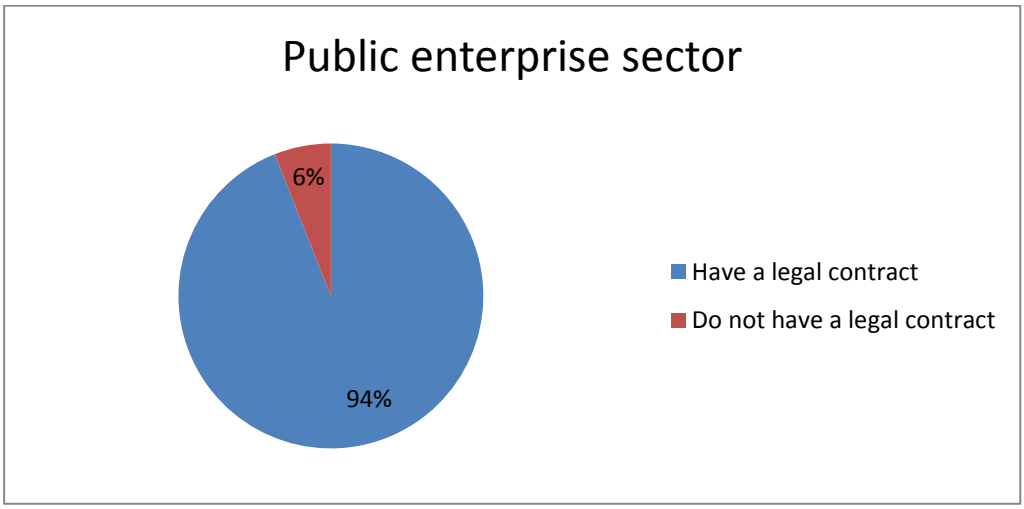
[3] Unemployment is defined as all individuals aged between 15 and 64 who are physically able to work, want to work, and were actively searching for jobs but could not find work.

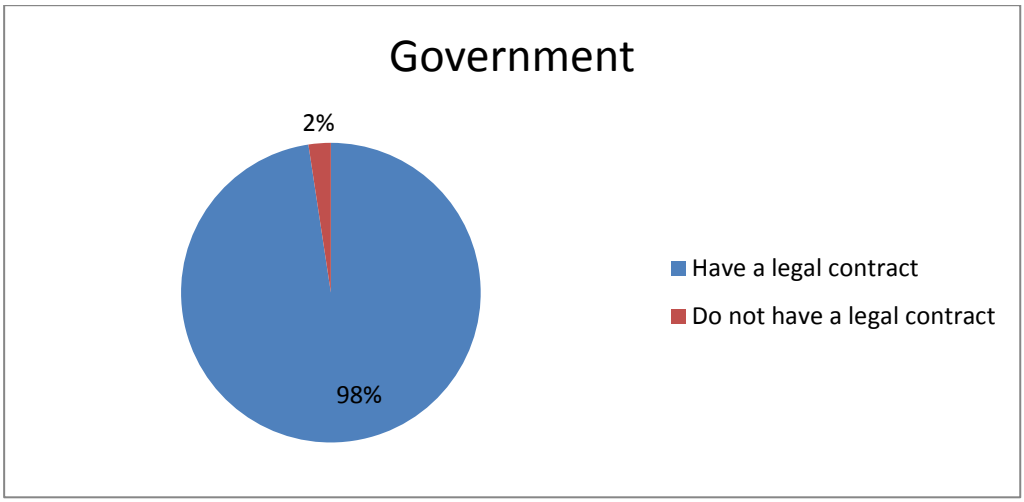
Another key problem in the Egyptian labor market is the concentration of unemployment among the youth and the educated; that is, those who have intermediate, above intermediate, university, and post-graduate degrees. The unemployment rate among young people (15-29 years) reached 27.6 percent for the last quarter of 2015. The highest rate is among the age bracket of 20-24 years, reaching 35.4 percent (CAPMAS, 2012). Out of all unemployed persons, about 60 percent belong to the educated group (about 39 percent of them have intermediate and above intermediate certificates and about 21 percent of them have university degrees and post-graduate degrees). These high levels of unemployment among youth and the educated are due to the insufficient growth level of job creation in the private sector on the one hand and the mismatch between the education system outcomes and labor market requirements on the other.

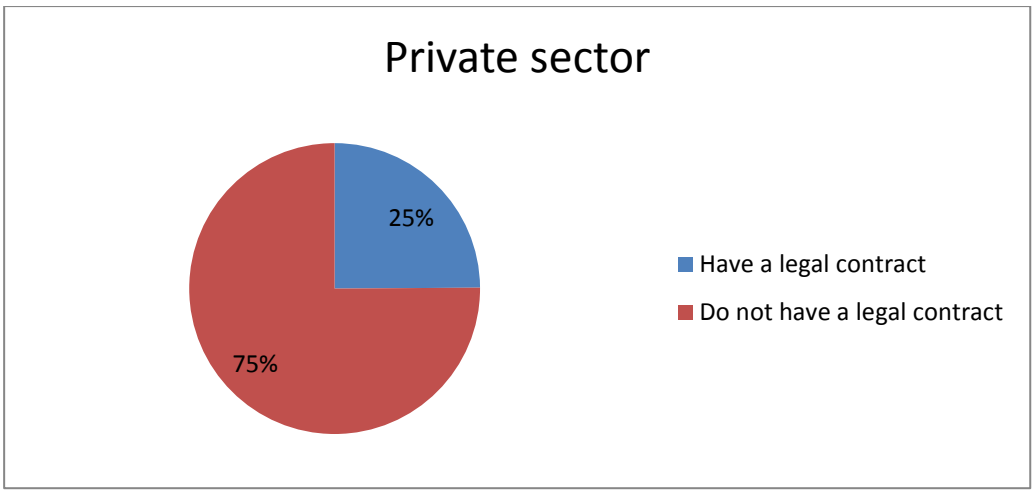
The small number of jobs available in the formal private sector led jobseekers to rely on the informal economy. Total employment in the informal[4] non-agricultural private sector consisting of outside establishments and workers in private firms employing less than five workers declined and reached 52.9 percent in 2009, compared to 85 percent in 1996. If we exclude employment in firms employing less than five employees from the definition of the informal sector, informal employment in non-agriculture private firms only amounts to 18 percent in 2009 (Ehab, 2012). A major difference between the public and the private sectors is the dominant share of informal employment in the private sector while the public sector is almost entirely formal. The measure for formal employment is the existence of a legal job contract (El-Ghamrawy and Amer, 2011).

[4] Generally, employees in the informal sector have no contracts, no fixed hours, and no employment benefits such as sick pay or maternity leave because employers avoid regulation and taxation. They refuse both to enter into binding work contracts and to bear costs of the social security system.

Figure 2: Structure of Employees According to Legal Contracts







Source: El-Ghamrawy Tarek and Amer Ziad, 2011.

Informal employment is still high despite the introduction of the new labor law number 12 for 2003 with the aim of increasing the flexibility of the labor market and formalizing jobs. This high percentage of employment in the informal unorganized sector means that those employees are not protected by the labor laws as intended by the government. In order to reduce this informality, labor laws still need to be less rigid. Formalizing jobs will result in extending the umbrella of protection to workers in informal jobs. In contrast, stringent regulations deter formal employment and increase informality (Sharma, 2009). This paper discusses how the Egyptian labor market is regulated, guides its reader to different data sources that can be used, and highlights a number of empirical studies about the labor market in Egypt. This chapter is organized as follows. The next section provides a review of the institutional framework in the Egyptian labor market. Section three includes an overview of the available datasets. Then, some recent empirical studies in the context of the Egyptian labor market and their main findings are summarized in section four. Section five concludes.

2. Institutional Framework of the Labor Market in Egypt

2.1. Labor Market Organizations

The principal objective of the labor market organizations is to facilitate the match between labor supply and demand. In Egypt, the main labor market institutions that aim at planning and coordinating activities to promote employment are:

1. The Ministry of Manpower and Migration (MOMM), which is responsible for facilitating the match between labor supply and demand, helping to increase the employability of the labor force and monitoring labor market demand. It runs its own training centers that focus primarily on training school dropouts and laid-off workers. MOMM also runs an employment Information Program that prepares labor market statistics and publishes the Monthly Vacancy Bulletin.

Once a year, it also organizes an enterprise census to collect information on training needs from all enterprises with more than ten workers. The Ministry collaborates with employers and workers through the Supreme Council for Human Resources Development and also directly shapes training policies while encouraging private enterprises to set up their own training centers and provides them with methodological guidance and certification.

2. The Supreme Council for Human Resources Development is the main body responsible for coordinating the training policies of all ministries. It is headed by the Minister of Manpower and Migration and includes high-level representatives from all other relevant ministries. The Council meets four times a year and announces national training needs. The different ministries are supposed to integrate such announcements in their training programs in order to adapt them to labor market requirements.

3. The Information and Decision Support Centre (IDSC)[5] is conducting a labor demand analysis based on newspaper advertisements.

4. Employment offices which are part of MOMM and have a territorial structure.

5. The Social Fund for Development (SFD)[6] is a semi-autonomous governmental agency under the direct supervision of the Prime Minister. It was created in 1991 as a joint initiative between the Egyptian Government, the World Bank and UNDP with the task of mitigating the negative effects of the economic reforms on the most vulnerable groups of people. It promotes economic development in backward regions. The SFD is very active in the field of job creation and runs several employment programs (De Gobbi and Nesporova, 2005).

[5] The home page of this Centre can be accessed via www.idsc.gov.eg/

[6] The home page can be accessed via www.sfdegypt.org

It is worth noting that one of the newly established organizations according to labor law regulations is the National Council for Wages which is in charge of setting minimum wages[7].

Presided over by the Ministry of Planning, it is composed of technical experts (half of the total number of members) and of representatives of employers and workers (one fourth of total membership per category). Article 11 of the labor law describes the establishment of a new body. The article reads: "A higher committee shall be established under the concerned Minister for Planning and employing the manpower inland and abroad, comprising representatives of the concerned ministries, as well as representatives of the General Federation of Egyptian Trade Unions and of the employers' organizations, to be elected by their organizations equally among them". This committee is responsible for "drawing up the general policy for employing Egyptian manpower in the Arab Republic of Egypt or abroad, and setting the systems, rules and procedures required for that employment." So far it is not clear whether the committee will be a new body or whether this task will be given to an existing body. The Labor Law also envisages the creation of a Supreme Consultancy Council for Insuring a Healthy Vocational Working Environment. Headed by the Prime Minister, this body should include representatives of concerned ministries, workers, employers, and some technical experts. The main task of the Council is to formulate a policy to ensure a healthy working environment for all professions (De Gobbi and Nesporova, 2005).

2.2. Employment Services

Other labor market regulations are those that provide employment services. Employment services are under discussion because they have proven to be rather ineffective. The institution providing employment services is mainly MOMM, but other agencies, councils and funds are

[7] Up till now, this National Council for Wages is unable to enact the minimum wages law because of the absence of an elected and independent Parliament and the non-independence of the judicial system.

also involved. Article 16 of the Labor Law states, “The concerned minister may issue a decree licensing the associations, institutions and trade union organizations—with regard to their members—to establish offices for recruiting the unemployed.” These employment services should meet the same functioning requirements as existing governmental employment agencies. MOMM is responsible inter alia for monitoring labor market demand.

Local employment offices collect information on job vacancies and MOMM advertises them in order to facilitate the match between labor supply and demand. Vacancies are announced through a monthly bulletin issued by the Ministry. Job seekers and vacancies are registered in a computerized system. Additionally, a recent innovation has been introduced that allows enterprises to seek the assistance of local employment offices in finding candidates for vacancies in between the publications of bulletins.

The monthly bulletin advertises both public and private jobs. Most vacancies are blue-collar, low paid positions. Enterprises have an obligation to report all vacancies and all changes in their staff to local employment offices. Nevertheless, they are free to either accept or refuse the candidate(s) proposed to them as officials of local employment offices are reportedly lacking the skills for proper screening of jobseekers. The bulletins are said to be useful, but they only partially reflect labor demand. In addition to the job bulletins, private enterprises often advertise available positions, in particular skilled and better paid jobs, through newspapers. As of March 2003, the placement rate reached through the monthly bulletin was only 40 per cent due to both mismatches between required skills for the jobs and available skills of jobseekers and to the low salaries offered. To remedy part of this problem, local employment offices may send jobseekers with low skills on training courses (De Gobbi and Nesporova, 2005).

2.3. Social Partners

Because of the centralized economy of Egypt in the past, the government and employers are very closely connected. The government has traditionally been the principal employer in the country. This has led to the development of a large group of employers who do not represent the private sector. The most representative organization of Egyptian employers is the Federation of Egyptian Industries (FEI) founded in 1921. At present, FEI groups comprising 15 industrial sectoral chambers represent a total of about 18,000 enterprises, both from the public and the private sector.

In Egypt, there are 23 official trade unions, each representing a different industry or service. Total membership in all these unions was 4.5 million in 2001, which corresponds to 25 percent of the total labor force. Most union members belong to the services sectors and public agencies. Twenty-five percent of union members work in public manufacturing enterprises. Only 25 percent are private sector workers. On a company level, unions are organized in committees. As of 2000, 1,641 committees had been established. Any trade union must be affiliated with the Egyptian Trade Union Federation (ETUF) which is the only legally recognized trade union federation in Egypt. The ILO Committee of Experts on the Application of Conventions and Recommendations has repeatedly stated that a law requiring all trade unions to be part of one single federation is not in conformity with the principle of freedom of association. Egypt has nonetheless ratified ILO Convention No. 87 on the Freedom of Association and Protection of the Right to Organize. Collective bargaining is allowed in all enterprises. In companies with 50 workers or more, negotiation occurs between the employer and either the union committee on an enterprise level or the general union on the industry level. However, according to the Labor Law, workers in establishments with less than 50 workers cannot be part of collective bargaining on the improvement of working conditions and settlement of disputes. Under these circumstances, collective bargaining takes place

between the general union and the employer's association. This is a considerable limitation, given that in Egypt, the majority of total workers in the non-agricultural private sector are employed in establishments with less than 50 workers (De Gobbi and Nesporova, 2005).

2.4. Labor Law No. 12 for 2003

Until July 2003, when the Labor Law was ratified, existing legislation had been rather stringent, both for workers and for employers. It prohibited employers from terminating the contract of a worker after a certain probation period. In addition, employers were not allowed to recruit workers directly, but only through local employment offices.

This particular rule was a major problem for employers because of the risk of low productivity of potential workers that were selected by employment offices. To avoid the stringent rules, many employers developed a practice according to which workers had to sign a resignation letter before being regularly hired. Workers were not entitled to go on strike when facing harsh working conditions. They could not engage in collective bargaining either. All these unfavorable conditions for workers made job seekers choose employment in the public sector rather than employment in the private sector. Labor law number 12 of 2003 comprises 257 articles that address all the legal aspects regulating the Egyptian labor market. The law aims at increasing private sector involvement and, at the same time, achieving a balance between employees' and employers' rights.

Amongst the most important issues that the new law addresses is the right of an employer to fire an employee and the conditions pertaining to this as well as granting employees the right to carry out a peaceful strike according to procedures prescribed in the new law. However, these guarantees for workers still do not seem to make private employment any more attractive than it was before. Public employment still remains the preferred option because it offers guarantees against dismissal and ensures the benefits of social insurance, vacations and

periodical wage increases for employers and workers. Its fixed and limited daily duration also allows workers to do other jobs (moonlighting) at the same time, thereby increasing their incomes (Wahba, 2009). Labor law number 12 of 2003 introduces some quite important changes. It was drafted by a committee composed of representatives of the Egyptian Trade Union Federation (ETUF), business organizations, the Ministry of Manpower and Migration (MOMM), and the local legal community. The International Labor Organization was in charge of ensuring that the new legislation would not undermine Egypt's participation in international agreements. The law allows employers to hire workers directly, without having to rely on public employment services.

Employers are still required to notify local employment offices of vacancies, but if the latter do not find suitable candidates within a week, employers are free to recruit workers directly. An outstanding innovation of the Labor Law is its recognition for workers of the right to strike. This right is nonetheless restricted to specific conditions which may make it difficult to exercise (De Gobbi and Nesporova, 2005).

This law also introduces a new procedure for dispute settlement. If a dispute on work conditions, terms or employment provisions arises, both the employer and the worker have the right to ask the competent administrative authorities (public employment offices) to start informal negotiations to settle the dispute. This right can be exercised only within seven days of the emergence of the dispute. If a solution is not found within ten days from the time administrative authorities were requested to intervene, both the employer and the worker can resort to a judicial committee within forty-five days of the dispute. This judicial committee is composed of two judges, a representative of the Ministry of Manpower and Migration (MOMM), a representative of the trade union, and one individual from the employers' associations. Within sixty days, the committee is to reach a decision. If the decision concerns discharging a worker, the sentence is delivered within fifteen days. When the committee’s

position is against the employer's request to fire a worker, the former must reintegrate the latter into his job and pay all due emoluments. If the employer does not respect the ruling, the worker is entitled to receive compensation for unlawful dismissal. Article 122 states that the amount of such compensation cannot be less than two months of salary per year of service and the judicial committee fixes the exact amount. Article 70 also states, “The committee shall, in the merits, decide for provisional compensation if the worker requests doing that.”

Dismissal for unionist activities of workers as well as for other reasons that are deemed to be discriminatory (color, sex, social status, family obligations, pregnancy, religion, or political view) is strictly forbidden. Dismissals based on discrimination are subject to the sanction foreseen for unlawful discharges and thus to the compensation mentioned above.

The costs stipulated in the Labor Law for unlawful dismissal, which is to be borne by the employer as described above, are rather high. However, no information is available on how strictly this norm is applied. As for collective disputes, the Labor Law states that if negotiations do not lead to a settlement within 30 days, one or both of the parties can ask for mediation. Mediators are selected by MOMM which is also responsible for informing mediators of the situation. The Ministry receives the report of the mediators and presents its results and recommendations to the parties. If one or both disputers reject the recommendations, the Ministry is responsible for starting the procedure of arbitration. The results of arbitration are to be provided within a week. They are then presented to the parties by the Ministry (De Gobbi and Nesporova, 2005).

The Labor Law contains a section dealing with occupational safety and the assurance of an adequate working environment protecting good health. These norms are complemented by some ministerial decrees. The law establishes the responsibility of employers to create a safe and healthy work environment and their obligation to report work accidents and accident-related statistics. It also envisages the creation of an administrative body in charge of

occupational safety and health inspection, the establishment of occupational safety and health committees at an enterprise level and the setting up of national and provincial consultative bodies. Furthermore, the provisions on health and safety at work apply to both private and public enterprises and entities. They do not apply to household servants and family members who are direct dependents of the employer. The law provides comprehensive guidelines for the recruitment, hiring, compensation, and termination of employees. In particular, it provides increased flexibility for firms in the hiring/firing process which has been a major bottleneck for job creation in the Egyptian labor market. Moreover, the law aims at increasing the involvement of the private sector and at the same time achieving a balance between employees' and employers' rights.

The labor law aims at providing more flexibility in the labor market by allowing a private sector employer to renew a temporary contract without having to transform it automatically into a permanent employment status as was the case under the preceding law. Also, under the new regulation, employers can terminate a contract more easily and layoffs can be justified by difficult economic conditions. In return workers that have been dismissed have the right to appeal. However, workers in the public sector keep their privileges of life-long security for jobs as their contracts cannot be terminated (De Gobbi and Nesporova, 2005).

2.5. Labor Contracts

The Labor Law mentions two types of labor contract: contracts for an indefinite period and fixed-term contracts. The latter category includes labor contracts with a fixed term and contracts concluded for the accomplishment of a specific task. Employment contracts are required to be in writing, in triplicate, and in Arabic. The employer, employee and social insurance office each keeps one copy of the employment contract, which must include certain information as specified in the Law (Article 32). It is necessary that both employer and

employee agree on essential matters in the law concerning wages, job description, and contract period. It is also important to state the kind of work that the employee is obliged to do. The probation period shall be specified in the labor contract and no employee shall be under probation for a period exceeding three months, neither shall an employee be appointed under probation more than once with the same employer (Article 33).The maximum duration of a fixed contract is five years. If the employer and employee agree on a longer employment duration, then the employee has the right to terminate the contract after the initial five years without receiving compensation; however, the employer must be notified within a stated time period, namely, three-month prior notice. A fixed-term contract is deemed renewed for an indefinite period if both parties continue to abide by it after its date of expiry, although an exception is made for foreign workers (Article 105).

Upon agreement of the two parties, the fixed-term employment contract may be renewed several times (Article 106). According to the 2003 Labor Law, employees should not work more than eight hours a day or 48 hours over a six day working week. Most private sector employees work 5 days a week, usually Sunday to Thursday. The number of working hours may be increased to 9 hours a day in certain circumstances. Employees are entitled to one whole working day off each week. Certain exceptions apply when work is intended to prevent a serious accident or to cope with a heavy workload. In such situations, employees must be paid overtime. Employees are entitled to a minimum annual paid leave of 21 days every full year of service and proportionally if their period of service is less than one year. This annual leave is increased to one month after the employee has worked for 10 consecutive years or is over 50 years old. In addition, every employee is entitled to full pay for official holidays not to exceed 13 days a year. If employees are required to work during official holidays, employees are entitled to overtime (paid at twice their normal rate). Overtime for hours that go beyond 36 per week is payable at the rate of 35% extra for daylight hours and 70% extra for work performed at night. The premium for work on rest days is 100% while workers

should receive 200% for work on national holidays (Boni, 2009). It is worth noting that part-time work bridges the way for a more flexible labor market and that government employees work part-time jobs or 'moonlight' in the small and micro-enterprise (SME) sector while still being employed in the government (Handoussa and El Oraby, 2004).

2.6. Dismissal and Termination of Labor

A worker can now be dismissed for a just cause based on a 'serious error'. The Labor Law lists nine types of serious errors on the side of workers. These include long absences without legitimate justification; false documents submitted by workers; serious damage to employers committed by workers, if employers notify the authorities of this damage within 24 hours; serious worker misconduct and others.

Moreover, the employer is entitled to dismiss a worker in the case of some custodial sentences, which are listed under Article 129, such as "breach of honor, honesty or public morals." Similarly, workers can terminate the contract if an employer "defaults on any of the substantial obligations ensuing from the law, the individual or collective labor contract, or the articles of association of the establishment or if employers or their representatives commit a hostile act against the worker or a member or his family." An employee may not be dismissed until the matter is brought before a committee with judicial powers at the Ministry of Manpower and Emigration (MOME). The committee shall decide the request for dismissal brought to it within 15 days from the date of the first session and its decision shall be final. However, the employer may thereafter dismiss an employee and the employee retains the right to challenge the dismissal in court. Egyptian Labor Courts retain discretion in reviewing a dismissal. Compensation awards may be granted to employees for wrongful dismissal on the basis of a review of the facts and circumstances of each case. An employee is entitled to 60 days' notice for dismissal if his period of service does not exceed 10 years and 90 days if that

period exceeds 10 years. Should the employer desire to dismiss the employee without giving him the stipulated notice period, the employee shall receive two or three month's salary payment in lieu of such notice. Article 122 states that the compensation shall not be less than the wage of two months' salary for each year of employment for wrongful dismissal. Throughout the notification period, the labor contract shall remain active. The termination of employment provisions do not apply to public servants employed by State agencies, public establishments and local authorities, or to domestic workers and the like, or to employer's family members whom the employer is responsible for (Boni, 2009).

In terms of terminations for economic reasons, the severance allowance must be equal to one month's wage for each of the first five years of service, and one-and-a-half months for each subsequent year (Article 201).

Employees retiring at the age of 60 are entitled to pension payments (Article 126). At the age of 60, a worker is entitled to indemnity calculated on the basis of half of her monthly wage for each of the first five years of employment, and one month's wage for each subsequent year, unless she is entitled to benefits under the old-age, disability and death insurance scheme provided for by the Social Insurance Law (Boni, 2009).

2.7. Wage Determination Mechanism

The MOME oversees and monitors collective negotiations and agreements. The government sets wages, benefits and job classifications for both public sector and government employees. Employers must pay social insurance contributions to the Ministry of Social Insurance and Social Affairs for their Egyptian employees[8]. Egyptian employees are also liable for contributions. Employees' contributions are retained by the employer from the employees'

[8] According to Law, foreigners that have been working on a contract basis for a year or more are insured on the condition of the existence of a reciprocity agreement between Egypt and the foreigner's country of origin.

salaries and wages each month and paid to the ministry, together with the employer's own contributions, within the first two weeks of the following month. In Egypt, wage setting mechanisms are defined by law for public employment and public enterprises. Labor legislation sets the minimum wage and wage increases linked to the cost of living. It fixes wage levels according to the different job categories and field of specialization, and describes the qualifications required to receive a specific salary. Promotion and incentive mechanisms are also defined precisely. In addition, the maximum amounts to be granted for overtime, allowances and incentives are all set by law. In 1987, public enterprises were granted a certain degree of freedom in setting rules on incentives and the system applied in public enterprises became more successful in promoting productivity than that adopted in the public sector. In the formal private sector, wages are determined by labor demand and supply. National law only sets the minimum wage, social insurance, special wage increases, and living-cost allowances (Wahba, 2009a).

These rules have always been largely ignored by private sector employers and their application can certainly not be imposed by workers, given their low level of unionization. Wages are set almost on an individual level according to personal skills and degree of specialization. In the agricultural sector and in the informal sector, wages are determined by the labor market and are, therefore, rather flexible. Employers make social insurance contributions at rates of 26% of basic wage and 24% of variable wage. The basic wage consists of basic salary and all fixed allowances, while the variable wage comprises bonuses and incentives that may be paid by the employer from time to time. Employees pay at rates of 14% and 11% respectively. The maximum monthly amounts on which contributions are payable are, for basic salaries, EGP[9] 650 (the Egyptian pound) and, for variable salaries, EGP 500 (Wahba, 2009a).

[9] 1 Euro = 9.91 EGP in March 2016.

In 2003 a National Council for Wages was established to set and adjust minimum wages, establish a national wage policy, carry out studies on minimum wages, and study reports issued from Arab and international organizations. The National Council for Wages has been revising the minimum wage level in an attempt to provide better levels of income to a large proportion of society. The legislative framework of the wages system in the government sector is very complicated since it is regulated by more than 40 laws and decrees issued between 1942 and 2008. The monthly minimum wage was set at EGP 35 in 1984 when it represented 60% of the GDP per capita. It reached EGP 214 in 2005/06 according to the Wage Council. In practice, official figures based on the Annual Bulletin of Employment, Wages and Working Hours in 2007 state that the average weekly wage was EGP 252, with the average weekly wage being EGP 308 in the public sector and EGP 214 in the private sector. According to estimates by the World Bank and the Ministry of Economic Development, the poverty line was at EGP 155 per individual per month, thus, the Wage Council was considering raising the minimum monthly wage to EGP 250.

The minimum wage in Egypt is not only very low, but is also poorly enforced. Employers in the private sector do not adhere to the minimum wage, even in the formal sector (Wahba, 2009a).

2.8. Unemployment Benefit Schemes

Data on the rate of coverage of unemployment benefit is not available. Although the government was not committed to providing unemployment insurance benefits against unemployment for workers in the private sector since 1982, it continues, according to the ILO, to apply the law requiring employers to pay 2% of all salaries for unemployment insurance. Unemployment benefits are regulated by Law number 79 of 1975 and they correspond to 60 % of the last salary received by the dismissed worker and are granted for a maximum period

of 28 weeks after dismissal. Unemployment benefits are financed through a contribution of employers equal to 2% of their workers' wages, and through the revenues made from the investment of such contributions (De Gobbi and Nesporova, 2005). In practice, very few workers receive unemployment benefits because of the poor state of law enforcement in Egypt in general.

2.9. Labor Unions and Collective Bargaining

One of the main reasons behind the political instability since January 2011 was the performance of the labor unions in Egypt, which did not play a significant role in protecting workers rights, nor in setting the wage levels. The underlying reason is the lack of sufficient independence[10]. This, in turn, is due to several factors, including the centralized hierarchical structure of syndicates as well as government intervention and tendency to control syndicates' leaders to ensure political stability and achieve strict control over the labor force.

In addition, the government tended to attract and contain syndicates' leaders by granting them several privileges, involving them in boards of directors of the holding companies, and with promises of giving them more important positions. The Egyptian Constitution acknowledges labor rights in establishing unions and federations on a democratic basis. Syndicate activities are allowed as long as they match the framework of the General Federation for Labor Unions' programs. Workers were not entitled to go on strike when facing harsh working conditions. They could not engage in collective bargaining, either. The Labor law number 12 of 2003 shows a considerable degree of flexibility when compared to the previous labor law. The law permits collective negotiation at all levels, starting at the establishment level and reaching the national level. Collective negotiation may aim at improving labor terms and conditions,

[10] The official labor unions were not, and are still not, independent and their main role was to suppress workers' demands for better working conditions and wages, ensure that they toe the government line, and thus keep them in their place as loyal supporters of the regime.

fostering cooperation between various labor parties to achieve workers' social development, and settling disputes between workers and employers. According to Clause 192 of the Labor Law of 2003, workers cannot legally strike without the green light from the labor union. There is very little scope for collective bargaining in the private sector. Companies must comply with certain government-established standards, particularly in relation to the minimum wage, social security and official public holidays. The 2002 Special Economic Zones (SEZs) Law laid the legal foundation for setting up export-oriented SEZs. Newly established investment companies in the zones are exempted from complying with legal clauses relating to labor organizing, depriving workers of the right to set up local union committees (Wahba, 2009a).

3. An Overview of Labor Market Datasets in Egypt

3.1. The Labor Force Sample Surveys (LFSS)

The Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS), which is the main statistical agency of the Egyptian government, implements these surveys quarterly. LFSS are nationally representative surveys.

LFSS provide information on the working-age population, the labor force, employment and unemployment by gender, age groups, educational attainment, employment status, economic activity, and occupation. The week preceding the survey is the reference period. LFSS use the broad definition of economic activity (including subsistence activities) of the ILO (1993). However, in practice, LFSS capture female participation in subsistence activities very poorly. Thus, the participation rates obtained reflect only female participation in market economic activities. Moreover, the definition of unemployment was changed in 1996 so as to exclude all individuals receiving any income. In 1988, a special LFSS survey was carried out. This was the first detailed survey that attempted to extend and deepen the measurement of employment in Egypt (Said, 2004).

3.2. Annual Bulletins for Employment, Wages and Work Hours Statistics

Annual Bulletins for Employment, Wages and Work Hours Statistics are published by the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). This dataset lends itself to conducting analysis at two distinct levels: all economic activities in the Egyptian economy (18 in total) and skill level occupations (9 in total). Employment and wage statistics are classified by skill level occupation and economic activity covering private sector enterprises employing 10+ workers in addition to public and public business sector enterprises, regardless of the number of workers therein. Wages are measured on a weekly basis. They are paid in compensation for the relevant working period prior to any deductions, including basic wage, overtime, periodic allowances and any other periodic accruals, such as commissions and periodic production bonuses (Helmy, 2012). One important obstacle is access to data. Not all data collected by CAPMAS is accessible for researchers. Only summary tables are published by CAPMAS.

3.3. Egypt Labor Market Panel Survey (ELMPS)

The Economic Research Forum (ERF), with the cooperation of the Population Council and the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS) has successfully conducted the Egypt Labor Market Panel Survey of 2006 (ELMPS 06). It is a follow-up survey to Egypt Labor Market Survey of 1998 (ELMS98).

The ELMPS06 is the second round of what is intended to be a periodic longitudinal survey that tracks the labor market and demographic characteristics of households and individuals. The fieldwork for ELMPS06 was carried out from January to March 2006. The final sample of 8,349 households is made up of 3,684 households from the original ELMS98 survey, 2,167 new households that emerged from these households as a result of splits, and a refresher

sample of 2,498 households. Of the 23,997 individuals interviewed in 1998, 17,357 (72%) were successfully re-interviewed in 2006. The questionnaire for the ELMPS06 is closely based on that used in the ELMS98 to ensure comparability of the data over time. The surveys provide a rich source of information on the labor market conditions of individuals. Overall, the surveys collect information on the characteristics of jobs such as on the presence of a legal job contract and social security coverage (Wahba, 2009b). The ELMS98 and the ELMPS06 are available through the ERF. It is worth noting that a third round was carried out to complement the two previous surveys of 1998 and 2006.

3.4. The World Bank Panel Dataset for the Egyptian Manufacturing Firms

The World Bank Enterprise Surveys[11] collect data from key manufacturing and service sectors in every region of the world. The Surveys use standardized survey instruments and a uniform sampling methodology to minimize measurement error and to yield data that are comparable across the world‘s economies.

Most importantly, the World Bank Enterprise Surveys are designed to provide panel data sets. Because panel data are one of the best ways to pinpoint how and which of the changes in the business environment affects firm-level productivity over time and across countries, the Enterprise Survey Initiative has made panel data a top priority. At the same time, it is important to note that there is a lack of studies using the World Bank Enterprise Surveys not only in Egypt but also at the MENA region.

To the best of my knowledge, there are no previous papers studying the effect of labor regulations on labor market flexibility in Egypt using this valuable dataset which I will depend on mainly in the following chapters in this thesis. These Surveys are firm-level

[11] See www.enterprisesurveys.org for detailed description of the data and methodology used for data collection.

surveys for the manufacturing sector in Egypt. The dataset includes 3129 observations resulting from interviews conducted in years 2004, 2007, and 2008. The dataset covers major industries in the manufacturing sector, such as textiles, garments, food, metals, machinery, electronics, chemicals, wood and furniture, non-metallic and plastic products, paper, and printing and publishing. The Survey topics include firm characteristics, gender participation, access to finance, annual sales, costs of inputs/labor, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilization, land and permits, taxation, informality, business-government relations, innovation and technology, and performance measures. Over 90% of the questions objectively ascertain characteristics of a country's business environment. The remaining questions assess the survey respondents' opinions on what the obstacles to firm growth and performance are. It is worth noting here that a new dataset was released by the World Bank Enterprises surveys in 2013 for the manufacturing firms. This dataset provides more information about the age and gender of the workforce but less information can be found concerning the educational attainment levels of the workforce compared to the 2004, 2007, and 2008 surveys. Another shortcoming of this dataset is that it contains data for years 2008 and 2013 only.

4. An Overview of Some Selected Empirical Studies about the Egyptian Labor Market

Table 1: An overview of some selected empirical studies about the Egyptian labor market

Study	Data set used	Estimation methods	Study Abstract
Said (2004)	The 1987 Egyptian Labor Force Sample Survey (LFSS) and the 1997 Egyptian Integrated Household Survey (EIHS)	OLS and Maximum Likelihood Methods	The study investigates the determinants of male and female pay in the public and private sectors. The results highlight the importance of job security as the major factor determining the existence of queues for public sector jobs in Egypt. The results suggest that there are significant differences between public and private sectors choice decisions and earning structures in Egypt. The impact of the public sector hiring and compensation policies on labor productivity in the Egyptian labor market is still an open question for future research.
Elhamidi and Said (2008)	Labor Force Sample Surveys (LFSS) for the years 2000-2004	Multinomial Logit Model (Maddala, 1983) Model of human capital earnings function (Mincer, 1974)	This study assesses the impact of recent economic liberalization measures and institutional changes in Egypt on gender wage and occupational inequality. The determinants of female occupational decisions, the education-occupation mismatches, and gender-based wage discrimination are examined. The main findings are that women's education and skill accumulation are the most important factors determining the impact of trade and economic reform on women's employment and the gender wage gap.
Wahba (2009b)	The Egyptian Labor Market Panel Survey (ELMPS 2006)	Probit Model with Selection	This study addresses an important question, namely, whether informal employment is a stepping stone, as first argued by economists such as Fields (1975), or a dead end. The main aim of the study is to examine the determinants of informal workers graduating to semi-formal or formal jobs. The empirical findings suggest that the mobility from informal to semi-formal or formal employment is highly segmented along education and gender. Overall, it seems that informal employment is a stepping stone for

			highly educated male workers, but is a dead end for the uneducated and for female workers. However, the study does not proffer policy recommendations (incentives, for example) to minimize the number of uneducated and females stuck in the informal labor market.
Zaki (2011)	The Egyptian Labor Market Panel Survey (ELMPS 2006)	Human Capital Model (Mincer, 1974)	This paper proposes an empirical investigation of the effect of different trade barriers on wages in Egypt. The effect of trade barriers on wage disparity is studied in three dimensions: on gender (males vs. females), qualification (blue vs. white collar) and regional (urban vs. rural workers). Females, urban workers and blue-collar workers are more affected by such barriers. The main findings show that both non-tariff measures and red tape barriers have a higher impact than traditional tariffs on wage disparity. Females, urban workers and blue collars are more affected by such barriers. It would be interesting to consider also the services and agriculture sectors given the importance of the former and the high protection practices of the latter in Egypt.
Al-Azzawi (2014)	(ELMS 1998) and (ELMPS 2006)	Standard Oaxaca-Blinder procedure and difference—in differences estimation	This study investigates the impact of trade liberalization on the gender wage gap and on female employment in the Egyptian manufacturing sector. Results indicate that the gender wage gap is high and has increased dramatically over time. Increasing trade liberalization has largely had a negative impact on women's relative wages and on their employment. The study also gives important evidence that exporting industries are more likely to hire female workers. The last evidence might be a subject for a future research into the relationship between female employment and exporting firms in Egypt, especially firms with longer export experience.

Kiendrebeogo (2014)	The World Bank Enterprise Surveys for years 2004, 2007 and 2008	Logit model and propensity score matching (PSM)	The author finds that labor productivity and total factor productivity are significantly higher for exporters than for non-exporters and that export premium is driven by a learning-by exporting process rather than just a self-selection of more productive firms into exporting. The author refers also to an inverted U-shaped relationship between export intensity and productivity, suggesting the existence of a "threshold of exporting" in the manufacturing firms in Egypt.
Pfeifer (2015)	The World Bank Enterprise Surveys for years 2004, 2007 and 2008	OLS (Pooled and fixed effects linear regressions)	Positive correlation between productivity in manufacturing firms in Egypt and firms managed by top managers who have some kind of university degree, more experience in management activities, and foreign experience in management jobs.

5. Conclusion

This chapter sheds some light on the labor market performance in Egypt, in particular its legal framework. The Labor Law number 12 of 2003 was reviewed by addressing almost all the legal aspects regulating the Egyptian labor market. The law aims at increasing the private sector involvement while at the same time achieving a balance between employees' and employers' rights. The law addresses various important issues, including, most notably, the right of an employer to fire an employee and the conditions pertaining to this, and the right of employees to carry out a peaceful strike according to controls and procedures prescribed in this law.

The law aims at providing more flexibility in the labor market by allowing a private sector employer to renew a temporary contract without transforming it automatically into a permanent employment status as was stated in the preceding law. Also, under the new regulation, employers can terminate a contract more easily and layoffs can be justified by difficult economic conditions. In return, workers that have been dismissed have the right to

appeal. However, workers in the public sector keep their privileges of life-long security for jobs as their contracts cannot be terminated.

The labor law aims at increasing flexibility in the labor market by providing comprehensive guidelines for the recruitment, hiring, compensation, and termination of employees. In particular, it provides more flexibility for firms in the hiring and firing process which has been a major bottleneck for job creation in the Egyptian labor market. Even though this labor law shows some progress, further changes may be required to make it more effective. For example, reducing the social security contribution by employers and workers may help create and formalize jobs. Furthermore, policymakers must recognize that labor regulation is only one part of the broader economic policy framework. Its interaction with the regulations of product markets, macroeconomic policy, and the business investment climate will determine the overall labor market performance.

References

Ahsan, A., Pagés, C. (2009). Are all labor regulations equal? Evidence from Indian manufacturing. Journal of Comparative Economics 37, 1, 62-75.

Al-Azzawi, S. (2014). Trade liberalization, industry concentration and female workers: The case of Egypt. *IZA Journal of Labor Policy* 3, 20. http://www.izajolp.com/content/pdf/2193-9004-3-20.pdf

Boni, G. (2009). The labor market in the SEM countries: A legal perspective. *CARIM*, mimeo. http://cadmus.eui.eu/handle/1814/11848

Central Agency for Public Mobilization and Statistics (CAPMAS) (2012). *Annual Labor Force Survey for 2012.* Cairo.

Caballero, R., Cowan D., Engel E., Micco A. (2013). Effective labor regulation and micro economic flexibility. Journal of Development Economics 101, 1, 92-104.

De Gobbi, M., Nesporova, A. (2005). Towards a new balance between labor market flexibility and employment security for Egypt. ILO, *Employment Strategy Paper No.10*.

Djankov, S., Ramalho, R. (2009). Employment laws in developing countries. *Journal of Comparative Economics* 37, 1, 3-13.

Ehab, M. (2012). Labor market flexibility in Egypt: with application to the textiles and apparel industry. Egyptian Centre for Economic Studies, *Working Paper No. 170*.

El-Ghamrawy, T., Amer, Z. (2011). Public wage premium in Egypt: Mirage or reality? Egyptian Centre for Economic Studies, *Working Paper No.164*.

El-Hamidi, F., Said, M. (2008). Have economic reforms paid off? Gender occupational inequality in the new millennium in Egypt. Egyptian Centre for Economic Studies, *Working Paper No. 128*.

Frost, J. (2008). Returns to qualifications in informal employment: A study of urban youth in Egypt. Ludwig-Maimilians-Universiät-München,unpublished thesis.

Handoussa, H., El Oraby, N. (2004). Civil services wages and reform: The case of Egypt. Egyptian Centre for Economic Studies, *Working Paper No. 98*.

Helmy, O., (2012). Skill Demand Polarization in Egypt. Egyptian Centre for Economic Studies, *Working Paper No. 168.*

Kiendrebeogo, Y. (2014). Export activity and productivity: New evidence from the Egyptian manufacturing industry. Document de travail de la série Etudes et Documents E 2012.20, Centre d'études et de recherches sur le développement international (CERDI).

Maddala, G. (1983). Limited Dependent and Qualitative Variables in Econometrics, Cambridge: Cambridge University Press.

Mincer, J. (1974). Schooling, Experience and Earnings (New York: National Bureau of Economic Research).

Pfeifer, C. (2015). The nexus between top managers' human capital and firm productivity. *Applied Economics Letters* 22, 12, 982-986.

Said, M. (2004). Compensating differentials and the queue for public sector jobs: Evidence from Egyptian household survey data. School of Oriental and African Studies, University of London, *Working Paper No.136*.

Said, M. (2007). The fall and rise of earnings and inequality in Egypt: New evidence from the ELMPS, 2006. Economic Research Forum, *Working Paper No.708*.

Schwab, K. (ed.) (2013). The Global Competitiveness Report 2013-2014. Geneva: World Economic Forum.

Sharma, S. (2009). Entry regulation, labor laws and informality. Washington, DC: World Bank http://documents.worldbank.org/curated/en/908491468042012686/Entry-regulation-labor-laws-and-informality.

Wahba, J. (2009a). Labor Markets Performance and Migration Flows in Egypt. Robert Schuman Centre for Advanced Studies, European University Institute.

Wahba, J. (2009b). Informality in Egypt: A stepping stone or a dead end? Economic Research Forum, Working Paper No. 456.

Zaki, C. (2011). On trade policies and wage disparity in Egypt: Evidence from microeconomic data. Economic Research Forum, *Working Paper No. 606*.

Chapter 2

Determinants of Using Fixed-term Contracts in the Egyptian Labor Market: Empirical Evidence from Manufacturing Firms Using World Bank Firm-Level Data for Egypt[12]

Abstract

Based on the dual labor market theory, fixed-term contracts (FTCs) were analyzed to test the following. Firms in the manufacturing sector in Egypt use FTCs to adjust the level of employment to the profit maximizing level in case of demand changes. The hypothesis was not supported by the results of econometric analyses with a firm-level data set from the World Bank Enterprise Surveys. The probit and the Tobit models were used to estimate the probability and intensity of different kinds of numerical labor market flexibility. Empirical results revealed that demand changes had no effects on using FTCs in the manufacturing firms in Egypt.

Keywords: labor market flexibility, fixed-term contracts (FTCs), dual labor market

JEL classification: J21, J41, J

[12] I would like to thank the DAAD and the Egyptian Ministry of Higher Education for funding my scholarship. I'm also grateful to Christian Pfeifer for his valuable comments and guidance during the course of conducting this research. Thanks are also due to Joachim Wagner, Antonia Arsova, and Iris Burmester for helpful discussions and to John P. Weche Gelübcke for guiding me to the data. Any shortcomings in the paper are entirely mine. This chapter was presented in the Colloquim of the Institute of Economics, Leuphana University on 04.06.2014, 7th RGS doctoral conference in Dortmund on 02.2014, 5th Euro-African Conference in Finance and Economics in Agadir in Morocco on 04.2014, 3rd Workshop in applied Economics in Hannover on 05.2014, 14th international conference of the Middle East Economic Association (MEEA) in Hammamet in Tunisia on 03.2015. This chapter is a Working paper number 301 in the University of Lüneburg Working Paper Series in Economics, September2014 and was published in the Journal of Empirical Economics Vol. 4, No. 1, 2015, 29-48.

1. Introduction

According to the recent Global Competitiveness Report 2013/2014, Egypt fell behind a number of MENA (Middle East and North African) regional countries with a rank of labor market efficiency of 146 out of 148 countries. Furthermore, Egypt ranks 120 out of 148 countries in hiring and firing practices during the same year (i.e., high social security payments, severance payment and notice payment requirements, pressure for higher wages through strikes or other channels, etc.). This indicates that the Egyptian labor market is overly regulated, which is evident in its deteriorating performance (The Global Competitiveness Report 2013/2014).

Despite the introduction of the unified Labor Law in 2003[13], with the aim of addressing the shortcomings and the rigidities of the previous law, the unemployment rate reached 14.3 percent in the first quarter of 2014, while informal employment reached 51.2 percent from the whole employment in 2012, an indication of the inadequate capacity of the Egyptian labor market to create formal jobs. Another key problem in the Egyptian labor market is the concentration of unemployment among the educated and the youth. The unemployment rate across those with tertiary education is 36 percent in 2012. On the other hand, the unemployment rate is the highest in the age bracket of 20 to 24 years, reaching 47 percent in 2012 (CAPMAS 2012). Furthermore, unemployment levels are likely to rise further as a result of the demographic pressures with 700,000 expected new entrants to the labor force every year. Of course, this requires on the one hand a higher quality of labor supply through educational reforms[14]. On the other hand, this suggests that any initiative to reduce unemployment will need to boost the demand for labor (Ehab, 2012).

[13] A more detailed description of this law will be shown in the next section.

[14] According to the recent Global Competitiveness Report 2013/2014, Egypt occupies the last rank out of 148 countries in the quality of primary education indicator and ranks 118 in the higher education and training indicator.

The experience across the world, especially in Europe and Latin America during the eighties and nineties, in the last century revealed that relaxing hiring constraints through depending on short-term employment relationships such as FTCs helped formalize a number of jobs and have resulted in stable options for employees in general and especially during economic upturns (Botero et al., 2004; Kaplan, 2008; Aguirregabiria and Alonso-Borrego, 2014; Eichhorst and Marx, 2009; Dhyne and Mahy, 2012; Ricci, 2013). According to the dual labor market theory, firms that face demand fluctuations can hire two types of labor: type one (non-temporary workers) and type two (temporary workers). In "good" economic states, firms will hire a constant number of non-temporary workers and a fluctuating number of temporary workers and the latter will be used in the margin to adjust to demand fluctuations (Saint-Paul, 1991).

Based on the human capital theory and by looking simultaneously at the employer and the employee sides, Portugal and Varejão (2010) studied the determinants of using FTCs in Portugal. This chapter, however, uses a different approach to estimate the determinants of using FTCs in Egyptian manufacturing firms by concentrating only on the behavior of the employers by simulating the same approach adopted by (Pfeifer, 2009) for estimating the probability and intensity of using FTCs in Germany by testing whether the use of FTCs is positively correlated with an increase in demand as proposed by the dual labor market theory. It is important and might be interesting to investigate the same hypothesis tested by (Pfeifer, 2009) in a developing country like Egypt to extract some relevant policy recommendations for a huge labor market in the MENA region. This chapter makes use of a rich panel dataset at the firm-level provided by the Enterprise Surveys at the World Bank by using probit and tobit models. This chapter is organized as follows. In the next section, some institutional background information about the labor law in Egypt in general and FTCs in particular are presented and this is accompanied by descriptive statistics about FTCs. Section three focuses

on theoretical considerations and the research hypothesis. In section four the data description is included and the estimation techniques are explained in section five, followed by the empirical results in section six. Section seven concludes this chapter.

2. Institutional Background

Until July 2003, when the Labor Law number 12 was ratified, existing legislation had been rather stringent, both for workers and employers. It prohibited employers from terminating the contract of a worker after a probation period. In addition, employers were not allowed to recruit workers directly but only through local employment offices. Because of the risk of low productivity of potential workers selected by employment offices, this particular rule was a major problem for employers. To avoid the stringent rules, many employers developed a practice according to which workers had to sign a resignation letter before being regularly hired.[15] Furthermore, workers were not entitled to go on strike when facing difficult working conditions. They could not engage in collective bargaining, either. All these unfavorable conditions for workers made job seekers choose public sector work rather than employment in the private sector. Furthermore, regular work with labor contract was declining, especially for women, and reportedly less than one newly recruited worker out of five was hired with a regular labor contract. Many employers did not grant labor contracts in order to avoid social security restrictions. Women were more affected than men in this regard because of the higher social security costs that the recruitment of a female employee required—maternity benefits, child care facilities, etc. (De Gobbi and Nesporova, 2005).

Labor Law number 12 of 2003 comprises 257 articles that address the legal aspects regulating the Egyptian labor market. The law aims at increasing the involvement of the private sector in creating jobs and, at the same time, achieving a balance between employees' and employers'

[15] In a situation where workers may be dismissed at any time, if the employer decides to use the already-prepared resignation letter, a fixed term contract becomes a better option than a contract for an unlimited duration also for workers who at least know for sure when the labor relationship comes to an end.

rights. Amongst the most important issues that the new law addresses is the right of an employer to fire an employee and the conditions pertaining to this and the right of employees to carry out a peaceful strike according to procedures prescribed in the new law. However, the guarantees provided to employees in the new law do not seem to make private employment any more attractive than it was before; that is why public employment for many Egyptians still remains the preferred option because it offers guarantees against dismissal and ensures the benefits of social insurance, vacations and periodical wage increases for employers and workers. Its fixed and limited daily duration also allows workers to do other jobs at the same time, thereby increasing their incomes (Wahba, 2009).

The 2003 Labor Law also provides comprehensive guidelines for the recruitment, hiring, compensation, and termination of employees. In particular, it provides increased flexibility for firms in the hiring and firing process which has been and still is a major bottleneck for job creation in the Egyptian labor market. Moreover, the law aims at increasing the involvement of the private sector in job creation and at the same time achieving a balance between employees' and employers' rights. The labor law aims at creating more flexibility in the labor market by allowing a private sector employer to renew a temporary contract without transforming it automatically into a permanent employment status as was stated in the preceding law. Also, under the new regulation, employers can terminate a contract more easily and layoffs can be justified by difficult economic conditions. In return, employees who have been dismissed have the right to appeal. However, workers in the public sector keep their privileges of life-long security for jobs, as their contracts cannot be terminated (De Gobbi and Nesporova, 2005).

In addition, the labor law mentions two types of labor contract: contracts for an indefinite period and fixed-term contracts. The latter category includes labor contracts with a fixed term and contracts for the accomplishment of a specific task. The maximum duration of a fixed-

term contract is five years. If the employer and employee agree on a longer employment duration, then the employee has the right to terminate the contract after the initial five years, without receiving compensation; however, the employer must be notified within an agreed time period, namely, three-month prior notice. If the employee and the employer continue in implementing a fixed-term contract after the initial term, such an agreement shall be considered as a renewal of the contract for an indefinite term. A fixed-term contract is deemed renewed for an indefinite period if both parties continue to abide by it after its date of expiry, although an exception is made for foreign workers (Article 105). Upon the agreement of the two parties, the fixed-term employment contract may be renewed several times. The Egyptian law makes it clear that a labor contract for an indefinite period is the rule and that a fixed-term contract is more of an exception. Article 106 establishes, "If the period of a labor contract concluded with a definite period expires and its two parties continue to execute it, it shall then be considered by them as a renewal of the contract for an indefinite period." (Wahba, 2009).

In Egypt, many workers in the private sector are employed with fixed term-contracts while jobs in the government and the public sector are often obtained for an indefinite period. Egyptian legislation grants the right to equal treatment to fixed-term workers and workers hired for an indefinite period of time with regard to access to pension schemes and other social benefits. Yet, doubts may easily be expressed on the actual application of this provision, given that private companies do not always provide benefits related to social protection (De Gobbi and Nesporova, 2005). It is worthwhile mentioning that the 2003 labor law does not mention any other atypical forms of labor contracts, besides fixed-term contracts, to promote labor market flexibility. Part-time work and temporary agency work are not mentioned in the labor law. Probation contracts are admitted for a maximum duration of three months.

In general, the Egyptian labor market legislation appears rather flexible. Despite the new labor law's lack of specific mention of other types of labor contracts, such as part-time and

temporary agency work, the unlimited and free use of fixed-term contracts grants employers considerable power and freedom in shaping the size and employment modalities of their labor force at different moments, production cycles and economic circumstances (De Gobbi and Nesporova, 2005). Some of the MENA countries, such as Bahrain, Iran, Iraq, Oman, Saudi Arabia, and Syria, have no limits on the duration of fixed term contracts, while Djibouti, Morocco and Yemen have established a limit of 12 months. Other countries, such as Qatar, Jordan, Kuwait, and the United Arab Emirates, have longer limits for the duration of fixed-term contract ranging from 24 to 60 months. Some of the countries in the region, such as Algeria, Iraq, Jordan, Kuwait, Oman, and the United Arab Emirates, have no limits on the renewal of fixed term contract. Other countries limit the number of times or regulate the time span under which fixed term contracts are renewed. Only Morocco prohibits renewal of fixed term contracts (Urdinola and Kuddo, 2010). Data from the World Bank Enterprise Surveys indicate that in some regional MENA countries labor regulation is perceived as an important constraint to doing business, which indicates to some extent the low level of labor market flexibility.

Table 2 presents the share of firms identifying labor regulations as a major constraint to doing business based on the World Bank Enterprise Surveys. In some countries, mainly Lebanon, Oman, Syria, and Egypt, labor regulation is perceived by firms as a major constraint while to a less extent this is also true in other countries such as Jordan, Algeria, Morocco, and the West Bank and Gaza. It is interesting that employers in countries with “apparently” more rigid labor regulation such as Algeria and Morocco do not identify labor law as a major constraint to doing business as much as in countries with “apparently” less rigid labor laws such as Egypt, Lebanon, and Syria. This can be explained by the fact that labor regulation could be completely bypassed in some countries where enforcement is low. In such cases, despite the

existence of rigid labor laws, the labor market could be virtually unregulated and thus be quite flexible in reality (Urdinola and Kuddo, 2010).

Table 2: Share of firms identifying labor regulations as a major constraint to doing business

Lebanon 2006	38 %
Oman 2003	35 %
Syria 2003	34 %
Egypt 2008	27 %
Morocco 2007	16 %
Algeria 2007	14 %
Jordan 2006	14 %
WBG 2006	12 %

Source: World Bank 2010 at: www.enterprisesurveys.org

3. Theory and Hypothesis

Employers have several strategies to react to demand-induced output fluctuations (Pfeifer, 2005). Based on the strategies that firms use, Atkinson (1984) distinguished between four forms of labor market flexibility. First, external numerical flexibility and this can be achieved by employing workers on temporary work or fixed-term contracts or through relaxed hiring and firing regulations according to the firms' needs. Second, internal numerical flexibility, which can be achieved by adjusting working hours or schedules of workers already employed within the firm. Third, functional flexibility or organizational flexibility, which describes the extent to which employees can be transferred to different activities and tasks within the firm. Job rotation is a label given to many functional flexibility schemes. Fourth, financial or wage flexibility, which indicates that the employees' wages can vary according to their performance and according to the firm's production plans. In other words, wage levels are not decided collectively and there are more differences between the wages of workers.

This is done so that pay and other employment costs reflect the supply and demand of labor (Atkinson, 1984).

This chapter focuses only on external numerical flexibility[16] and shows the impact of using FTCs in this regard. In a labor market, both parties–employers and employees– would contract at the market clearing wage with an explicit or implicit understanding that employees provide a certain level of labor services in exchange for the wage. Accordingly, both parties would have to keep an eye on each other to make sure that the terms of the contract are adhered to. This is easy for employees as long as they are paid the contracted wage but not so easy for the employer. Thus, employers would have to monitor employees' performance to ensure that they provide the contracted amount of labor services. In case an employee is not abiding by the contract pretending to work while not and in the absence of penalties for breach of contract, the only punishment that the firm can impose is to dismiss the shirking employee. "The shirking model of (Shapiro and Stiglitz, 1984) is the most frequently cited efficiency wage model. The model assumes that there is a fixed supply of $\overline{E}$ identical employees whose utility functions can be represented by $u = w - e$. This form of the utility function implies risk neutrality of wages and effort, assuming that the employees' choice is restricted to two levels of effort, $e = 0$, and some positive level, $e > 0$. Employees who are employed are paid a wage of w. Those who choose $e > 0$ will always be employed at this wage. Those who shirk, choose $e = 0$, however, face a risk of being caught shirking in which case they will be fired. The probability, per unit of time, of this happening is q. When fired they join the ranks of the unemployed and receive unemployment benefit of b. However, the shirkers do not remain unemployed forever. Having become unemployed they are free to look for another job. The probability of finding another job depends on the state of the labor market. Workers who decide not to shirk are employed all the time at a utility $u = w - e$ per

[16] Other forms of flexibility are out of the scope of this chapter.

period. A worker who chooses a shirking strategy alternates between employment and unemployment. Suppose that the worker is employed for a fraction θ of the time and unemployed for the remainder, $1-\theta$. The utility from shirking can then be expressed as a weighted average of the utility when employed and when unemployed. According to the above arguments the utility of a non-shirker is

$$u^N = (w-e) \qquad (1)$$

While the shirker's utility is

$$u^S = \theta w + (1-\theta)b \qquad (2)$$

The worker's optimization problem is to choose the strategy that yields the highest expected utility. This means that a worker will not shirk if and only if $u^N > u^S$, known as the "no shirking condition." Using (1) and (2), the no shirking condition can be written as

$$w > b + [1(1-\theta)]e \qquad (3)$$

The first term on the right hand side is the income that would be obtained from unemployment. Clearly the wage must be larger than that amount. It also has to compensate the non-shirker for the utility loss of exerting effort, which explains the second term on the right hand side. When the shirker is employed, he or she is better off than the non-shirker, by e to be precise. For it to be profitable not to shirk, the difference between w and b must be large enough to make up for this fact. We see from the form of the second term that this difference is larger; the smaller is $1-\theta$, the proportion of time a shirker is unemployed" (Bosworth et al., 1996, pp. 307-308).

Dual labor market theory suggests that market processes tend to create non-temporary jobs characterized by high wages and long job tenure and temporary jobs that offer low wages and short tenure. Firms may be motivated to hire temporary workers who form a buffer of last-

hired-first-fired workers when firms expect demand fluctuations (Rebitzer and Taylor, 1991) and (Hagen, 2003). According to internal dual labor market theory, firms require some degree of flexibility in their workforce during a recession to reduce the total amount of employment needed to adjust to the profit-maximizing level. Firms do not want to get this flexibility at the expense of their non-temporary (core) employees, which is why they concentrate the adjustments on the temporary employees (periphery) of the workforce who are less crucial (Cappelli and Neumark, 2004).

Pfeifer (2009) explained easily how temporary employment reacts more strongly than permanent employment if a firm encountered demand changes. Equation (4) refers to the share of FTCs in total employment $(0 \le \mu \le 1)$, in which total employment (E) consists of temporary employment (F) and permanent employment (N) which all depend on some output measures (Y).

$$\mu(Y) = \frac{F(Y)}{E(Y)} = \frac{F(Y)}{N(Y) + F(Y)} \qquad (4)$$

$$\frac{\partial \mu}{\partial Y} = \frac{\left(\frac{\partial F}{\partial Y} \cdot N\right) - \left(\frac{\partial N}{\partial Y} \cdot F\right)}{\left(N + F\right)^2} \qquad (5)$$

Equation (5) is obtained by deriving equation (4) with respect to Y. It is obvious that the share of temporary employment increases with an increase in demand $\left(\partial \mu / \partial Y > 0\right)$ if $\partial F / \partial Y > \partial N / \partial Y \ge 0$ and $N \ge F > 0$. The first condition is met by the assumption that temporary employment reacts more strongly to changes in demand than permanent employment. This holds even if the permanent employment is not adjusted at all $\left(\partial N / \partial Y = 0\right)$ which might be attributed to better working conditions and higher job security they have. Consequently, $\partial \mu / \partial Y > 0$ is always given. The second condition that $N \ge F$ is more frequently to occur. However, even if $N < F$, it is possible that $\partial \mu / \partial Y > 0$ if $\partial F / \partial Y$ is

large enough or if $\partial N / \partial Y$ is small enough (Pfeifer, 2009, p. 96). The previous background leads us to the following hypothesis: Temporary employees (FTCs) tend to increase (decrease) with an increase (decrease) in demand changes as proposed by the dual labor market theory.

4. Data Description

The World Bank Enterprise Surveys[17] collect data from key manufacturing and service sectors in different regions all over the world. These Surveys use standardized survey instruments and a uniform sampling methodology to minimize measurement error and to yield data that are comparable across the world's economies. Most importantly, the Enterprise Surveys are designed to provide panel data sets to pinpoint how and which of the changes in the business environment affects firm-level productivity over time and across countries. It is worth noting that there is a lack of studies using the World Bank enterprise survey not only in Egypt but also at the MENA region. The dataset covers major industries in the manufacturing sector, such as textiles, garments, food, metals, machinery, electronics, chemicals, wood and furniture, non-metallic and plastic products, paper, and printing and publishing. The topics of these surveys include firm characteristics, gender participation, access to finance, annual sales, costs of labor, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilization, land and permits, taxation, informality, business-government relations, innovation and technology, and performance measures. There is also information on firms' sales, working capital and new investments, exporting and importing activities and total costs of labor, including wages, salaries and bonuses, in addition to the conditions in the local investment climate and how they affect firm-level productivity, exports and imports.[18] Over 90 percent of the questions objectively ascertain characteristics of a country's business

[17] See www.enterprisesurveys.org for detailed description of the data and methodology used for data collection.

[18] Furthermore, there are other interesting questions about the unethical behavior in Egyptian businesses. For example, did the firm have to present gifts or unofficial payments to "get things done" with regard to taxes, customs, licenses, regulations, services, etc.

environment. The remaining questions assess the survey respondents' opinions on what the obstacles are to firm growth and performance (Enterprise Surveys, 2008).

The enterprise surveys contain some information that allows the measuring of the impact of labor regulations that might directly affect firms' decision to hire or lay off workers. One important question asks about the two main reasons that influence the decision to change the number of employees. Another question[19] asks about the number of workers that firms would adjust by if there were no restrictions on the labor markets as to hiring and firing. The surveys also include information on the number of temporary and permanent workers, male and female workers and employees, skilled and unskilled workers, part-time and full-time, the percentage of unionized workforce and others. The surveys also have important information about the education levels of permanent employees (males and females), the highest level of education of the top managers and the number of years of experience they have in a foreign and in a domestic establishment before running their establishments. The Enterprise Survey questionnaire is answered by business owners and top managers. Sometimes the survey respondent calls company accountants and human resource managers into the interview to answer questions in the sales and labor sections of the survey.

The panel data set for the manufacturing firms in Egypt for years 2004, 2007 and 2008 is an unbalanced panel data set with gaps in some years (e.g., 2005 and 2006); however, it is a rich data set that covers different topics as mentioned. The data set includes 3129 observations and the sample size is 2672 observations.

Table 3 displays the probability of using FTCs among Egyptian employees in manufacturing firms in 2004, 2007 and 2008. The probability that firms use FTCs for their total employment is 43.7 percent in 2004, 29.8 percent in 2007, and 31.2 percent in 2008. Among the male

[19] "At your current level of production, how many workers would you fire/hire, if there are no restrictions affecting your decision?"

employment, the probability of using FTCs is 31.2 percent in 2004, 29 percent in 2007 and 29.7 percent in 2008, while among female employment the probability of using FTCs is 14.2 percent in 2004, 12.3 in 2007 and 12.4 in 2008.

Table 3: Probability of using FTCs in manufacturing firms in 2004, 2007 and 2008

	2004	2007	2008
Total	43.7%	29.8%	31.2%
Male	31.2%	29%	29.7%
Female	14.2%	12.3%	12.4%

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank

Now, we turn to the econometric analysis which tests whether or not the use of FTCs is positively correlated with an increase in demand as proposed by the dual labor market theory.

5. Estimation Techniques

The empirical analysis is divided into two parts to test whether or not the use of FTCs is positively correlated with an increase in demand as proposed by the dual labor market theory. The first part estimates the probability of using FTCs and the second part focuses on the estimation of the share (intensity) of FTCs. The hypothesis about an expansion of total employment in case of a positive development of sales with an expansion of FTCs is tested by estimating the probability of using FTCs using a dummy dependent variable, which takes the value one if the share of FTCs is larger than zero $(F_{it} > 0)$ and zero if no employee with a FTC is employed $(F_{it} = 0)$ (Pfeifer 2009, pp. 97-98). It is worth noting again here that the methods used in this chapter remain to some degree a replication of Pfeifer (2009) although some different specifications will be presented for the sake of robustness checks. For instance, the capacity utilization is used as a proxy for the changes of demand and not only the development of sales. More details will be given later in this section.

Linear probability models (LPM) have some drawbacks. The two most important disadvantages are that the fitted probabilities can be less than zero or greater than one and the marginal effects of the explanatory variables are constant. These limitations of the LPM models can be overcome by using binary response models. The probit model is a binary dependent variable model. It is an example of limited dependent variable models (LDV)[20] whose range of values is substantively restricted (Wooldridge, 2009). Such a binary choice model can be estimated with the technique in equation (6), where Φ is the standard normal cumulative distribution function.

The panel dataset enables us to estimate a random effects probit model, which exploits the serial correlation in the error terms generated by unobserved heterogeneity to improve the efficiency of the estimator. The coefficients are denoted with α and β, the constant term with γ, and the firm index is i (Pfeifer, 2009, pp. 97-98).

$$\Pr\left(F_i \rangle 0\right) = \Phi\left(\gamma + \alpha\left(\log Y_{it} - \log Y_{i,t-1}\right) + x_i^{'}\beta\right) \quad (6)$$

The development of sales is measured as the logarithm of the firms' sales Y_{it} in Egyptian pound for the year (2007) minus the logarithm of sales $(Y_{i,t-1})$ in the last year (2006). In addition, a row vector of control variables is included (x_i'). It may be argued that the development of sales is not the best proxy for the changes of demand[21]. We are lucky that our rich dataset allows the use of another proxy to capture changes of demand. This variable is capacity utilization which refers to the amount of output actually produced relative to the maximum amount that could be produced within a certain firm using existing machinery and equipment and regular shifts that is why capacity utilization will be used as well later to measure changes of demand. Per capita wages are calculated by dividing total cost of labor,

[20] Limited dependent variable models can be used for time series and panel data, but they are most often applied to cross-sectional data.

[21] 295 observations are missing data for the sales as many firms are often reluctant to share such sensitive information and no way of compelling them to respond as clarified by the Enterprise Surveys technical team.

including wages, salaries and bonuses by total employment. Differences in the employment structure of firms are taken into account by the following variables: female, unionized and qualified employees in total employment. Furthermore, Dummy variables are used to control for four variables:

i. Firm size by categorizing firms into small-size firms (50-100 workers), medium-size firms (100-1000 workers) and large-size firms (higher than 1000 workers).

ii. Macroeconomic uncertainty[22] to control for aggregated influences (like recession inflation, etc.) to find out whether these influences affect the operation and growth of business. Ernst and Viegelahn (2014) derived a measure for the macroeconomic uncertainty that employers are confronted with when taking decisions about the size of their workforce. They argued that hiring can be seen as a real investment option. When hiring new staff, firms invest into an increase of their workforce. They incur a sunk cost which includes the costs of recruitment, training and committed salary payments. In return, they expect that the newly hired workers contribute to larger profits through their productivity. However, it is uncertain how productive new staff can be, given that the macroeconomic environment in which workers operate is uncertain. Even if a firm is perfectly able to assess the skill level of new entrants through appropriate screening measures in the recruitment process, there is some uncertainty about the returns on the investment. There are external factors beyond the control of an individual firm, in particular economic policies that can have an impact on the demand for the firms' products and services as well as on the conditions of production. These factors, thus, have a bearing on the return that is generated by new staff.

[22] Uncertainty is hard to measure since it is an intrinsically unobservable concept. It reflects the uncertainty in the minds of consumers, managers and policymakers about possible futures. It is also a broad concept—reflecting uncertainty over macro phenomena like GDP growth, over micro phenomena like firm-growth, and over non-economic events like war and climate change. So not surprisingly there is no one perfect measure of uncertainty, but a range of proxies like stock-market and GDP volatility, forecaster disagreement, news mentions of "uncertainty" and firm TFP shock dispersion (Bloom, 2014).

iii. Labor regulation effects like social insurance which shows whether or not these regulations affect firm operations and growth and hence the hiring decision. The effect of labor market regulations on economic outcomes is the subject of an ongoing and often heated debate among economists and policymakers. To some, regulations are detrimental to economic efficiency and, therefore, an impediment to growth and prosperity. To others, they are essential tools to correct market imperfections and achieve goals of redistribution without hampering efficiency (Boeri et al., 2008).

iv. Hiring willingness which shows whether or not hiring decision restrictions (Minimum wages, social insurance, generous paid leaves, vacations, etc.) are constraining the hiring decision of the employer[23].

Correlation matrix shows that there is a very weak correlation between explanatory variables in the model.

Table 4: Correlation matrix for explanatory variables

	Development of sales	Wages per capita	Share of female employees	Share of qualified employees	Share of unionized employees	Macroeconomic uncertainty	Labor regulations	Hiring willingness
Development of sales	1.0000							
Wages per capita	0.0558	1.000						
Share of female employees	-0.0137	-0.0339	1.000					
Share of qualified employees	-0.0061	0.0191	-0.0524	1.0000				
Share of unionized employees	0.0222	-0.0091	-0.0084	0.0345	1.0000			
Macroeconomic uncertainty	-0.0330	-0.0779	-0.0386	-0.0187	-0.0174	1.0000		
Labor regulations	-0.0126	-0.0059	0.0318	-0.0106	-0.0104	0.0356	1.0000	
Hiring willingness	0.0366	0.0072	0.0077	-0.1207	-0.0279	-0.0070	-0.0426	1.0000

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

[23] A question in the questionnaire: At your current level of production, how many workers would you hire, if there are no restrictions affecting your decisions?

Now, I proceed to the second part of the empirical analysis by estimating how much are FTCs employment in the total workforce composition (the FTCs intensity). Based on the dual labor market theory, the share of FTCs $\left(F_i \ / E_i\right)$ should be positively correlated with an increase in sales (see equations (4) and (5) in section 3), by that, the composition of the workforce should change in favor of FTCs. Consequently, the number of FTCs (F_i) divided by the number of all employees (E_i) is regressed on an indicator for each firm's development of sales. As the share of FTC in total employment can only take values that range between zero (no FTCs) and one (only FTCs), the total sample includes corner solutions. The Tobit[24] model is useful in such situations. Hence, equation (7) is estimated with a double-censored Tobit model for the total sample with a lower limit at zero and an upper limit at one, in which the error term is denoted with u_{it}. The panel character of the data enables the use of a random effects Tobit model.

$$\frac{F_i}{E_i} = \gamma + \alpha(\log Y_{it} - \log Y_{i,t-1}) + x_i'\beta + u_i \quad (7)$$

The intensity has to be explained by the same variables like the probability of using FTCs and the coefficients in both equations need to have the same signs (Verbeek, 2004). It is not an easy mission to find variables that are important for the probability (yes or no decision), while it is not important for the intensity (how much decision) and vice versa that is why Tobit I estimates for the total sample might be biased. Alternatively, Heckman's selection model (Heckman, 1979), which is a so-called Tobit II model, if maximum likelihood is applied, can provide a useful way to explore this problem. According to the sample selection model, firms hiring FTCs workers presumably are not a random sample and the decision of using FTCs is different from the decision of how many FTCs to employ. Notwithstanding, some drawbacks

[24] While the probit and the logit models are used for a binary response outcome, the Tobit model is used for a corner solution outcome.

with Heckman's selection model came up to the surface. For instance, the identification problem cannot be solved if the probability and the intensity are determined by the same regressors in both equations. Moreover, the results are very sensitive to changes of the specification (Pfeifer, 2009, pp. 97-98).

Marginal effects[25]are informative means of summarizing how change in an outcome is related to change in the explanatory variables. In nonlinear[26] models like probit and Tobit, marginal effects are computed after estimations. The marginal effects of the probit model calculate the probability of a positive outcome, assuming that the random effect for that observation's panel is zero. This probability may not be similar to the proportion of observed outcomes in the group.

The marginal effects of the Tobit model are complex. The estimated coefficients are the marginal effects of a change in x_j on y^*, the unobservable latent variable

$$\frac{\partial E[y^*|\boldsymbol{X}]}{\partial x_j} = \beta_j$$

but that information is rarely useful. The effect on the observable y is

$$\frac{\partial E[y|\boldsymbol{X}]}{\partial x_j} = \beta_j \times \Pr(a < y_i^* < b)$$

where a is the lower limit for left censoring (from below) and b is the upper limit for right censoring (from above). For left censoring at zero, $a = 0$, $b = +\infty$ and an increase in an explanatory variable with a positive coefficient implies that a left-censored individual is less likely to be censored. For an uncensored individual, an increase in x_j will imply that E [y | y

[25] Marginal Effects at the Means (MEMs) are computed by setting the values of X variables at their means, and then seeing how a change in one of the Xk variables changes P(Y = 1). With Average Marginal Effects (AMEs), a marginal effect is computed for each case, and the effects are then averaged. Many prefer AMEs because they provide a better representation of how changes in Xk affect P(Y = 1).

[26] In the linear regression model, the ME equals the relevant slope coefficient, greatly simplifying analysis.

> 0] will increase. For a detailed explanation, see Baum (2006, p.264). In the Tobit model, two different types of marginal effects are computed for each explanatory variable on the probability [prob (FTC> 0)] and intensity [E (FTC-share|FTC>0)] of using FTCs as shown in tables 4 and 5.

6. Empirical Results

The results of the probit model together with their marginal effects are presented in Table 5.

Table 5: Probability of FTCs; probit and marginal effects

	Probit	Average Marginal effects
Development of sales	0.0244 (0.030)	0.0077 (0.009)
Wages per capita	-0.00005 (0.00005)	-0.00001 0.00001
Share of qualified employees	0.0527 (0.0474)	0.0167 (0.015)
Share of female employees	0.3796** (0.1482)	0.1206** (0.0468)
Share of unionized employees	-0.0003 (0.0006)	-0.0001 (0.0002)
Labor regulations	-0.0769 (0.0622)	-0.0244 (0.0197)
Hiring willingness	0.4643*** (0.0574)	0.1475*** (0.0174)
Macroeconomic uncertainty	0.1217* (0.0654)	0.0387* (0.0207)
Firm size: 51-99 employees (dummy)	0.344*** (0.0933)	0.1152*** (0.0320)
100-1000 employees (dummy)	0.035 (0.0693)	0.011 (0.0218)
> 1000 employees (dummy)	0.0430 (0.1335)	0.0135 (0.0423)
Constant	-0.672 (0.133)	
Year (dummies)	Yes	Yes
Industry (dummies)	Yes	Yes
Region (dummies)	Yes	Yes

Number of observations	2665	2665

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

There is no evidence that firms with a better demand development are more likely to use FTCs. Estimates show that the impact of demand changes is not significant at any level of significance but has a positive sign. A possible explanation of the previous result is that the labor market in a developing country like Egypt is dual in its structure and many Egyptians do not have the opportunity to work in the formal labor market even when firms are with better demand developments. This could be attributed to the insufficient incentives given to employers in the Egyptian manufacturing firms (e.g., expensive social insurance contributions they bear). The coefficient of the share of female employees is 0.379 and significantly correlated with the probability of using FTCs at the 5 per cent level (marginal effect: 0.120), which means that holding all other explanatory variables constant, the probability of using FTCs increases by this amount (0.120) when the share of qualified employees increases by a unit.

The coefficient of the willingness of employers to hire new workers if there are no restrictions is 0.464 and significant at 1 per cent which may mean that the lowering of different hiring restrictions (e.g., social insurance contributions) would be needed. Firm size is significantly positively correlated with the probability of using FTCs for small firms at 1 percent. The other control variables are not significant. The empirical results suggest also that macroeconomic uncertainty is significantly positively correlated with the probability of using FTCs. It might be that employers prefer hiring temporary employment in such macroeconomic uncertainty situations (recession, inflation, etc.). The correlation between the share of FTCs in total employment and changes in demand is estimated using the Tobit model. The results are represented in Table 6.

Table 6: Share of FTCs; Tobit and marginal effects

	Tobit	Average Marginal effects Prob(FTC> 0)	Average Marginal effects E(FTC-share|FTC>0)
Development of Sales	0.0043 (0.008)	0.0046 (0.008)	0.0011 (0.0043)
Wages per capita	-0.00001 (0.0083)	-0.00001 (0.00001)	-3.25e-06 (0.00001)
Share of qualified employees	0.0089 (0.0112)	0.0095 (0.0119)	0.0024 (0.0082)
Share of female employees	0.1323** (0.0394)	0.1413** (0.0419)	0.0358 (0.1138)
Share of unionized employees	-4.56e-07 (0.0001)	-4.87e-07 (0.00019)	-1.23e-07 (0.00004)
Labor regulations	-0.0088 (0.0168)	-0.0095 (0.0179)	-0.0024 (0.0088)
Hiring willingness	0.130*** (0.015)	0.139*** (0.015)	0.0353 (0.1116)
Macroeconomic uncertainty	0.017 (0.0175)	0.019 (0.0187)	0.0048 (0.0159)
Firm size:			
51-99 employees (dummy)	0.0754** (0.0243)	0.0854** (0.0280)	0.0221** (0.0074)
100-1000 employees(dummy)	-0.0412** (0.018)	-0.0435** (0.0198)	-0.0108** (0.005)
> 1000 employees(dummy)	-0.049 (0.0370)	-0.0517 (0.0375)	-0.012 (0.0094)
Constant	-0.148 (0.036)		
Year (dummies)	Yes	Yes	Yes
Industry (dummies)	Yes	Yes	Yes
Region (dummies)	Yes	Yes	Yes
Number of observations	2665		
Number of left-censored observations	1837		
Number of uncensored observations	828		
Number of right-censored observations	0		

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.
Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

The impact of demand changes is also not significant but has a positive sign. The coefficient of the share of female employees is 0.1323 and significantly correlated with the probability of

using FTCs at the 5 per cent level. The coefficient of the willingness of employers to hire new workers if there are no restrictions is 0.130 and significant at the 1 per cent level. Firm size, like in the probit model, is significantly positively correlated with the probability of using FTCs for small firms at 5 per cent while it is negatively correlated with medium-size firms. The other control variables are not significant. These findings confirm the results in the probit model. Across both models, the share of female employees is significantly and positively correlated with the use of FTCs. This finding might indicate that hiring women increase the probability and intensity of using FTCs which might suggest that employers may prefer to depend on women to men as temporary employment. This might be associated with some cultural and social reasons (e.g. maternity leave) which will be explained later in more details in the next chapter.

The previous results do not support the hypothesis that firms use employees with FTCs to adjust their employment to the profit-maximizing level in case of changes in demand. The same estimation strategy (the probit and the Tobit models) that was adopted to estimate the determinants of using FTCs was implemented to estimate other kinds of numerical labor flexibility (hiring and firing) and no evidence was found that demand changes had effects on hiring and firing (see tables 7, 8, 9 and 10).

Table 7: Probability of hiring employees; probit and marginal effects

	Probit	Average Marginal effects
Development of Sales	0.045 (0.030)	0.0176 (0.0115)
Share of qualified employees	-0.620*** (0.130)	-0.238*** (0.049)
Share of female employees	0.046* (0.122)	0.017* (0.047)
Share of unionized employees	-0.053* (0.032)	-0.020* (0.012)
Labor regulations	-0.169** (0.058)	-0.065* (0.022)
Macroeconomic uncertainty	-0.0131 (0.0614)	-0.005 (0.023)
Firm size: 51-99 employees (dummy)	0.042* (0.091)	0.016* (0.035)
100-1000 employees (dummy)	-0.170* (0.063)	-0.066* (0.024)
> 1000 employees(dummy)	-0.588*** (0.125)	-0.217*** (0.042)
Constant	0.382 (0.104)	
Year (dummies)	Yes	Yes
Industry (dummies)	Yes	Yes
Region (dummies)	Yes	Yes
Number of observations	2672	2672

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

Table 8: Share of hiring employees; Tobit and marginal effects

	Tobit	Average Marginal effects prob(FTC> 0)	Average Marginal effects E(FTC-share|FTC>0)
Development of Sales	0.030 (0.0938)	6.04e-06 (0.00002)	0.0001 (0.0004)
Wages per capita	-0.00004 (0.00014)	-8.48e-09 (3.46e-08)	-1.89e-07 (6.67e-07)
Share of qualified employees	-0.6401*** (0.4096)	-0.00012 (0.00027)	-0.0028*** (0.0018)
Share of female employees	-0.2920 (0.3958)	-0.00005 (0.00014)	-0.0013 (0.0017)
Share of unionized employees	-0.0693 (0.0968)	-0.00001 (0.00003)	-0.0003 (0.0004)
Labor regulations	0.4400** (0.1881)	0.00008 (0.0001)	0.0019** (0.0008)
Macroeconomic uncertainty	0.1296 (0.1976)	0.00002 (0.00006)	0.0005 (0.0008)
Firm size:			
51-99 employees (dummy)	-0.6382** (0.2916)	-0.0003 (0.0005)	-0.0028** (0.0013)
100-1000 employees(dummy)	-0.5692** (0.2065)	-0.0001 (0.0002)	-0.0025** (0.0009)
> 1000 employees(dummy)	-0.4772 (0.3847)	-0.00005 (0.0004)	-0.0021 (0.0017)
Constant	1.31645 (0.3685)		
Year (dummies)	Yes	Yes	Yes
Industry (dummies)	Yes	Yes	Yes
Region (dummies)	Yes	Yes	Yes
Number of observations	2650		
Number of left-censored observations	0		
Number of uncensored observations	2650		
Number of right-censored observations	0		

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

Table 9: Probability of firing employees; probit and marginal effects

	Probit	Average Marginal effects
Development of Sales	0.0037 (0.0329)	0.0008 (0.0076)
Share of qualified employees	-0.3230** (0.1433)	-0.0752** (0.0333)
Share of female employees	0.2943** (0.1412)	-0.0685** (0.0328)
Share of unionized employees	0.0074 (0.0301)	-0.0017 (0.0070)
Labor regulations	0.0166 (0.0651)	-0.0038 (0.0151)
Macroeconomic uncertainty	0.0959 (0.0700)	0.0223 (0.0163)
Firm size: 51-99 employees (dummy)	-0.0756 (0.1015)	-0.0175 (0.0229)
100-1000 employees (dummy)	-0.1230* (0.0707)	-0.0278* (0.0156)
> 1000 employees (dummy)	0.1719 (0.1241)	0.0449 (0.0344)
Constant	-0.838 (0.113)	
Year (dummies)	Yes	Yes
Industry (dummies)	Yes	Yes
Region (dummies)	Yes	Yes
Number of observations	2672	2672

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

Table 10: Share of firing employees; Tobit and marginal effects

	Tobit	Average Marginal effects prob(FTC> 0)	Average Marginal effects E(FTC-share|FTC>0)
Development of Sales	-0.01950 (0.02105)	-0.000691 (0.00075)	-0.00062 (0.00067)
Wages per capita	-9.75e-06 (0.000033)	-3.45e-07 (1.17e-06)	-3.14e-07 (1.06e-06)
Share of qualified employees	-0.1397 (0.09198)	-0.00495 (0.00329)	-0.00449 (0.0029)
Share of female employees	-0.074895 (0.10824)	-0.00265 (0.00384)	-0.00240 (0.0034)
Share of unionized employees	-0.00285 (0.0206)	-0.00010 (0.00073)	-0.00009 (0.0006)
Labor regulations	0.02085 (0.04202)	0.000739 (0.0014)	0.0006 (0.0013)
Macroeconomic uncertainty	-0.011034 (0.04348)	-0.0003911 (0.00154)	-0.0003 (0.0013)
Firm size:			
51-99 employees (dummy)	-0.09431 (0.503)	-0.00322 (0.0026)	-0.0030 (0.0023)
100-1000 employees (dummy)	-0.16233** (0.05647)	-0.0059* (0.0022)	-0.0052** (0.0018)
> 1000 employees (dummy)	-0.12673 (0.108378)	-0.00449 (0.0043)	-0.0040 (0.0034)
Constant	0.1884 (0.11167)		
Year (dummies)	Yes	Yes	Yes
Industry (dummies)	Yes	Yes	Yes
Region (dummies)	Yes	Yes	Yes
Number of observations	2654		
Number of left-censored observations	0		
Number of uncensored observations	2654		
Number of right-censored observations	0		

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

It is worth noting here again that firms' average capacity utilization (in percentages) was used as a proxy for demand changes instead of using the development of sales and no evidence was found also that demand changes had effects on using FTCs in the Egyptian manufacturing firms (See tables 11 and 12).

Table 11: Probability of FTCs; probit and marginal effects

	Probit	Average Marginal effects
Capacity utilization changes	0.00160 (0.00238)	0.00047 (0.0007)
Wages per capita	-0.000024 (0.00004)	-7.31e-06 (0.000012)
Share of qualified employees	-2.139*** (0.1449)	-0.6299*** (0.0358)
Share of female employees	0.2540 (0.1432)	-0.0748 (0.04204)
Share of unionized employees	-0.0259 (0.0292)	-0.0076 (0.00861)
Labor regulations	-0.06348 (0.0602)	-0.0186 (0.017)
Hiring willingness	0.4004*** (0.055556)	0.1179*** (0.01579)
Macroeconomic uncertainty	0.1776 (0.0641)	0.0523* (0.01875)
Firm size: 51-99 employees (dummy)	0.1983** (0.09037)	0.06022* (0.02800)
100-1000 employees (dummy)	0.00169 (0.0673)	0.00049 (0.0196)
> 1000 employees (dummy)	0.05031 (0.1279)	0.014* (0.0380)
Constant	0.5159 (0.1476)	
Year (dummies)	Yes	Yes
Industry (dummies)	Yes	Yes
Region (dummies)	Yes	Yes
Number of observations	2895	2895

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

Table 12: Share of FTCs; Tobit and marginal effects

	Tobit	Average Marginal effects prob(FTC> 0)	Average Marginal effects E(FTC-share|FTC>0)
Capacity utilization change	0.0005 (0.0005)	0.0006 (0.0006)	0.00015 (0.0001)
Wages per capita	-7.05e-06 (0.00001)	-7.78e-06 (0.00001)	-1.97e-06 (2.93e-06)
Share of qualified employees	-0.6628*** (0.0341)	-0.7309*** (0.0306)	-0.185*** (0.0095)
Share of female employees	0.0603 (0.0342)	0.0665 (0.0377)	0.0168 (0.0095)
Share of unionized employees	-0.0047 (0.0072)	-0.0051 (0.0079)	-0.0013 (0.0020)
Labor regulations	-0.0098 (0.0143)	-0.0108 (0.0158)	0.0027 (0.0040)
Hiring willingness	0.1025*** (0.0133)	0.1130*** (0.0142)	0.0286*** (0.0037)
Macroeconomic uncertainty	0.0275 (0.0152)	0.0304 (0.0168)	0.0077 (0.0042)
Firm size:			
51-99 employees (dummy)	0.0215* (0.0211)	0.0248 (0.0245)	0.0063 (0.0063)
100-1000 employees (dummy)	-0.0620*** (0.0163)	-0.0675*** (0.0176)	-0.0168*** (0.0043)
> 1000 employees (dummy)	-0.0536* (0.0321)	-0.0587* (0.0340)	-0.0146* (0.0083)
Constant	0.2139 (0.0343)		
Year (dummies)	Yes	Yes	Yes
Industry (dummies)	Yes	Yes	Yes
Region (dummies)	Yes	Yes	Yes
Number of observations	2895		
Number of left-censored observations	1988		
Number of uncensored observations	907		
Number of right-censored observations	0		

Note: Standard errors in brackets. Significant at the *10, **5 and *** 1% levels.

Source: Enterprise Surveys 2004, 2007 and 2008, World Bank.

7. Conclusion

The econometric evidence did not support the ideas of the dual labor market theory that firms in the manufacturing sector in Egypt use employees with FTCs to adjust their employment to the profit-maximizing level in case of demand fluctuations. Empirical results revealed that demand changes had no effects on using FTCs in the manufacturing firms in Egypt. In addition, the results indicated that there was no effect on using hiring and firing instruments. In the light of knowing the determinants of using FTCs in Egypt, more incentives might be given to employers in the Egyptian manufacturing firms to use this kind of contracts. An agency for temporary work should be created in the Labor Law.

Furthermore, new institutions are still needed to lower hiring restrictions (i.e., social insurance contributions) and thereby improve labor market flexibility in Egypt. This might help lower both the increasing number of the unemployed in Egypt and the growing number of those who are already working but in the informal labor market. Meanwhile, more research might be needed to study the behavior of the other side in the Egyptian labor market (i.e., the supply of labor) to find out what determines the decision of the job seekers themselves to accept or reject this kind of employment relationship (FTCs).

References

Aguirregabiria, V., Alonso, C. (2014). Labor contracts and flexibility: Evidence from a labor market reform in Spain. *Economic Inquiry* 52, 2, 930–957.

Atkinson, J. (1984). Flexibility, Uncertainty and Manpower Management, IMS Report No.89, Institute of Manpower Studies, Brighton.

http://www.employment-studies.co.uk/system/files/resources/files/89.pdf

Baum, C. (2006). *An Introduction to Modern Econometrics Using Stata*, Stata Press, Texas.

Bloom, N. (2014). Fluctuations in uncertainty. Center for Economic Studies, Stanford Institute for Economic Policy Research. *Discussion Paper No. 13-033*.

Boeri, T., Helppie, B., Macis, M. (2008). Labor regulations in developing countries: A review of the evidence and directions for future research. *SP Discussion Paper No. 0833*, the World Bank.

http://documents.worldbank.org/curated/en/180101468316162725/pdf/463060NWP0Box31DiscussionPaper00833.pdf

Boni, G. (2009). The labor market in the SEM countries: A legal perspective. Robert Schuman Centre for Advanced Studies, European University Institute, *CARIM Research reports* 2009/15.

Bosworth, D. Dawkins, P., Stromback, T. (1996). *The Economics of the Labor Market*, 1st edn. Prentice Hall, UK.

Botero, J., Djankov, S., Porta, R., Lopez-De-Silanes, F. (2004). The regulation of labor. *Quarterly Journal of Economics* 119, 4, 1339-382.

Cappelli, P., Neumark, D. (2004). External churning and internal flexibility: Evidence on the functional flexibility and core-periphery hypotheses. *Industrial Relations* 43, 1, 148–82.

Central Agency for Public Mobilization and Statistics (CAPMAS) (2012). *Annual Labor Force Survey for 2012*. Cairo.

De Gobbi, M., Nesporova, A. (2005). Towards a new balance between labor market flexibility and employment security for Egypt. *Employment Strategy Paper*, ILO, 2005/10.

Dhyne, E., Mahy, B. (2012). Work organization, labor contracts and employment. *International Journal of Manpower* 33, 3, 246-263.

Ehab, M. (2012). Labor market flexibility in Egypt: With application to the textiles and apparel industry. Egyptian Center for Economic Studies. *Working Paper No. 170*.

Eichhorst, W., Marx, P. (2009). Reforming German labor market institutions: A dual path to flexibility. *IZA Discussion Paper No. 4100*.

http://ftp.iza.org/dp4100.pdf

Ernst, E., C. Viegelahn (2014). Hiring uncertainty: a new labour market indicator.

http://www.policyuncertainty.com/media/HiringUncertainty.pdf .

Hagen, T. (2003). Does fixed-term contract employment raise firms' adjustment speed? Evidence from an establishment panel for West Germany. Journal of Economics and Statistics 223, 4, 403-421.

Heckman, J.J. (1979). Sample selection bias as a specification error. *Econometrica* 47, 1, 153-161.

Kaplan D. (2008). Job Creation and Labor Reform in Latin America. Enterprise Analysis Unit, World Bank. *Policy Research Working Paper No. 4708*.

Papke, L.E., Wooldridge, J.M. (1996). Econometric methods for fractional response variables with an application to 401(K) plan participation rates. *Journal of Applied Econometrics* 11, 6, 619-632.

Pfeifer, C. (2005). Flexibility, dual labor markets, and temporary employment—Empirical evidence from German establishment data. *Management Revue* 16, 3, 404-422.

Pfeifer, C. (2009). Fixed-term contracts and employment adjustment: An empirical test of the core-periphery hypothesis using German establishment data. *Economic Record* 85, 268, 92–107.

Portugal, P., Varejão, J. (2010). The hidden side of temporary employment: Fixed-term contracts as a screening device. Banco de Portugal, *Working Papers 29*.

Rebitzer, J.B., Taylor, L.J. (1991). A model of dual labor markets when product demand is uncertain. *Quarterly Journal of Economics* 106, 4, 1373-1383.

Ricci, A. (2013). Employers' higher education and typologies of fixed term contracts: First evidence from Italian firms. XXVIII AIEL Conference, Rome.

Saint-Paul, G. (1991). Dynamic Labor Demand with Dual Labor Markets. *Economics Letters* 36, 2, 219-22.

Shapiro, C., Stiglitz, J.E. (1984). Equilibrium unemployment as a worker discipline device. *American Economic Review* 74, 3, 433-444.

Schwab, Klaus (ed.) (2013). The Global Competitiveness Report 2013-2014. World Economic Forum, Geneva.

Urdinola, Kuddo (2010). Key characteristics of employment regulation in the Middle East and North Africa. World Bank, *SP Discussion Paper No.1006*.

Verbeek, M. (2004). *A Guide to Modern Econometrics*, 2nd edn.Wiley, Chichester.

Wahba J. (2009). Labor markets performance and migration flows in Egypt. Robert Schuman Centre for Advanced Studies, European University Institute. *National Background Paper*.

Chapter 3

Determinants of Female Employment in Egyptian Firms[27]

Abstract

We use the World Bank Enterprise Surveys for the Egyptian manufacturing sector in order to estimate pooled and random effects probit and Tobit regressions for the probability that a firm employs any female workers and for the female employment share. Our main findings suggest that female employment at the firm-level is more likely and more intense if the firm is led by a top manager with a university degree and with foreign experience in management jobs, if the firm is an exporter with more export experience, and if the firm does not employ unionized workers.

Keywords: Egypt; Female employment; World Bank Enterprise surveys

JEL classification: J16; J21; J23; J82

[27] This chapter was published in the Empirical Economics Letters, Vol.13, No.12, 2014, 1267-1275 jointly with Christian Pfeifer.

1. Introduction

Gender equality is often considered as important due to equity reasons, but also due to economic reasons such as the negative effect of gender inequality in employment on economic growth (e.g., Klasen and Lamanna, 2009). In the MENA (Middle East and North Africa) region, only about 17 percent of women, compared to 68 percent of men, are employed. This is by far the lowest rate of female employment throughout the world, which is on average almost 50 percent and even higher in Asia and sub-Saharan Africa (OECD, 2013; ILO, 2014, p. 92, table A5). According to the World Bank gender database (http://data.worldbank.org/topic/gender), the share of female employment in Egypt in the nonagricultural sector (industry and services) was 18 percent in 2010.

According to Assad (2007, p. 406), the main reason Egyptian employers are reluctant to hire women is the widespread perception that women have a low attachment to the workforce. Female workers have a high turnover rate, which makes them poor prospects for training; their absenteeism rates are high, and they are often unwilling to work long hours. Such low commitment to the workforce is a direct outcome of social norms that make the home women's primary domain of responsibility. This applies to both married and unmarried women and the situation for married women is further compounded by the fact that their wage work is seen as totally incompatible with marriage, which is why many women quit work at marriage. Furthermore, women are more geographically constrained than men. Their place of residence is generally determined by either parents or husbands so that they cannot adjust where they live to where the jobs are (Moghadam, 1998, pp. 118-119).

Moreover, they are less able to commute long distances to work because of time constraints and safety concerns (Assaad and Arntz, 2005). Public sector work is much preferred by most female workers in Egypt due to its generous medical and retirement benefits, relatively short work hours, low effort requirement, transportation provided by the employer in many

instances, and the presence of a large number of other women in the workplace, providing a measure of safety from male sexual harassment (Assaad, 2007, p. 404).

There is a wide stream of empirical literature that examines the determinants of female employment in the MENA in general and Egypt in particular. This stream of literature has primarily focused on the supply-side factors, mainly demographic and household-related characteristics using household survey data. However, firm-related determinants which influence female employment in Egypt have received less attention. Low female employment could be explained by demand-side factors that are more associated with employers' preferences and characteristics (Pissarides et al., 2005). For example, Fakih and Ghazalian (2015) finds that the MENA's manufacturing firms engaged in exporting activities have higher proportions of female workers by an average of 3.9 percentage points compared to non-exporting firms, ceteris paribus. Assaad and Arntz (2005) reveal that export-oriented industries, which account for the feminization of employment in other countries, appear not to favor female employment in Egypt. Al-Azzawi (2014) also investigates the effects of trade liberalization on female employment and finds that exporting industries are more likely to hire female workers. Al-Azzawi (2014) also controls for the share of workers who are members of a union. The unionization rate was significant only when the share of private sector workers was excluded from the model. In this research note, we provide further empirical evidence of the determinants of female employment by using the World Bank Enterprise Surveys for the Egyptian manufacturing sector.

2. Data and Econometric Approach

We use the World Bank Enterprise Surveys for the Egyptian manufacturing sector for the survey years 2004, 2007, and 2008.[28] These surveys are carried out in an unbalanced panel design at the establishment level. All establishments in the data employ more than 5 workers.

[28] For more information about the World Bank enterprise survey please see http://www.enterprisesurveys.org.

In our estimation sample, the number of observations is 2914 for 1593 firms. In order to study the determinants of female employment in Egyptian firms, we estimate at first probit regressions for the probability that a firm employs, at least, one woman in its permanent workforce, i.e., has a female employment share in all permanent workers larger than zero. Moreover, we estimate Tobit regressions that allow us to compute marginal effects for the extensive margin, i.e., for the probability of reporting a positive female employment share, and marginal effects for the intensive margin, i.e., for the expected female employment share in percent conditional on a positive female employment share (McDonald and Moffitt, 1980). In order to account, at least, partly for unobserved time invariant firm heterogeneity, we exploit the panel nature of the data set by estimating random effects probit and Tobit models as robustness check.[29]

Several explanatory variables that are available in all three survey years and might be important determinants of female employment or important control variables are included in our regressions. Because top managers have a large impact on employment policies in firms, we include characteristics of the top manager (university degree, experience in management jobs, foreign work experience). We further take into account the exporter status and the exporter experience of firms, as international contacts with firms and employees in countries with a higher female employment share might increase the employment opportunities for women in the own company as well, i.e., some kind of spillover effect might exist. Moreover, we include three dummy variables for the ownership structure (firm, at least, partly owned by private Arab investors, by other foreign investors, or by the government which relates to public ownership with pure private Egyptian ownership as reference group). For foreign ownership the same logic as for export holds and public firms are often associated with higher

[29] As no consistent fixed effects models can be estimated for probit and Tobit models in short panels, we can only estimate random effects models that exploit the between and the within variance. Also note that the panel estimates serve mainly as a robustness check because our panel length is short and most variables of interest have low within variance.

female employment shares (e.g., policy driven, sorting due to working conditions which are especially attractive for women). Unions also affect firms' employment policies so that we take into account a proxy for union impact (at least, one unionized worker in firm). Further included firm characteristics are training of workers, the existence of an own R&D department, ownership of other branches, firm's age, employment shares of qualification groups, employment share of temporary workers, and firm size. At last, we control for the survey year and differences in the sector of main activity and the governorate region. For definitions of the variables and descriptive statistics in the pooled sample see Table 13.

Table 13: Descriptive statistics for the pooled sample

	Mean	Std. Dev.	Min	Max
Female employment (dummy)	0.62972	0.48296	0	1
Female employment share (%)	16.40303	21.82494	0	100
Top manager has university degree (dummy)	0.76802	0.42217	0	1
Top manager experience in management jobs (years)	14.08751	12.05521	0	90
Top manager also has foreign experience in management jobs (dummy)	0.07721	0.26698	0	1
Exporter (dummy)	0.24297	0.42895	0	1
Exporter experience (years)	3.18806	7.59508	0	65
Owner partly Arab (dummy)	0.03329	0.17942	0	1
Owner partly foreign (dummy)	0.03089	0.17304	0	1
Owner partly public (dummy)	0.03363	0.18031	0	1
At least, one unionized worker in workforce (dummy)	0.22992	0.42086	0	1
Training of workers (dummy)	0.18188	0.38581	0	1
Own R&D department (dummy)	0.21139	0.40837	0	1
Firm also owns other branches (dummy)	0.21483	0.41077	0	1
Firm's age (years)	22.42107	16.86004	0	148
Share of permanent workers with primary schooling (%)	11.73141	15.74053	0	100
Share of permanent workers with preparatory or incomplete secondary schooling (%)	17.75967	17.73564	0	100
Share of permanent workers with secondary schooling (incl. vocational) (%)	38.55047	22.90496	0	100
Share of permanent workers with university degree (%)	17.03505	14.88345	0	100
Share of temporary workers in all workers (%)	7.09012	13.55875	0	97.22
Firm size categories (dummies, reference 5-10 workers)				
11-20 workers	0.27831	0.44824	0	1
21-100 workers	0.31846	0.46596	0	1
101-500 workers	0.22066	0.41476	0	1
>500 workers	0.09472	0.29287	0	1
Survey year (dummies, reference 2004)				
2007	0.32395	0.46806	0	1
2008	0.37234	0.48351	0	1
Further sets of control variables: Sector of main activity (9 dummies), Governorate region (23 dummies)				

Notes: Number of observations is 2914 for 1593 firms.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08.

3. Estimation Results

Table 14 presents the estimation results for the pooled and random effects probit and Tobit regressions. In order to facilitate the quantitative interpretation, we present and discuss only the average marginal effects. Below the marginal effects, we present the corresponding standard errors in parentheses and the statistical significance levels in brackets. The mean probability that a firm employs female workers is 63 percent in our estimation sample.

The mean female share in all permanent workers is 16.4 percent in the total sample and 26 percent conditional on employing females.

Table 14: Probit and Tobit regression results (average marginal effects)

	Probit (Prob(Y>0))		Pooled Tobit		Random effects Tobit	
	(1) Pooled	(2) Random effects	(3) Prob(Y>0)	(4) E(Y|Y>0)	(5) Prob(Y>0)	(6) E(Y|Y>0)
Top manager university degree (dummy)	0.0747	0.0774	0.0558	2.0510	0.0486	1.7710
	(0.0207)	(0.0219)	(0.0219)	(0.8047)	(0.0179)	(0.6541)
	[0.0003]	[0.0004]	[0.0106]	[0.0108]	[0.0066]	[0.0068]
Top manager experience (years)	-0.0012	-0.0016	-0.0008	-0.0276	-0.0008	-0.0283
	(0.0007)	(0.0008)	(0.0006)	(0.0223)	(0.0006)	(0.0212)
	[0.0911]	[0.0426]	[0.2169]	[0.2165]	[0.1825]	[0.1827]
Top manager foreign experience (dummy)	0.0481	0.0523	0.0416	1.5277	0.0313	1.1409
	(0.0320)	(0.0351)	(0.0225)	(0.8256)	(0.0232)	(0.8474)
	[0.1323]	[0.1367]	[0.0648]	[0.0642]	[0.1780]	[0.1782]
Exporter (dummy)	0.0008	-0.0033	0.0125	0.4608	0.0192	0.7002
	(0.0332)	(0.0369)	(0.0215)	(0.7885)	(0.0232)	(0.8475)
	[0.9812]	[0.9280]	[0.5593]	[0.5590]	[0.4085]	[0.4087]
Exporter experience (years)	0.0047	0.0055	0.0021	0.0776	0.0019	0.0703
	(0.0021)	(0.0026)	(0.0010)	(0.0354)	(0.0012)	(0.0440)
	[0.0277]	[0.0310]	[0.0283]	[0.0285]	[0.1104]	[0.1104]
Owner partly Arab (dummy)	0.0665	0.0748	0.0594	2.1835	0.0400	1.4571
	(0.0633)	(0.0564)	(0.0380)	(1.3984)	(0.0339)	(1.2368)
	[0.2937]	[0.1844]	[0.1174]	[0.1184]	[0.2385]	[0.2388]
Owner partly foreign (dummy)	0.0728	0.1086	0.0299	1.0970	0.0352	1.2819
	(0.0580)	(0.0632)	(0.0337)	(1.2379)	(0.0360)	(1.3104)
	[0.2095]	[0.0858]	[0.3751]	[0.3755]	[0.3280]	[0.3280]
Owner partly public (dummy)	0.1002	0.1193	0.0135	0.4957	0.0124	0.4527
	(0.0641)	(0.0711)	(0.0323)	(1.1858)	(0.0370)	(1.3486)
	[0.1179]	[0.0932]	[0.6760]	[0.6759]	[0.7371]	[0.7371]
At least, one unionized worker (dummy)	-0.0366	-0.0380	-0.0413	-1.5178	-0.0352	-1.2822
	(0.0206)	(0.0221)	(0.0157)	(0.5760)	(0.0158)	(0.5752)
	[0.0750]	[0.0862]	[0.0083]	[0.0084]	[0.0257]	[0.0258]
Training of workers (dummy)	0.0207	0.0243	0.0259	0.9534	0.0313	1.1423
	(0.0246)	(0.0259)	(0.0171)	(0.6287)	(0.0171)	(0.6250)
	[0.4013]	[0.3474]	[0.1294]	[0.1294]	[0.0673]	[0.0676]
R&D department (dummy)	0.0562	0.0588	0.0056	0.2060	0.0056	0.2047

	(0.0243)	(0.0252)	(0.0171)	(0.6270)	(0.0170)	(0.6208)
	[0.0208]	[0.0198]	[0.7425]	[0.7425]	[0.7415]	[0.7416]
Other branches (dummy)	0.0532	0.0603	0.0104	0.3828	0.0113	0.4133
	(0.0216)	(0.0231)	(0.0156)	(0.5746)	(0.0160)	(0.5821)
	[0.0140]	[0.0090]	[0.5053]	[0.5053]	[0.4776]	[0.4777]
Firm's age (years)	0.0006	0.0006	0.0001	0.0024	0.0001	0.0034
	(0.0006)	(0.0006)	(0.0005)	(0.0169)	(0.0004)	(0.0158)
	[0.3239]	[0.3136]	[0.8881]	[0.8881]	[0.8300]	[0.8300]
Share of primary schooling (%)	0.0005	0.0006	0.0007	0.0268	0.0006	0.0221
	(0.0005)	(0.0006)	(0.0005)	(0.0173)	(0.0005)	(0.0169)
	[0.3269]	[0.3193]	[0.1203]	[0.1207]	[0.1918]	[0.1920]
Share of preparatory or incomplete secondary schooling (%)	0.0011	0.0012	0.0017	0.0626	0.0018	0.0652
	(0.0004)	(0.0005)	(0.0004)	(0.0161)	(0.0004)	(0.0147)
	[0.0109]	[0.0220]	[0.0001]	[0.0001]	[<0.0001]	[<0.0001]
Share of secondary schooling (incl. vocational) (%)	0.0014	0.0016	0.0019	0.0701	0.0019	0.0699
	(0.0004)	(0.0004)	(0.0004)	(0.0137)	(0.0003)	(0.0124)
	[0.0002]	[0.0003]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]
Share of university degree (%)	0.0025	0.0027	0.0019	0.0690	0.0018	0.0642
	(0.0006)	(0.0007)	(0.0005)	(0.0176)	(0.0005)	(0.0178)
	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0003]	[0.0003]
Share of temporary workers (%)	-0.0002	-0.0001	0.0004	0.0152	0.0005	0.0180
	(0.0006)	(0.0006)	(0.0005)	(0.0189)	(0.0005)	(0.0178)
	[0.7352]	[0.8682]	[0.4217]	[0.4217]	[0.3103]	[0.3105]
Firm size categories (dummies, reference 5-10 workers)						
11-20 workers	0.0640	0.0989	0.0324	0.9774	0.0482	1.4397
	(0.0313)	(0.0384)	(0.0314)	(0.9364)	(0.0274)	(0.8034)
	[0.0406]	[0.0101]	[0.3029]	[0.2966]	[0.0788]	[0.0731]
21-100 workers	0.1998	0.2498	0.1243	4.0796	0.1316	4.2338
	(0.0344)	(0.0418)	(0.0332)	(1.0237)	(0.0289)	(0.8729)
	[<0.0001]	[<0.0001]	[0.0002]	[0.0001]	[<0.0001]	[<0.0001]
101-500 workers	0.3036	0.3665	0.1694	5.8348	0.1814	6.1530
	(0.0386)	(0.0456)	(0.0347)	(1.1104)	(0.0313)	(1.0017)
	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]
>500 workers	0.3930	0.4674	0.1859	6.5309	0.1987	6.8785
	(0.0479)	(0.0500)	(0.0391)	(1.3498)	(0.0374)	(1.3238)
	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]	[<0.0001]
Survey year (dummies, reference 2004)						
2007	0.0029	0.0042	0.0095	0.3441	0.0060	0.2160
	(0.0153)	(0.0201)	(0.0131)	(0.4723)	(0.0150)	(0.5401)
	[0.8498]	[0.8336]	[0.4663]	[0.4662]	[0.6895]	[0.6893]
2008	0.0177	0.0119	0.0256	0.9399	0.0160	0.5830
	(0.0213)	(0.0232)	(0.0182)	(0.6694)	(0.0172)	(0.6271)
	[0.4058]	[0.6063]	[0.1598]	[0.1603]	[0.3528]	[0.3526]
Sector (9 dummies)	Yes	Yes	Yes	Yes	Yes	Yes
Region (23 dummies)	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.2802		0.0623	0.0623		
LogLikelihood	-1375.93	-1322.70	-9165.18	-9165.18	-9097.11	-9097.11
LR-Test random effects		106.46			136.15	136.15
		[p<0.001]			[p<0.001]	[p<0.001]

Notes: Number of observations is 2914 for 1593 firms. Number of censored observations (female share equals zero) is 1076 and number of uncensored observations (female share larger zero) is 1835. Dependent variable in probit regressions is binary with zero if the female share equals zero and one if the female share is larger than zero (mean probability 63%). Dependent variable in Tobit regressions is the share of females in all permanent workers (mean share 16.4%). Average marginal effects for probit and Tobit models. Standard errors in parentheses (clustered at firm level for pooled estimates). P-values for statistical significance in brackets.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08.

Firms led by top managers with a university degree are on average 7.47 percentage points (statistically significant at 0.0003 percent) more likely to employ female workers than other firms in the pooled probit regressions in column 1.

The sizes of the average marginal effect and of the significance level do not change significantly in the random effects probit regressions in column 2. The Tobit results indicate a smaller but still significant average marginal effect on the probability to employ females of 5.58 percentage points in the pooled Tobit regressions in column 3 and of 4.86 percentage points in the random effects Tobit regressions in column 5.

The Tobit results further reveal that firms led by top managers with a university degree have a 2.05 percentage point higher share of female workers in the pooled Tobit regressions in column (4) and a 1.77 percentage point higher share of female workers in the random effects Tobit regressions in column (6). Both average marginal effects are statistically significant at the 1 percent level. The regression results further show that the experience of the top manager in management jobs is negatively correlated with the employment of females, which might be explained by the correlation between experience and age of the top manager, which is unfortunately not observed in the data. The marginal effects in the Tobit regressions are, however, only statistically significant at approximately 20 percent. But if the top manager has also gained foreign experience in management jobs outside Egypt, the firm has a 3 to 5 percentage point higher probability to employ females and a more than one percentage point higher female employment share.

The exporter status alone is not significantly correlated with female employment. But it is jointly significant with the experience as an exporting firm. Firms with a longer exporter experience are significantly more likely to employ females and have a higher female employment share. Note that exporter experience does not reflect firm's age as we control for firm's age, which does not have a significant effect. The results further indicate a positive

correlation between female employment and ownership other than private Egyptian, i.e., Arab, other foreign, or public ownership, which is, however, only of weak statistical significance. Firms with, at least, one unionized worker are on average about 4 percentage point less likely to employ any female workers and have on average a more than one percentage point lower female employment share conditional on employing female workers than firms without any unionized workers in their workforce.

These differences are statistically significant. The results further indicate that firms tend to have a higher probability and share of female workers in their workforce if they offer training for their workforce, have an own R&D department, own other branches in Egypt, have a more qualified workforce, and are larger.

4. Conclusion

Our results suggest that top managers with a university degree and with foreign experience in management jobs have a positive impact on female employment.

An explanation for this finding might be that these top managers have learned from experience that female employment is rather beneficial for firms and society. Exporting firms and especially firms with longer export experience are also more likely to employ females and have a higher female employment share, which points to potential international spillover effects such as learning and adapting management practices that also promote female employment. This finding is in line with the results of Fakih and Ghazalian (2015) that MENA's manufacturing firms engaged in exporting activities have higher proportions of female workers compared to non-exporting firms and with the results of Al-Azzawi (2014) that exporting industries are more likely to hire female workers. An important policy implication that emerges from these findings points to the importance of policies that encourage and support international firm activities (e.g., export, international experiences)

such as reducing tariffs, concluding free trade agreements, easing regulatory barriers, improving logistics, increasing the efficiency of infrastructure, providing finance, reducing corruption, improving the skills of the labor force, and providing international exchange programs (African Development Bank, 2012). Meanwhile, policy makers might also provide incentives (e.g., subsidies, tax exemptions) to firms that employ women. It is worth noting here that empirical evidence will be presented later in chapter five which reveals that the manufacturing firms in Egypt are more likely to export when they hire more female workers. Moreover, our results indicate that unions in Egypt do not seem to foster female employment, as we have found a negative correlation between female employment and the existence of a unionized workforce. As unions can act as promoter for employment equality, the positions of women within Egyptian unions should be strengthened in order to foster female employment at the establishment, industry, and regional levels.

References

African Development Bank (2012). Comparative study on export policies in Egypt, Morocco, Tunisia and South Korea (URL: http://www.afdb.org/en/news-and-events/article/comparative-study-on-export-policies-egypt-morocco-tunisia-and-south-korea-9965/).

Al-Azzawi, S. (2014). Trade liberalization, industry concentration and female workers: The case of Egypt. *IZA Journal of Labor Policy*, 3:20 (URL: http://www.izajolp.com/content/pdf/2193-9004-3-20.pdf).

Assaad, R. (2007). Institutions, household decisions, and economic growth in Egypt. In: J. Nugent and M. Hashem Pesaran (eds.), *Explaining Growth in the Middle East*. Elsevier, 385-411.

Assaad, R., Arntz, M. (2005). Constrained geographical mobility and gendered labor market outcomes under structural adjustment: Evidence from Egypt. *World Development* 33, 3, 431-454.

Fakih, A., Ghazalian, P. (2015). Female labour force participation in MENA's manufacturing sector: The implications of firm-related and national factors. *Journal of Economic Change and Restructuring* 2015, 48, 1, 37-69.

ILO (2014). Global employment trends 2014: Risk of a jobless recovery? International Labour Organization, Geneva.

Klasen, S., Lamanna, F. (2009). The impact of gender inequality in education and employment on economic growth: New evidence for a panel of countries. *Feminist Economics* 15, 3, 91-132.

McDonald, J.F., Moffitt, R.A. (1980). The uses of Tobit analysis. *Review of Economics and Statistics* 62, 2, 318-321.

Moghadam, V. (1998). *Women, Work and Economic Reform in the Middle East and North Africa*. Lynne Rienner Publishers.

OECD (2013). Gender inequality and entrepreneurship in the Middle East and North Africa: A statistical portrait. *Discussion Paper.*

(URL: http://www.oecd.org/mena/investment/Statistical%20Portrait.pdf).

Pissarides, C., Olivetti, G., Petrongolo, B., Wasmer, E. (2005). Women in the labour force: How well is Europe doing? In: T. Boeri, D. Del Boca, and C. Pissarides (eds.), *Women at Work: An Economic Perspective*. Oxford University Press, 1-66.

Chapter 4

Ownership Structure and Firm Performance in the Egyptian Manufacturing Sector[30]

Abstract

We use the World Bank Enterprise Surveys for the Egyptian manufacturing sector to study the correlation between the ownership structure (private vs. public, Egyptian vs. Arab foreign vs. non-Arab foreign) and firm performance, which we measure as sales per worker, capacity utilization, and net profit rate. Our main findings indicate that (1) productivity differences between Egyptian private and public firms are not significant, but firms with public ownership have a lower capacity utilization and a lower net profit rate than private firms; (2) firms with private Arab and private non-Arab foreign ownership are significantly more productive and have a higher capacity utilization than purely Egyptian owned firms; and (3) differences between Arab and non-Arab foreign ownership are not significant for productivity and capacity utilization, but firms with non-Arab foreign ownership have a higher net profit rate than firms with Arab foreign or Egyptian owners.

[30] This chapter was published in The Economics Bulletin, Vol. 35, No.4, 2015, 2197-2212 jointly with Christian Pfeifer and John P. Weche Gelübcke.

1. Introduction

Firm performance is one of the driving forces for economic wellbeing and development in economies (Harrison and Rodríguez-Clare, 2010). Whereas determinants of firm performance in developed and large emerging economies have been studied empirically for decades, few empirical studies have been conducted for developing countries due to a lack of adequate microdata (Thompson, 2010). In order to overcome the data problem, the World Bank has conducted enterprise surveys around the world. The surveys for firms from the Egyptian manufacturing sector are one of the most attractive data sets for empirical researchers. First, approximately one thousand firms are interviewed in each wave and this sample size is larger than for most other countries, especially developing countries in the Middle East and North Africa (MENA) and other African and Asian regions. Second, the World Bank has successfully conducted three waves (2004, 2007 and 2008) in Egypt instead of only one or two waves as for other countries, which is crucial when applying panel regression techniques such as fixed effects methods that exploit only the within variance over time. Moreover, Egypt is one of the largest economies in the MENA region.

In this chapter, we focus on firms' ownership structure as an important determinant of firm performance (Maher and Andersson (1999); Dewenter and Malatesta (2001); Bellak (2004), which we measure as sales per worker, capacity utilization, and net profit rate. The ownership structure is highly relevant from a practical perspective because it can be influenced directly by national policies and international development programs. For example, public firms are often considered as less efficient than privately owned firms. The lack of empirical evidence in this research area has recently been decried by the OECD (2013, p. 7): "State-owned enterprises (SOEs) constitute an integral feature of almost all economies in the Middle East and North Africa (MENA) region, and yet, unlike family-owned or listed companies, they have for the most part not been subject to systematic research, either in a regional or in a

country-specific context." If privately owned firms would perform better than public firms, privatization of public firms should be considered. As public firms, in which the government is a shareholder, have a large impact on the Egyptian economy, we can contribute to this stream of the literature by analyzing data from the World Bank Enterprise Surveys for the Egyptian manufacturing sector. Our results indicate that productivity differences between Egyptian private and public firms are not significant, whereas firms with private ownership have a higher capacity utilization and a higher net profit rate than public firms.

Furthermore, the literature about foreign ownership has emphasized that foreign-owned firms perform better than domestically owned firms. Because the World Bank Enterprise Surveys for the Egyptian manufacturing sector contain not only information about private domestic and private foreign, but also about Arab and non-Arab foreign ownership, we can contribute to this stream of the literature by further distinguishing between the origins of foreign ownership. Foreign investments from Arab countries are highly relevant in many developing countries with an Islamic background in the MENA region as well as in many Asian countries. Our results indicate that firms with private Arab and private non-Arab foreign ownership are significantly more productive and have a higher capacity utilization than purely Egyptian owned firms. But the differences between Arab and non-Arab foreign ownership are not significant for productivity and capacity utilization. Firms with non-Arab foreign ownership have, however, a higher net profit rate than firms with Arab foreign or Egyptian owners.

The remainder of this chapter is structured as followed. In the next section, we summarize the relevant literature, give some background information on Egypt, and derive our research hypotheses. The data set, variables, and econometric approach are described in Section 3. In Section 4, we present and discuss the results from our regression analyses. The chapter concludes with a short summary and policy implications in Section 5.

2. Literature Review, Background Information, and Hypotheses

The ownership structure of a firm can be an important determinant of firm performance, which we measure as sales per worker, capacity utilization, and net profit rate, and is, therefore, often the target variable of economic policy measures.[31] For the case of Egypt, we focus on two dimensions of firm ownership: i) whether a firm is privately or publicly owned, and ii) the nationality of the owner.[32]

It is well known that market failure is more likely to occur in developing countries than in developed countries (Stiglitz, 1989). State-owned enterprises (SOEs) are considered as a tool to address market failure (Megginson and Nettern, 2001). However, Shirley and Walsh (2000) using a variety of performance measures, examined 51 studies both for developing and industrialized countries from 1971 to 2000. Among 18 studies conducted for the developing countries, no evidence was found that public firms perform better than private ones. In Egypt, a significant number of politically connected military officers—mostly retired, but some in active service—sit on the supervisory boards of a wide range of state-owned public utilities (for more details, see Sayigh, 2012). At the same time, public firms enjoy a preferential treatment from the government which may remediate productivity differences. For example, state-owned firms often have easier access to credit facilities from the state-dominated banking system than private firms (U.S. Department of State, 2014; Abdelkader, 2006; Fawzy and El-Megharbel, 2004).[33]

[31] Another variable of interest in this context, which has gained increased attention recently, is the survival of firms or their exit probability. For example, Mata and Portugal (2002) and Taymaz and Özler (2007) investigate the survival patterns of foreign and domestic firms in Portugal and Turkey, but do not find significant differences after controlling for other determinants. Ferragina *et al.* (2012) instead find foreign multinationals to be more likely to exit. For a comprehensive survey of this strand of literature, see Wagner and Weche Gelübcke (2012).

[32] We do not consider other dimensions of ownership structure such as the concentration of shareholdings or the specific type of owner (e.g., family ownership).

[33] For a detailed discussion of reforms, governance, transparency, public policy outcomes, etc., of state-owned enterprises in the MENA countries, see OECD (2012, 2013).

Prior to the privatization program, which began in 1991, the Egyptian economy was characterized by many sub-sectors in which economic activity was monopolized by public sector enterprises which were responsible for almost 55 percent of industrial production and controlled 80 percent of total export and import activities (Privatization Coordination Support Unit, 2002). In the context of a comprehensive economic reform program in Egypt during the 1990s, many SOEs were privatized in the hope of improving their poor management and weak capitalization (Omran, 2007). However, despite the efforts at privatization, the share of SOEs in Egypt has remained among the largest within the region (Omran et al., 2008). SOEs are generally expected to operate less efficiently and less profitably than privately-owned enterprises due to the following reasons summarized by Dewenter and Malatesta (2001). First, the pursuit of the social and political objectives of SOEs may outweigh the maximization of profits (e.g., through employing excess labor input or a preference for employing politically connected people instead of the best qualified). Second, the de facto nontransferability of SOE ownership leads to reduced incentives of monitoring the management. In line with theory, cross-country empirical studies on comparative performance differences between SOEs and privately owned enterprises find the latter to operate more efficiently and more profitably, ceteris paribus (e.g., Boardman and Vining, 1989; Dewenter and Malatesta, 2001). Looking at SOEs that become privatized (Dewenter and Malatesta, 2001) find, however, little evidence that the privatization itself increases firm performance, since improvements start around three years before the change of ownership. They conclude that rather "the political impetus behind privatization first impels government firms to operate more profitably" (Dewenter and Malatesta, 2001: p. 334). Omran (2007) presents evidence on the post-privatization firm performance in Egypt. He finds firm performance, such as profitability and operating efficiency, increasing for enterprises that were privatized between 1994 and 1998. We derive our first hypothesis regarding the performance link of public and private ownership accordingly.

Hypothesis 1: Firms with private ownership are more productive, have higher capacity utilization, and have a higher profit rate than firms with public ownership.

The second dimension of ownership structure refers to the nationality of the owner. Although there was a cessation of foreign direct investment (FDI) inflows following the 2011 revolution, Egypt represents the most attractive destination for foreign investors in the region due to its large population and cheap labor costs with a stock of USD 85,046 million in 2013 and inflows of USD 5553 (9495) million in 2013 (2008) (UNCTAD, 2014: p. 38, Annex Table 1 and 2). Even though the Egyptian government has several schemes to attract FDI, there are significant obstacles for foreign investors. For example, labor rules prohibit a non-Egyptian workforce of more than ten percent in most sectors, importing for trading purposes is permitted only through a wholly Egyptian owned firm, and there is a lack of intellectual property rights protection. Other hurdles are excessive bureaucracy and the fact that the judicial system may be subject to political influence (U.S. Department of State, 2014).

FDI and foreign owned firms or foreign multinational enterprises (MNEs)[34] are an important channel, especially for developing economies, to raise overall industry performance through compositional effects as well as the performance of indigenous firms at the micro level through positive externalities. For example, positive technology and productivity spillovers can occur if indigenous producers learn from the demonstration of superior technology by foreign competitors by establishing backward or forward linkages with foreign MNEs or by benefiting from knowledge of employees that were formerly working for foreign MNEs (see Görg and Greenaway (2004) for a detailed discussion and a survey of the empirical evidence). An inevitable precondition for such positive spillovers is some kind of superiority in terms of applied technology or productivity in general. Standard MNE theory suggests a specific competitive advantage of multinationals, such as a superior production technology,

[34] We use the terms *foreign multinationals* and *foreign owned firms* interchangeably.

organizational superiority or an established brand that is available within all company affiliates at low marginal costs due to its public good character (e.g., Dunning, 1988; Caves, 1996). This competitive advantage has either been the initial reason for the international expansion of the firm or may stem from the multinationality of the firm itself due to better access to input and output markets or the flexibility of shifting activities across borders (Casson, 1987). This specific advantage of MNEs over non-MNEs is assumed to outweigh the extra costs these firms have to bear when operating in foreign markets. This "liability of foreignness" has been described by Hymer (1977) and is due to, for example, communication and transport barriers, higher search costs in factor markets, product adaption, and monitoring problems due to spatial distance.

The theory of specific competitive advantages mainly finds support in a huge strand of literature on the foreign ownership performance premium. Foreign owned firms turn out to enjoy a robust predominant performance in terms of a broad set of measures across developed and developing countries. This foreign ownership performance premium regularly loses significance if foreign multinationals are compared to only domestic multinationals pointing to multinationality as the driving factor instead of foreignness. (For an overview of the literature, see Bellak (2004)) Empirical evidence is mainly available for developed countries because of better data availability but studies for developing and emerging economies nevertheless exist—for example, for India, Chibber and Majumdar (1999); Rasiah and Kumar (2008); Keshari (2013); for Mexico, Khawar (2003); for Indonesia, Takii and Ramstetter (2005); Arnold and Javorcik (2009); for Turkey, Yasar and Paul (2007); for Brazil, Willmore (1986); for Kenya, Rasiah and Gachino (2005); for Venezuela, Aitken and Harrison (1999); for Ghana, Aryeetey et al. (2008); Waldkirch and Ofosu (2010); and nineteen sub-Saharan African countries (Foster-McGregor et al., 2014). To the best of the authors' knowledge, Omran et al. (2008), is the only econometric study which investigates the foreign ownership

performance premium in Egypt.[35] In contrast to the vast majority of developing economy studies, they find no significant role of foreign ownership on firm performance in their case measured as return on assets and return on equity of listed companies. They also consider public ownership in their analysis and conclude with a positive role of concentrated government ownership on the return on equity. However, although the authors claim to use representative data, the number of Egyptian firms used for their analysis is only 81, 45 of which are operating in the manufacturing sector. Notwithstanding the empirical evidence, we follow the theory in stating our second hypothesis as follows.

Hypothesis 2: Firms with foreign (including Arab) ownership are more productive, have higher capacity utilization, and have a higher profit rate than domestically (Egyptian) owned firms.

Another step in our analysis is to split the group of foreign owned firms into those with Arab ownership and non-Arab foreign ownership to account for specific cultural and institutional differences between these groups. Although MNEs may have lost most of their country of origin imprint, their home country may still matter due to differences in management culture (Ferner, 1997), differences in national business systems (Whitley, 1992), differences in factor endowments, or overall cultural variations. The specific differences between Arab and non-Arab investors are of special interest in our context. An important aspect that differentiates between the characteristics of Arabs and non-Arabs is the culture, which can shape people's behavior and preferences via religious norms and identity (Akerlof, 2007). For example, in the famous Hofstede dimensions of culture (e.g., Hofstede, 1980; Hofstede, 2011; http://geert-hofstede.com), Arab countries show usually higher levels of power distance and uncertainty avoidance, but lower levels of individualism, masculinity, and pragmatism than Western

[35] Other studies consider the entire Middle East and North Africa (MENA) region and look at factors other than efficiency variables (such as productivity and profitability). For example, Fakih and Ghazalian, 2015, take a look at exporting behaviour and its determinants and report the export increasing effects of private foreign ownership also for Egypt separately.

countries. Furthermore, Arab countries' business systems and economic institutions are shaped by the principles of the Sharia. The system of Islamic economics is characterized mainly by three aspects: i) a set of behavioral norms, such as that men are required to "be content with 'normal' profits […] [and] that he must not engage in speculation and monopolization, or make deals, like insurance contracts, that allegedly involve gambling, uncertainty, and exploration." (Quran, 1986: p. 136) Two further aspects are: ii) the prohibition of interest, and iii) a special tax on agriculture and mining products (zakat) (ibid.). In particular the first two aspects lead us to our third hypothesis.

Hypothesis 3: Firms with non-Arab foreign ownership have a higher profit rate than firms with Arab ownership.

3. Data and Econometric Approach

We use the World Bank Enterprise Survey for the Egyptian manufacturing sector for the survey years 2004, 2007, and 2008 or financial years 2003, 2006, and 2007. The survey is carried out in an unbalanced panel design at the establishment level. All establishments in the data employ more than 5 workers. The World Bank Enterprise Surveys collect data from key manufacturing and service sectors in different regions all over the world.[36] These surveys provide important information such as sales and supplies, investment climate constraints, capacity utilization, profits, infrastructure and services, finance, legal environment, and business-government relations.

[36] See www.enterprisesurveys.org for a detailed description of the data and the methodology used for data collection as well as the online data access. Also note that we concentrate on the manufacturing sector, because information about capacity utilization is only available for the manufacturing sector. Moreover, the data for 2004 is taken from the Productivity and the Investment Climate Private Enterprise Survey available for the manufacturing sector.

In order to study the correlation between ownership structure and firm performance, we use several specifications and regression techniques. The dependent variables are either the log of sales per worker (SALES), the capacity utilization (CAPACITY) or the net profit rate (PROFIT). SALES is the log of total sales in a financial year (Egyptian pound value of all sales, including manufactured goods and goods the establishment has bought for trading) divided by the average number of all workers employed in that year. The log of sales per worker is a crude measure of productivity and is often used in the literature. For SALES, we estimate linear regression models with ordinary least squares (OLS). CAPACITY is the average capacity utilization in a financial year measured in percentage, which describes the amount of output actually produced relative to the maximum amount that could be produced with the existing machinery and equipment and regular shifts. Thus, CAPACITY can be broadly associated with efficiency. For CAPACITY, we estimate linear regression models with OLS as well as Tobit models that account for potential censoring of capacity utilization at 0 percent and 100 percent. PROFIT is the net profit rate in a financial year measured in percentage, which is net profits (after tax) over the establishment's total annual sales. For PROFIT, we also estimate linear regression models with OLS for firms with, at least, zero net profits as well as Tobit models that account for the fact that about 10 percent of all firms report to have no net profits, which can be reasoned by making net losses or by being a not-for-profit firm. In order to account for unobserved time invariant firm heterogeneity, we exploit the panel nature of the data set. Whereas it is simple to include firm specific fixed effects in the above OLS models, we can only estimate random effects Tobit models. Note, however, that the panel estimates serve only as a robustness check because identification stems from within variation which is typically low in the context of firm ownership and in our short unbalanced panel data.

We use two specifications for our explanatory variables of interest that describe the ownership structure of a firm. The first specification includes three dummy variables. The three dummy variables take the value 1 if the firm is, at least, partly owned by private Arab foreign investors, by private non-Arab foreign investors, or by the government, which relates to public ownership. The reference group is private Egyptian ownership. Multiple ownership is of course possible but does not occur often in our data. For example, most firms have either joint private Egyptian with Arab or joint private Egyptian with non-Arab foreign ownership, whereas joint Arab and non-Arab foreign ownership is rare. Arab as well as non-Arab foreign ownership occurs as minority and as majority shareholder. Moreover, a combination between private and public ownership is rare, as most public firms are entirely owned by the government. In our second specification, we use the shares of Arab, non-Arab foreign and public ownership in percentage instead of the dummy variables. Reference group is again private Egyptian ownership. The estimated coefficients for the ownership variables then indicate how far firm performance differs between different ownership structures.

Further explanatory variables are included in the regressions in order to control for differences between firms and within firms over time. As these variables fulfill only the purpose of control variables in this research note, they are not further discussed but only described in Table I, in which also descriptive statistics for our variables of interest can be found. Note that the number of observations slightly differs between the three samples for the firm performance measures SALES, CAPACITY, and PROFIT due to differences in the number of missing values in these three dependent variables. In the SALES sample, the number of observations is 2891 from 1583 firms. In the CAPACITY sample, the number of observations is 2953 from 1605 firms. The PROFIT sample is further restricted to firms with, at least, zero net profit rates, which results in 2379 observations from 1416 firms. More than three percent of the firms in our samples are, at least, partly owned by Arab foreign investors, another three

percent by non-Arab foreign investors, and another three percent by the government which relates to public ownership. The mean owner share for each ownership group in the samples is roughly more than two percent. Average sales per capita is approximately 10.44 log points (or 35000 Egyptian pounds). The average capacity utilization is 66.49 percent. The net profit rate for firms with, at least, zero net profits is on average 13.55 percent.

Table 15: Descriptive statistics for all variables

	SALES sample (n=2891, N=1583)		CAPACITY sample (n=2953, N=1605)		PROFIT sample (n=2379, N=1416)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variables						
SALES: log total sales per worker (Egyptian pounds)	10.4434	1.6283				
CAPACITY: capacity utilization (%)			66.4883	22.7879		
PROFIT: net profit rate (%)					13.5472	12.4049
Explanatory variables of interest:						
Ownership any private Arab foreign (dummy)	0.0346	0.1828	0.0339	0.1809	0.0366	0.1877
Ownership any private non-Arab foreign (dummy)	0.0315	0.1746	0.0315	0.1747	0.0324	0.1770
Ownership any public (dummy)	0.0339	0.1810	0.0342	0.1818	0.0277	0.1643
Ownership of share private Arab foreign (%)	2.0079	12.4405	1.9658	12.3125	2.1622	12.9385
Ownership of share private non-Arab foreign (%)	2.0369	12.7658	2.0212	12.6836	2.0456	12.7568
Ownership of share public (%)	2.7177	15.6353	2.7097	15.5520	2.1615	13.8464
Control variables:						
Exporter (dummy)	0.2567	0.4369	0.2547	0.4357	0.2673	0.4427
Top manager with university degree (dummy)	0.7738	0.4185	0.7704	0.4206	0.7810	0.4137
Top manager job experience (years)	14.1377	12.0454	14.1019	12.0309	14.2182	11.9312
Employment share primary schooling (%)	11.6904	15.6469	11.7345	15.6882	11.5453	15.2749
Employment share preparatory schooling (%)	17.8543	17.6595	17.7722	17.6718	17.8217	17.3824
Employment share secondary schooling (%)	38.5906	22.7764	38.6187	22.8666	39.0560	22.7457
Employment share university schooling (%)	17.0362	14.7924	17.0908	14.8916	17.1438	14.7790
Employment share female workers (%)	16.5181	21.8635	16.6610	22.0077	16.9468	21.9441
Employment share temporary workers (%)	7.0172	13.5237	7.0198	13.4885	7.0395	13.4077
Average number of all workers	224.3065	693.1781	225.1879	692.9547	200.7919	575.8121
Average number of all workers ^2, Average number of all workers ^3						
At least, one unionized worker (dummy)	0.2318	0.4220	0.2313	0.4217	0.2295	0.4206
Training for workers (dummy)	0.1809	0.3850	0.1825	0.3863	0.1803	0.3845
Firm age (years)	22.3964	16.8248	22.3854	16.8735	21.8840	16.4336
Firm has other branches (dummy)	0.2165	0.4120	0.2171	0.4123	0.2261	0.4184
Firm has R&D department (dummy)	0.2138	0.4100	0.2144	0.4104	0.2194	0.4139
Financial year 2006 (dummy)	0.3272	0.4693	0.3251	0.4685	0.3380	0.4731
Financial year 2007 (dummy)	0.3663	0.4819	0.3695	0.4827	0.3640	0.4813

Nine sectors of main activities (dummies): Garments, textiles, machinery & equipments, chemicals, electronics, metal, non-metal, agro, other.
23 regional governorates (dummies): Cairo, Alexandria, Port Said, Suez, Damietta, Dakahliya, Sharkiya, Qualyubia, Kafr-El-Sheikh, Gharbiya, Menoufiya, Beheira, Ismailia, Giza, Bani-Suef, Fayoum, Minya, Assuit, Souhag, Qena, Aswan, Loxur, South Saini.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08.

4. Estimation Results

Table 16 presents our regression results for ownership structure and log sales per worker as proxy for productivity.[37] The pooled OLS results for the complete estimation sample in column 1 indicate that firms with any Arab or non-Arab foreign owners have on average more than 0.6 log points or more than 80 percent higher sales per capita than purely Egyptian owned firms, whether private or public. The second specification with owner shares indicates that firms, which have one percentage point more Arab or non-Arab foreign owners, have on average more than 0.008 log points or nearly one percent higher sales per capita. Differences between private and public Egyptian ownership are not statistically significant.

In column 2, we conduct a robustness check with respect to firm size. As small firms seldom have foreign or public owners, we re-estimate the pooled OLS regressions for a sample of firms with, at least, 100 workers. The results do not change significantly. Our next robustness check is concerned with unobserved time invariant heterogeneity between firms. In column 3, we present results for fixed effects OLS regressions. The results support the significant positive correlation between productivity and Arab ownership and the non-significant differences between private and public Egyptian ownership. The coefficients for private non-Arab foreign ownership are, however, smaller, and standard errors are larger than in the pooled OLS regressions so that the coefficients are not statistically significant at conventional levels anymore. Note, however, that the fixed effects regressions suffer from the low within variance of the ownership variables and the short panel length. The estimation results for ownership structure and capacity utilization in percentage as proxy for the efficient use of resources are presented in Table 17. The pooled OLS results for the complete estimation sample in column 1 indicate that firms with any Arab or non-Arab foreign owners have on average an approximately four percentage point higher capacity utilization than purely Egyptian-owned firms. Firms with any public Egyptian ownership have on average an

[37] We only present and discuss the results for our variables of interest, i.e., the ownership structure. The complete estimation results can be requested from the corresponding author.

approximately three percentage point lower capacity utilization than firms with only private Egyptian owners. The difference is, however, only statistically significant at the 21 percent level. When looking at the pooled OLS regressions for larger firms with, at least, 100 workers in column 2, the coefficient for any private Arab ownership is not significant anymore, whereas the coefficients for any private foreign and public Egyptian ownership are larger in size and statistically significant at higher levels than in the estimates for the complete sample in column 1. In the fixed effects OLS regression in column 3, which suffer again from low status changes in ownership and short panel length, only the lower capacity utilization (by approximately eleven percentage points) for firms with public ownership remains significant.

Table 16: Estimation results for log sales per worker (SALES)

	(1) OLS	(2) OLS	(3) OLS-FE
Specification with dummies:			
Ownership any private Arab foreign (dummy)	0.6496***	0.6176***	0.6929**
	(0.1418)	(0.1916)	(0.2745)
	[0.0000]	[0.0013]	[0.0117]
Ownership any private non-Arab foreign (dummy)	0.6185***	0.6641***	0.3811
	(0.1579)	(0.1804)	(0.2744)
	[0.0001]	[0.0003]	[0.1651]
Ownership any public (dummy)	-0.1036	-0.0575	-0.3683
	(0.2201)	(0.2576)	(0.3879)
	[0.6379]	[0.8234]	[0.3426]
R^2 (within R^2 for FE)	0.1910	0.1976	0.1227
Number observations	2891	929	2891
Number firms	1583	666	1583
Specification with shares:			
Ownership share private Arab foreign (%)	0.0093***	0.0089***	0.0121***
	(0.0022)	(0.0028)	(0.0044)
	[0.0000]	[0.0015]	[0.0056]
Ownership share private non-Arab foreign (%)	0.0083***	0.0084***	0.0035
	(0.0023)	(0.0025)	(0.0034)
	[0.0004]	[0.0008]	[0.3014]
Ownership share public (%)	-0.0011	-0.0009	-0.0024
	(0.0022)	(0.0026)	(0.0039)
	[0.6178]	[0.7202]	[0.5332]
R^2 (within R^2 for FE)	0.1898	0.1938	0.1237
Number observations	2891	929	2891
Number firms	1583	666	1583

Notes: Sample includes all firms with more than 5 workers in columns 1 and 3 and with more than 100 workers in column 2. Dependent variable is log of total sales per worker. Reference group for ownership is private Egyptian. All regressions include control variables as listed in Table 15. Column 3 includes additional firm fixed effects. OLS regressions with robust standard errors clustered at firm level in parentheses and p-values in brackets. Statistically significant at * p<0.10, ** p<0.05, or *** p<0.01.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08.

As already discussed in Section 3, we also estimate random effects Tobit models that account for potential censoring of capacity utilization. The estimated coefficients are presented in column 4. We have further computed and presented the marginal effects for the intensive margin, i.e., for the expected capacity utilization conditional on reporting a capacity utilization larger than 0 percent and smaller than 100 percent (McDonald and Moffitt, 1980), for an average firm with purely private Egyptian ownership as reference firm and under the assumption that the mean random effect is zero. Firms with any Arab foreign owners have on average an approximately three percentage point higher capacity utilization than purely private Egyptian firms, which is statistically significant at 13 percent. Firms with any non-Arab foreign owners have on average an approximately four percentage point higher capacity utilization than purely private Egyptian firms, which is statistically significant at 4 percent. Firms with any public Egyptian ownership have on average an approximately 3.4 percentage point lower capacity utilization than firms with only private Egyptian owners, which is statistically significant at 9 percent.

The regression results for the second specification with ownership shares in Table 17 support the general findings from the first specification that firms with private Arab and non-Arab foreign owners have a higher capacity utilization than private Egyptian firms and that firms with public ownership have a lower capacity utilization. A one percentage point higher share in Arab ownership is in all estimated models correlated with about 0.05 to 0.06 percentage point higher capacity utilization—except for the sample with only large firms in column 2. A one percentage point higher share in non-Arab foreign ownership is in all estimated models correlated with about 0.04 to 0.05 percentage point higher capacity utilization—except for the fixed effects OLS regression in column 3. A one percentage point higher share in public ownership is in all estimated models correlated with about 0.06 to 0.18 percentage point lower capacity utilization.

Table 17: Estimation results for capacity utilization in percentage (CAPACITY)

	(1) OLS	(2) OLS	(3) OLS-FE	(4) Tobit-RE	(4) mfx
Specification with dummies:					
Ownership any private Arab foreign (dummy)	3.6119*	1.2310	2.6256	3.8373	2.7717
	(2.1445)	(2.3147)	(3.1394)	(2.5004)	(1.8109)
	[0.0923]	[0.5950]	[0.4031]	[0.1249]	[0.1259]
Ownership any private non-Arab foreign (dummy)	4.2136*	4.5581*	3.5596	5.4444**	3.9326**
	(2.3328)	(2.3761)	(4.7610)	(2.6809)	(1.9438)
	[0.0711]	[0.0555]	[0.4548]	[0.0423]	[0.0431]
Ownership any public (dummy)	-3.3993	-4.4477	-11.1398**	-4.7474*	-3.4292*
	(2.7170)	(2.7510)	(4.5961)	(2.7830)	(2.0071)
	[0.2111]	[0.1064]	[0.0155]	[0.0880]	[0.0875]
R^2 (within R^2 for FE)	0.1603	0.1181	0.0692		
Number observations	2953	947	2953	2953	
Number firms	1605	677	1605	1605	
Specification with shares:					
Owner share private Arab foreign (%)	0.0587**	0.0146	0.0476	0.0665*	0.0480*
	(0.0277)	(0.0326)	(0.0352)	(0.0366)	(0.0265)
	[0.0341]	[0.6538]	[0.1772]	[0.0689]	[0.0698]
Owner share private non-Arab foreign (%)	0.0471	0.0521	0.0082	0.0598	0.0431
	(0.0320)	(0.0321)	(0.0613)	(0.0367)	(0.0265)
	[0.1414]	[0.1047]	[0.8935]	[0.1030]	[0.1039]
Owner share public (%)	-0.0635*	-0.0824**	-0.1811***	-0.0861***	-0.0621***
	(0.0344)	(0.0350)	(0.0580)	(0.0322)	(0.0232)
	[0.0650]	[0.0190]	[0.0018]	[0.0076]	[0.0075]
R^2 (within R^2 for FE)	0.1610	0.1214	0.0730		
Number observations	2953	947	2953	2953	
Number firms	1605	677	1605	1605	

Notes: Sample includes all firms with more than 5 workers in columns 1, 3 and 4 and with more than 100 workers in column 2. Dependent variable is capacity utilization in percent. Reference group for ownership is private Egyptian. All regressions include control variables as listed in Table 15. Column 3 includes additional firm fixed effects and column 4 random effects. OLS regressions in columns 1, 2, and 3 and random effects ML-Tobit regressions in column 4 with censoring levels at 0 and 100 percent capacity utilization. Marginal effects for the intensive margin in Tobit regressions are computed for an average firm with private Egyptian ownership and the assumption of a mean random effect of zero. Robust standard errors clustered at firm level in parentheses and p-values in brackets. Statistically significant at * p<0.10, ** p<0.05, or *** p<0.01.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08.

Table 18 presents our regression results for ownership structure and the net profit rate in percentage. Arab foreign ownership is in all estimated models neither in the specification with dummies nor in the specification with shares significantly correlated with the profit rate. If anything, firms with private Arab foreign ownership have a lower profit rate than firms with private Egyptian ownership. Firms with non-Arab foreign private ownership seem, however, to have a three to four percentage point higher profit rate than firms with private Egyptian or Arab ownership in the specification with dummies. A one percentage point higher share in non-Arab foreign private ownership is also correlated with approximately 0.03 to 0.05 percentage point higher profit rates in

the specification with shares. Although not statistically significant in all models, the estimation results further indicate that firms with public ownership have a lower net profit rate than firms with purely Egyptian private ownership. In the specifications with dummies, the profit rate for firms with public ownership is approximately one to three percentage point lower. In the specifications with shares, a one percentage point higher share in public ownership is correlated with approximately 0.02 to 0.05 percentage point lower profit rates.

Table 18: Estimation results for net profit rate in percent (PROFIT)

	(1) OLS	(2) OLS	(3) OLS-FE	(4) Tobit-RE	(4) mfx
Specification with dummies:					
Ownership any private Arab foreign (dummy)	-0.6288	1.5617	-1.7423	-1.4687	-0.9008
	(1.7704)	(2.5615)	(1.7542)	(1.3869)	(0.8523)
	[0.7225]	[0.5423]	[0.3208]	[0.2896]	[0.2906]
Ownership any private non-Arab foreign (dummy)	4.3378*	3.5242	3.0667	4.7316***	2.9021***
	(2.2121)	(2.4326)	(2.4489)	(1.5371)	(0.9381)
	[0.0501]	[0.1480]	[0.2107]	[0.0021]	[0.0020]
Ownership any public (dummy)	-1.2555	-3.4634*	-1.7237	-3.3743**	-2.0696**
	(1.8584)	(2.1004)	(3.8309)	(1.6698)	(1.0288)
	[0.4994]	[0.0997]	[0.6528]	[0.0433]	[0.0443]
R^2 (within R^2 for FE)	0.1007	0.1533	0.0828		
Number observations	2379	759	2379	2660	
Number firms	1416	574	1416	1499	
Specification with shares:					
Ownership share private Arab foreign (%)	-0.0135	0.0217	-0.0294	-0.0247	-0.0152
	(0.0251)	(0.0450)	(0.0229)	(0.0201)	(0.0124)
	[0.5920]	[0.6303]	[0.1994]	[0.2191]	[0.2201]
Ownership share private non-Arab foreign (%)	0.0490*	0.0491	0.0528	0.0509**	0.0313**
	(0.0280)	(0.0316)	(0.0346)	(0.0211)	(0.0129)
	[0.0811]	[0.1210]	[0.1270]	[0.0157]	[0.0153]
Ownership share public (%)	-0.0162	-0.0484*	-0.0318	-0.0426**	-0.0262**
	(0.0232)	(0.0247)	(0.0394)	(0.0194)	(0.0120)
	[0.4847]	[0.0507]	[0.4202]	[0.0280]	[0.0287]
R^2 (within R^2 for FE)	0.0997	0.1535	0.0841		
Number observations	2379	759	2379	2660	
Number firms	1416	574	1416	1499	

Notes: Sample includes firms with more than 5 workers in columns 1, 3 and 4 and with more than 100 workers in column 2. Samples for OLS regressions in columns 1, 2 and 3 are further restricted to firms with, at least, zero net profits. Dependent variable is the net profit rate in percent. Reference group for ownership is private Egyptian. All regressions include control variables as listed in Table 15. Column 3 includes additional firm fixed effects and column 4 random effects. OLS regressions in columns 1, 2, and 3 and random effects ML-Tobit regressions in column 4 with a censoring level below zero net profits. Marginal effects for intensive margin in Tobit regressions are computed for an average firm with private Egyptian ownership and the assumption of a mean random effect of zero. Robust standard errors clustered at firm level in parentheses and p-values in brackets. Statistically significant at * p<0.10, ** p<0.05, or *** p<0.01.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08.

5. Conclusion

Our estimation results indicate that productivity differences between Egyptian private and public firms are not significant. But firms with public ownership have lower capacity utilization and a lower net profit rate. The lower capacity utilization and net profit rate may point to inefficiencies in the public sector as suggested by theory and consequently is in line with our first research hypothesis. Even though we do not find productivity differences between private and public firms, the lower capacity utilization and lower profit rates of public firms suggest that privatization should be fostered. Omran (2007) underlines this conclusion in finding firm-level performance improvements following privatization.

Moreover, firms with private Arab and private non-Arab foreign ownership are significantly more productive and have higher capacity utilization than purely Egyptian-owned firms, which lends support to our second hypothesis. This superiority of foreign owned firms is in line with the traditional MNE theory that suggests that multinationals are endowed with specific competitive advantages, such as more up-to-date technology or better management. Thus, our findings support the position that it is generally advantageous to attract FDI to improve aggregate industry performance and enable domestic firms to benefit from spillovers. An open question is to what extent not only private firms but also public firms may benefit from inward FDI. For example, Girma and Gong (2008) provide rather pessimistic evidence in this context by finding that state-owned firms in China have not profited much from increasing inward FDI. In this context, it needs, however, to be mentioned that the World Bank data set does not allow us to distinguish between foreign multinationals and Egyptian multinationals. Therefore, we are methodologically not able to isolate the role of a firm's foreign ownership from multinationality. However, most Egyptian owned firms only serve the domestic market and there are only very few Egyptian owned multinationals. In fact, only two Egyptian firms, Orascom Telecom and Oriental Weavers for Carpets, are responsible for most of all outward FDI flows (Bonaglia and Goldstein, 2006).

We could not find significant differences between Arab and non-Arab foreign ownership for productivity and capacity utilization so that the source of FDI does not seem to matter that much for these dimensions. But our estimation results indicate that firms with non-Arab foreign private ownership have a higher net profit rate than firms with private Arab or private Egyptian owners. This finding lends support to our third hypothesis that cultural and institutional differences between Arab and non-Arab investors can play a significant role as a determinant of firm performance with respect to profitability and, consequently, might negatively affect the attraction of FDI from non-Arab investors in Arab countries.

When it comes to the causality of our results, caution is called for due to a possible selection bias. On the one hand, it may be the case that above-average performing Egyptian firms were preferably privatized or acquired by foreign investors ("cherry picking"), leading to a positive correlation of private or foreign ownership with firm performance, without, however, being the root cause. On the other hand, it may also be the case that below average-performing Egyptian firms were preferably privatized or acquired by foreign investors ("lemon grabbing"), leading to a negative correlation with firm performance (Weche Gelübcke, 2013).

References

Abdelkader, K. (2006). Private sector access to credit in Egypt: Evidence from survey data. *ECES Working Paper Number 111*.

Aitken, B., Harrison, A. (1999). Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. *American Economic Review* 98, 3, 605-618.

Akerlof, G.A. (2007). The missing motivation in macroeconomics. *American Economic Review* 97, 1, 8-9.

Arnold, J., Javorcik, B. (2009). Gifted kids or pushy parents? Foreign direct investment and plant productivity in Indonesia. *Journal of International Economics* 79, 1, 42-53.

Aryeetey, C., Barthel, F., Busse, M., Loehr, C., Osei, R. (2008). Empirical study on the determinants and pro-development impacts of foreign direct investment in Ghana. Study on behalf of the German Ministry for Economic Cooperation and Development and the German Technical Cooperation, URL: http://www.hwwi.org/fileadmin/hwwi/Leistungen/Gutachten/Report-FDI-Ghana-final.pdf.

Bellak, C. (2004). How domestic and foreign firms differ and why does it matter? *Journal of Economic Surveys* 18, 4, 483-514.

Boardman, A., Vining, A. (1989). Ownership and performance in competitive environments: A comparison of the performance of private, mixed, and state-owned enterprises. *Journal of Law and Economics* 32, 1, 1-33.

Bonaglia, F., Goldstein, A. (2006). Egypt and the investment development path. *International Journal of Emerging Markets* 1, 2, 107-127.

Casson, M. (1987). *The Firm and the Market: Studies on Multinational Enterprise and the Scope of the Firm*. Oxford, Basil Blackwell: Cambridge, Mass.: MIT Press.

Caves, R. (1996). Multinational enterprise and economic analysis. 2nd edition, Cambridge, New York, Melbourne, Cambridge University Press.

Chibber P., Majumdar, S. (1999). Foreign ownership and profitability: Property rights, control, and the performance of firms in Indian industry. *Journal of Law and Economics* 42, 1, 209-238.

Dewenter, K., Malatesta, P. (2001). State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. *American Economic Review* 91, 1, 320-334.

Dunning, J. (1988). The eclectic paradigm of international production: A restatement and some possible extensions. *Journal of International Business Studies* 19, 1, 1-31.

Fakih, A., Ghazalian, P.L. (2013). Why some firms export? An empirical analysis for manufacturing firms in the MENA region. *IZA discussion paper number 7172*.

Fawzy, S., El-Megharbel, N. (2004). Public and private investment in Egypt: Crowding-out or crowding-in? *ECES Working Paper Number 96*.

Ferner, A. (1997). Country of origin effects and HRM in multinational companies. *Human Resource Management Journal* 7, 1, 19-37.

Ferragina, A., Pittiglio, R., Reganati, F. (2012). Multinational status and firm exit in the Italian manufacturing and service sectors. *Structural Change and Economic Dynamics* 23, 4, 363-372.

Foster-McGregor, N., Isaksson, A., Kaulich, F. (2014). Foreign ownership and performance in sub-Saharan African manufacturing and services. *Journal of International Development*. (Article first published online July 15th.)

Girma, S., Gong, Y. (2008). FDI, Linkages and the Efficiency of State-Owned Enterprises in China. *Journal of Development Studies* 44, 5, 728-749.

Görg, H., Greenaway, D. (2004). Much ado about nothing? Do domestic firms really benefit from foreign direct investment?" *World Bank Research Observer* 19, 2, 171-197.

Harrison, A., Rodríguez-Clare, A. (2010). Trade, foreign investment, and industrial policy for developing countries. *Handbook of Development Economics*, Rodrik, D., Rosenzweig, M. (eds.), Vol. 5, Amsterdam et al., North-Holland, 4039-4214.

Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-Related Values.* Sage Publications: London.

Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. Online Readings in Psychology and Culture, 2(1), URL: http://dx.doi.org/10.9707/2307-0919.1014.

Hymer, S. (1977). *The International Operations of National Firms*. 2nd print, Sage Publications: London.

Keshari, P. (2013). Comparative performance of foreign affiliates and domestic firms in the Indian machinery industry. *MPRA Working Paper*, May 18th.

Khawar, M. (2003). Productivity and foreign direct investment—Evidence from Mexico. *Journal of Economic Studies* 30, 1, 66-76.

Kuran, T. (1986). The economic system in contemporary Islamic thought: Interpretation and assessment. *International Journal of Middle East Studies* 18, 2, 135-164.

Maher, M., Andersson, T. (1999). Corporate governance: Effects on firm performance and economic growth. OECD (ed.), OECD Publishing.

Mata, J., Portugal, P. (2002). The survival of new domestic and foreign owned firms. *Strategic Management Journal* 23, 4, 323-343.

McDonald, J., Moffitt, R. (1980). The uses of Tobit analysis. *Review of Economics and Statistics* 62, 318-321.

Megginson, W., Nettern, J. (2001). From state to market: A survey of empirical studies on privatization. *Journal of Economic Literature* 39, 2, 321-389.

OECD (2012). *Towards New Arrangements for State Ownership in the Middle East and North Africa*. OECD Publishing.

OECD (2013). *State-Owned Enterprises in the Middle East and North Africa: Engines of Development and Competitiveness?* OECD Publishing.

Omran, M. (2007). Performance consequences of privatizing Egyptian state-owned enterprises: The effect of post-privatization ownership structure on firm performance. *World Development* 35, 4, 714-733.

Omran, M., Bolbol, A., Fatheldin, A. (2008). Corporate governance and firm performance in Arab equity markets: Does ownership concentration matter? *International Review of Law and Economics* 28, 1, 32-45.

Privatization coordination support unit (2002). The Results and impacts of Egypt's privatization program, USAID Coordinating and Monitoring Services Project.

Rasiah, R., Gachino, G. (2005). Are foreign firms more productive and export- and technology-intensive than local firms in Kenyan manufacturing? *Oxford Development Studies* 33, 2, 211-227.

Rasiah, R., Kumar, A. (2008). Foreign ownership, technological intensities and economic performance of automotive parts firms in India. *Asia Pacific Business Review* 14, 1, 85-102.

Sayigh, Y. (2012). Above the state: The officers' republic in Egypt. *Carnegie Papers.* August 1, 2012, URL:http://carnegie-mec.org/2012/08/01/above-state-officers-republic-in-egypt/d4sx#.

Shirley, M., Walsh, P. (2000). Public vs. Private Ownership: The Current State of the Debate. *Policy Research Working Paper Series Number 2420*. World Bank, Washington, DC.

Stiglitz, J. (1989). Markets, market failures and development. *American Economic Review* 79, 2, 197-203.

Takii, S., Ramstetter, E. (2005). Multinational presence and labour productivity differentials in Indonesian manufacturing 1975-2001. *Bulletin of Indonesian Economic Studies* 41, 2, 221-242.

Taymaz, E., Özler, Ş. (2007). Foreign ownership, competition, and survival dynamics. *Review of Industrial Organization* 31, 1, 23-42.

Thompson, K. (2010). Data in development: An overview of Microdata on developing countries. *IASSIST Quarterly*, Winter/Spring 2010, 25-30.

U.S. Department of State (2014). 2014 Investment climate statement—Egypt. Bureau of Economic and Business Affairs, URL: http://www.state.gov/e/eb/rls/othr/ics/2014/index.htm.

UNCTAD (2014). World investment report 2014: Investing in the SDGs: An Action Plan. Geneva, United Nations.

Wagner, J., Weche Gelübcke, J. (2012). Foreign ownership and firm survival: First evidence for enterprises in Germany. *International Economics* / *Économie Internationale* 132, 4, 117-139.

Waldkirch, A., Ofosu, A. (2010). Foreign presence, spillovers, and productivity: Evidence from Ghana. *World Development* 38, 8, 1114-1126.

Weche Gelübcke, J. (2013). Foreign and domestic takeovers in Germany: Cherry-picking and Lemon-grabbing. *Applied Economics Quarterly* 59, 4, 275-294.

Whitley, R. (1992). *European Business Systems. Firms and Markets in their National Contexts*. Sage Publications: London.

Willmore, L. (1986). The Comparative Performance of Foreign and Domestic Firms in Brazil. *World Development* 14, 4, 489-502.

Yasar, M., Paul, C. (2007). International linkages and productivity at the plant level: Foreign direct investment, exports, imports and licensing. *Journal of International Economics* 71, 2, 373-388.

Chapter 5

Exporting and Workforce Skills-Intensity in the Egyptian Manufacturing Firms: Empirical Evidence Using World Bank Firm-Level Data for Egypt

Abstract[38]

The World Bank Enterprise Surveys for the manufacturing firms in Egypt are used to study the characteristics of exporting firms and the determinants of exporting behavior in the Egyptian manufacturing sector in general and to investigate the link between the exporting activities and the workforce's skills-intensity in the Egyptian manufacturing sector in particular. Several methods to estimate the probability and intensity of exporting are presented. The main findings indicate that firms in the manufacturing sector in Egypt whose workforce are characterized by higher levels of skills-intensity are more likely to export compared to other firms with lower levels of skills-intensity. Firms that hire female workers are more likely to export than other firms which do not employ women. Furthermore, firms that are larger in their size, have R&D departments, and are owned by foreigners are more likely to export than others and they have statistically significant effects on export intensity as well. The results suggest also that firms that are larger in their size are more likely to start to export than others.

Keywords: Exporting, Workforce skills, World Bank Enterprise Surveys, Egypt, Manufacturing

JEL Classification: J240, F14, F16

[38] I'd like to thank DAAD and the Egyptian Ministry of Higher Education for funding my scholarship. I'm also grateful to Katja Seidel, Inna Petrunyk, Antonia Arsova, Christian Pfeifer and Joachim Wagner for their comments and suggestions. Any shortcomings in the work are of course mine alone.

1. Introduction

The critical role of exports as a driving force of economic growth and broader development has been well established. However, Egypt as a developing country lags behind its peers in the growth of its export of world merchandise as shown in table 19.

Table 19: Some selected non-OECD countries in the World Merchandise Trade, 2013 (US billion dollars)

Exporters	Value	Rank
South Africa	96	27
Argentina	82	32
Philippines	57	39
Bangladesh	29	46
Egypt	28	47
Pakistan	25	48
Morocco	22	50

Source: https: https://www.wto.org/english/res_e/statis_e/its2014_e/its2014_e.pdf

Enterprises often cite a lack of suitable skills as an important constraint for doing business in Egypt. According to the World Bank Enterprise Surveys for the Egyptian manufacturing sector, 26.9 percent of manufacturing firms in 2008 in Egypt identify labor skill levels as a severe constraint to the operation and growth of businesses[39]. There is almost a consensus on the important role of human capital intensity for the international competitiveness and growth of industries and the economy as a whole. This refers to the decisive role of policy measures that focus on improvements in the qualification of the workforce. Nevertheless, human capital intensity per se is not sufficient to make a successful exporter. That is why studying the characteristics of exporting firms and investigating the determinants of the exporting behavior[40] of manufacturing firms are also crucial to

[39] 26.9 percent of firms reported very severe constraints; 14.04 percent of firms reported major constraints; 12.09 percent of firms reported moderate constraints; 5.52 percent of firms reported minor constraints; and 42.01 percent of firms reported no problem at all.

[40] Direct exports only are considered because information about indirect exports (through a distributer) is available only for 2008.

enhancing industrial growth and international competitiveness. Policy measures can then be designed that either target firms with these characteristics to help foster their export activities or to help firms that do not yet have these characteristics to build their capacity to become exporters in the future (Wagner, 2011).

Manufacturing firms in developed countries which are more skill-intensive in production are expected to have a higher propensity to export.

This argument is in accordance with the neo-classical trade theory where firms in developed countries would export products that are consistent with the comparative advantage of developed countries (Fakih and Ghazalian, 2014). Egypt as a developing country is considered to be plausibly more abundant in low skilled workers compared to its exporting destinations. One important question in this context is whether the exporting firms in the manufacturing sector in Egypt are characterized by higher or lower skilled workers compared to the non-exporters. Furthermore, most of the literature compares exporting firms to non-exporters at any given moment (e.g., for the US, see Bernard and Jensen (1999); for Germany, Bernard and Wagner (1997); for Colombia, Mexico, and Morocco, Clerides, Lach and Tybout (1998); for Taiwan and South Korea, Aw, Chung, and Roberts, 1998). Wagner (2002) compared not only non-exporters to exporters but also compared export starters to non-exporters. Wagner defined export starters as follows: Plants that did not export for three years prior to year t, export in year t, and export in, at least, two years between t+1 and t+3 belong to the cohort of export starters in year t. According to data availability in this panel data set, I will define firms that start to export (export starters) as follows: Firms that were not exporting in the previous year (t-1) and are exporting in the current year (t) and in the subsequent year (t+1).

The main contribution of this chapter is twofold:

1) It provides new evidence for the relationship between the workforce skills-intensity and the exporting behavior of firms in the manufacturing sector in Egypt, using the World Bank Enterprise Surveys for the manufacturing firms in Egypt.
2) It does not only make comparison between the characteristics of exporters and non-exporters but it also analyzes the characteristics of exporting firms and investigates the determinants of the exporting to help firms that do not yet have these characteristics to build their capacity to start exporting in the future.

The remainder of this chapter is organized as follows. Sections 2 and 3 summarize the theoretical background and the relevant literature, respectively. Section 4 describes data. Section 5 presents the empirical strategy. Section 6 interprets the main findings and Section 7 concludes and extracts some policy recommendations that help enhance exporting activities in the Egyptian manufacturing sector at the firm level.

2. Theoretical background

The trade and labor market interactions were tackled in old and new international trade theories. Building on the Ricardian comparative advantage theory, the neo-classical Heckscher-Ohlin (H-O) trade theory (sometimes called "old trade theory") stipulates that relative endowments of factors of production determine a country's comparative advantage. Bernard et al. (2006) stated, "A key implication of the Heckscher-Ohlin trade model is that the industries produced in a country are a function of its relative endowments: in an open world trading system, relatively capital- and skill-abundant countries like the U.S. are expected to produce a more capital- and skill-intensive mix of industries than relatively labor-abundant countries like China." (Bernard et al., 2006, p.221). A difficulty in using the Heckscher-Ohlin model to motivate an inquiry into plant behavior is that the model focuses on countries, factors and industries, not plants.

One way to reconcile the model with observed plant heterogeneity is to assume plants produce a bundle of products within an industry. Manufacturing firms in the developed countries which are relatively capital and skill abundant countries are expected to produce more products that are consistent with the comparative advantages they have than developing countries which are relatively labor abundant countries (Bernard et al., 2006). Egypt is a country that is relatively less endowed with skilled workers than its export destination countries. Accordingly, Egyptian firms have a higher comparative advantage in exporting goods that use unskilled workers more intensively. This study is mainly devoted to test to what extent this argument is valid in the manufacturing sector in a developing country like Egypt.

Recent developments in the international trade theory, such as the works of Melitz (2003) and Yeaple (2005) have focused attention on the role of firm heterogeneity within industries. The Melitz (2003) explains why various firms in the same industry have different exporting behaviors. In each industry a firm must pay a fixed entry cost to enter the market before observing its productivity. Firms enter the foreign market when revenues from doing so exceed the fixed costs of entry. Only firms with higher productivity exceeding a given threshold will be able to export. If their levels of productivity are too low to be profitable, they are forced to leave the market. Trade liberalization will force the least productive firms to exit and resources will be allocated towards the most productive ones that will continue in the market. Yeaple (2005) shows in a general equilibrium trade model in a perfectly competitive labor market that firm heterogeneity arises because firms choose to employ different technologies and hire different types of workers who vary in their skill levels. Based on the scarcity of skills in the labor market, employers decide to produce with technologies that differ in their characteristics. Suppose that a new technology was created that allows production at a lower unit cost relatively to an older technology. Given two workers that vary in their skill levels, the more skilled worker has an absolute advantage in both technologies and a comparative advantage in the newer technology.

3. Literature Review

There is indeed a wide stream of empirical literature that examines the determinants of the exporting behavior of manufacturing firms in many countries and regions; for example, Bernard and Jensen (2004), Alvarez and Lopez (2005), Molina and Muendler (2013), Martinez-Zarzoso (2012), Fakih and Ghazalian (2014). For an excellent survey of 51 studies published between 1991 and 2011 for firm characteristics and export activities in Germany, see Wagner (2011).

Using a linear probability framework, Bernard and Jensen (2004) examined the factors that increase the propensity to export of manufacturing firms in the United States to provide an answer to the research question: Why do some firms export? They found that firms with better quality of labor are expected to enter the export market. Fakih and Ghazalian (2014) used the World Bank Enterprise Surveys via a country-specific effect model with country variables to examine the factors that determine the probability of exporting and the export intensity of manufacturing firms located in the MENA region. The main results indicated that private foreign ownership, ICT use, and firm size have significant positive effects on the probability of exporting and on the export intensity of manufacturing firms in the MENA region and that the relative labor compositions of firms in terms of skilled production workers (skilled production workers over total production workers) tend to exert negative effects on firms' propensity to export. Fakih and Ghazalian (2014) showed that their results confirm the neo-classical Heckscher-Ohlin (H-O) trade theory. The authors' analysis was confined to total production workers by comparing skilled to unskilled production workers only, without considering the characteristics of the permanent workers. Controlling for the skill levels of the permanent workers (in terms of schooling and training) may lead to a different conclusion.

Alvarez and Lopez (2005) extracted different evidence from Chile. They found that increasing access to export markets increase productivity and that exporting firms in Chile are characterized by higher levels of skill-intensity in production compared to non-exporters. These results disagree with the comparative advantage of Chile which is relatively abundant in unskilled labor. Martinez-

Zarzoso (2012) investigated the link between exporting activities and productivity using the World Bank Enterprise Surveys datasets for Egyptian and Moroccan manufacturing firms and using a probit equation. She found that exporting status depends on firm characteristics, lagged productivity, sales, employment, capital endowment, sector and geographical characteristics and skill intensity, which is measured by dividing the number of workers with secondary or tertiary education over the total number of workers.

Wagner (2012) used a large representative panel of enterprises from German manufacturing industries to shed new light on the role of highly qualified employees for exporting. The author introduced evidence of the quality of the average wage in a firm as a proxy variable for the qualification of the workforce[41]. His results point to the decisive role of human capital intensity and highly qualified employees for exporting. Wagner (2001) introduced important evidence concerning the relationship between firm size and exports—firm size is neither necessary nor sufficient for exporting in each and every industry or country. His results also show that the importance of the role of other factors (human capital, research and development, and innovative products) differ between industries.

Kiendrebeogo (2014) investigated the relationship between exporting and productivity by checking the self-selection process hypothesis, which assumes that exporters prepare themselves by being more productive before starting to export, versus the learning-by-exporting hypothesis, which argues that firms learn by exporting and, therefore, become more productive during the process of exporting.[42] The author divided exporters into two groups—export starters and export continuers. Export starters are defined as firms that did not export in year t-1 and export in year t while export continuers are firms that exported in year t-1 and continue to export in year t. In order to test for the self-selection hypothesis, Kiendrebeogo (2014) compared the productivity performances between

[41]Average wages and the ratio of white collar employees to total employees were also used by Bernard and Jensen (2004) to proxy for workforce quality.

[42] There is a wide stream of empirical literature that examines this relationship in the developing countries, for example, Clerides et al. (1998), Tybout (2000), Alvarez (2005), and Martinez-Zarzoso (2012).

today's exporters and non-exporters one year before starting to export. The hypothesis of learning-by-exporting is tested by comparing the performance of export-continuers and non-exporters one year after continuers start to export. It is worth noting here that the author used only the log of average wage as a proxy of firm's human capital although the panel dataset used provide rich information about the human capital of both the workforce and the top managers in terms of the educational attainment level. Pfeifer (2015) used the same panel dataset to investigate the link between productivity of firms and the human capital (in terms of schooling and experience) but only for the top managers.

Table 20 summarizes the main findings of empirical studies conducted using World Bank Enterprise Surveys to analyze both export activities and workforce characteristics.

Table 20: Summary of empirical studies on export activities and workforce characteristics using World Bank Enterprise Surveys

Study	Data	Methods	Main Findings
Fakih and Ghazalian (2014)	4386 manufacturing firms located in eight Arab countries in the MENA region (Algeria, Egypt, Jordan, Lebanon, Morocco, Oman, Syria, and Yemen) in different years between 2002 and 2010 (2029 manufacturing firms in Egypt in two years only 2007 and 2008).	Probit and fractional logit. A country-specific effect model with country variables.	Private foreign ownership, information and communication technology, and firm size are positively related to the probability and intensity of exporting of MENA manufacturing firms, while government ownership and the relative labor compositions of firms in terms of skilled production workers and in terms of non-production workers are negatively related to the probability of exporting.
Martiniz-Zarzoso (2012)	2316 Egyptian firms and 1539 Moroccan firms for only 2 years 2004 and 2007.	Both propensity score matching (PSM) using a probit equation and differences-in differences (DID) matching estimator.	The Egyptian exporters are larger and more productive than non-exporters. Exporting is positively correlated to labor productivity. In contrast, no differences are found in labor productivity between Moroccan exporters and non-exporters. The results support the self-selection hypothesis for

			Egyptian firms, but not for Moroccan firms
Fakih and Ghazalian (2015)	3619 manufacturing firms located in eight Arab countries in the MENA region (Algeria, Egypt, Jordan, Lebanon, Morocco, Oman, Syria, and Yemen) in different years between 2002 and 2010. Manufacturing firms in Egypt are in two years only 2007and 2008).	Fractional logit, probit and Tobit models (as robustness checks).	Private foreign ownership and exporting activities are positively correlated to overall female employment rates. The empirical results that implemented for female non-production employment rates show positive effects of private foreign ownership but these effects are smaller in magnitude compared to the corresponding effects on overall female employment rates in the MENA region.
Murat Seker (2012)	Data from 43 developing countries. 16722 manufacturing firms in 2002, 2005, and 2008 for Eastern Europe and the Central Asia region and in 2006 for Latin America and Caribbean region.	OLS, random effects probit model	Firms are divided into four distinct groups: two-way traders, exporters-only, importers-only, and non-traders. The empirical results show that two-way traders grow faster and innovate more than any other group of firms and they are followed by the exporters-only.
Kiendrebeogo (2014)	Unbalanced panel of 1655 manufacturing firms having, at least, 10 employees over the period 2003-2008. Indirect exports are not considered.	Logit model and propensity score matching (PSM)	The author finds that labor productivity and total factor productivity are significantly higher for exporters than for non-exporters and that export premium is driven by a learning-by exporting process rather than just a self-selection of more productive firms into exporting. The author refers also to an inverted U-shaped relationship between export intensity and productivity, suggesting the existence of a "threshold of exporting" in the manufacturing firms in Egypt.
Edwards and Balchin (2008)	3585 manufacturing firms in 8 African countries—Egypt (977 firms in 2004	Probit model	Across the eight African countries, exporters are larger in size than non-exporters; value-added per worker of exporters is higher than non-

	only), Kenya, Madagascar, Mauritius, South Africa, Tanzania and Zambia between 2002 and 2005		exporters. Exporting firms are younger, have higher share of foreign ownership, and have higher levels of skill intensity (measured as the ratio of permanent skilled production workers to total employment).
Parra et al. (2014)	2429 observations (554 firms) for years 2004, 2005 and 2007.	OLS and OLS fixed effects	Larger firms, exporting firms and foreign firms are less affected by the business environmental obstacles than small, domestic and non-foreign firms in Egypt.
Parra and Martinez-Zarzoso (2015)	1890 observations (519 firms) from 2003 to 2007	OLS, Panel probit model with random effects and panel Tobit model	Firms involved in export and import activities have higher productivity, are larger, own more capital and invest more than domestic-only firms. Both export and import activities are significantly interrelated and sunk cost are higher for import than for export activities in Egypt.
Marquez-Ramos et al.(2012)	2316 observations (695 firms) in 2004 and 2005.	Pooled regression	The use of foreign intermediate inputs as a proxy for production networks is positively correlated with the decision to export but does not affect the amount exported. Furthermore, innovation and adoption of new technologies are positively correlated with both the decision to export and the amount exported in Egypt.
Parra et al. (2013)	2316 observations (695 firms) in 2004 and 2005	Logit and Tobit models	Innovation and importing activities are positively correlated with the decision to export (extensive margin) and the amount exported (intensive margin) in Egypt.
Pfeifer (2015)	2891 observations for 1583 firms in an unbalanced panel in years 2004, 2007 and 2008 (1287 observations for balanced panel of 429 firms as	OLS (Pooled and fixed effects linear regressions)	Positive correlation between productivity in manufacturing firms in Egypt and firms managed by top managers who have some kind of university degree, more experience in management activities, and foreign experience in management

	robustness check)		jobs.
Abdelgouad and Pfeifer (2014)	2914 observations for 1593 firms in 2004, 2007 and 2008.	Pooled and random effects probit and Tobit regressions	Exporting firms in the Egyptian manufacturing sector and especially firms with longer export experience are more likely to employ women and have a higher women employment share. Results suggest also that female employment is positively correlated with firms managed by top managers with a university degree and with foreign experience in management jobs.
Abdelgouad (2015)	2672 observations for firms in 2004, 2007 and 2008.	Probit and Tobit models	Empirical results revealed that demand changes had no effects on using temporary employment in the manufacturing firms in Egypt.
Seker (2010)	1552 observations for 943 firms in the manufacturing sector	Probit	Using 26 countries in the Eastern Europe and Central Asia region, firms that cannot create new jobs due to rigid labor market regulations are less likely to export.

Molina and Muendler (2013) found that Brazilian manufacturing firms with more highly educated workers or with more skill-intensive occupations are more likely to be exporters than non-exporters. The authors made comparisons not only between exporters and non-exporters but also among exporters themselves. They found little variation among exporters in their observed workforce composition in terms of both schooling and occupations. Meanwhile and using the workers' prior job history and their experience at other exporters as a proxy to unobserved skills, Molina and Muendler (2013) found evidence that former exporter workers possess unobserved skills that are associated with exporter performance and that hiring workers with an exporting background from prior employers is an important predictor for firms to start to export in the future. The human capital of the workforce is an important determinant of establishment productivity (Black and

Lynch, 1996). Firms which employ more educated workers are more productive. This is consistent with a human capital theory where more skilled workers make the firm more productive (Haltiwanger et al., 1999). Of course, the human capital of the workforce in terms of the educational attainment (schooling and university) is an important driver of productivity of firms. Nevertheless, human capital intensity per se again is not sufficient to make a successful exporter (Wagner, 2011). That is why studying the characteristics of exporting firms and investigating the determinants of the exporting behavior in this study is crucial.

4. Data and descriptive statistics

The World Bank Enterprise Surveys for the manufacturing firms in Egypt for the survey years 2004, 2007 and 2008 are used to study the characteristics of exporting firms and the determinants of the exporting behavior in the Egyptian manufacturing sector in general and to investigate the link between the exporting activities and the workforce skill intensity in the Egyptian manufacturing sector in particular. The World Bank Enterprise Surveys collect data from key manufacturing and service sectors in different regions all over the world. One of the main advantages of these surveys is that the questions are identical through firms across all countries.

The surveys for firms from the Egyptian manufacturing sector are unique, at least, in the Middle East and North African (MENA) region. First, the World Bank has successfully conducted three waves of survey (2004, 2007 and 2008) in Egypt as against only one or two waves in the other MENA countries. Second, approximately one thousand firms are interviewed in each wave and this sample size is larger than that of most other countries, especially developing countries in the MENA region (Abdelgouad et al., 2015). The surveys gather information about export status, total sales, different firm characteristics and the workforce composition, for example, as shown in the summary statistics. These surveys are carried out in an unbalanced panel design at the establishment level. All establishments in the data employ more than 5 workers. The number of observations in the estimation sample is 3056 observations for 1634 firms.

Table 21: Detailed descriptive statistics for all variables in all specifications

		Mean	Standard deviation
Dependent variables			
Export status	Overall	0.2562	0.4366
	Between		0.3918
	Within		0.2384
Export/Sales ratio	Overall	0.0968	0.2338
	Between		0.2070
	Within		0.1275
Export starters	Overall	0.0305	0.1721
	Between		0.1721
	Within		0
Explanatory Variables:			
Share primary schooling (%)	Overall	0.1170	0.1547
	Between		0.1247
	Within		0.1055
Share preparatory or incomplete secondary Schooling (%)	Overall	0.1782	0.1764
	Between		0.1425
	Within		0.1199
Share secondary schooling (incl. vocational) (%)	Overall	0.3842	0.2277
	Between		0.1900
	Within		0.1486
Share university degree (%)	Overall	0.1715	0.1485
	Between		0.1296
	Within		0.0892
Training of workers (dummy)	Overall	0.1825	0.3863
	Between		0.3361
	Within		0.2429
High qualified manager (dummy)	Overall	0.7732	0.4188
	Between		0.3601
	Within		0.2408
Share female employment (%)	Overall	0.1673	0.2197
	Between		0.1990
	Within		0.1105
Temporary employment (dummy)	Overall	0.3121	0.4634
	Between		0.3857
	Within		0.3012
Unionized employment (dummy)	Overall	0.2454	0.4304
	Between		0.3690
	Within		0.2749
Government ownership (%)	Overall	3.169	16.876
	Between		16.201
	Within		7.9081
Private domestic ownership (%)	Overall	92.234	24.992
	Between		23.655
	Within		11.944

Foreign ownership (%)	Overall	2.010	12.633
	Between		11.830
	Within		6.7130
Arab ownership (%)	Overall	1.961	12.329
	Between		10.326
	Within		7.3056
Firm age (years)	Overall	22.457	16.965
	Between		15.272
	Within		8.3677
R&D department (dummy)	Overall	0.2185	0.4133
	Between		0.3600
	Within		0.2525
Other branches (dummy)	Overall	0.2195	0.4140
	Between		0.3477
	Within		0.2583

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08

Table 22: Descriptive statistics for all variables in all specifications

	Mean	Standard deviation
Dependent variables		
Export status	0.2562	0.4366
Export starters	0.0305	0.1721
Export/Sales ratio	0.0968	0.2338
Explanatory Variables:		
Share primary schooling (%)	0.1170	0.1547
Share preparatory or incomplete secondary schooling (%)	0.1782	0.1764
Share secondary schooling (incl. vocational) (%)	0.3842	0.2277
Share university degree	0.1715	0.1485
Training of workers (dummy)	0.1825	0.3863
High qualified manager (dummy)	0.7732	0.4188
Share female employment (%)	0.1673	0.2197
Temporary employment (dummy)	0.3121	0.4634
Unionized employment (dummy)	0.2454	0.4304
Government ownership (%)	3.1692	16.87
Private domestic ownership (%)	92.234	24.992
Foreign ownership (%)	2.010	12.633
Arab ownership (%)	1.9614	12.329
Firm age (years)	22.45	16.965
R&D department (dummy)	0.2185	0.4133
Other branches (dummy)	0.2195	0.4140
51-99 employees	0.1040	0.3054
100-1000 employees	0.2723	0.4452
> 1000 employees	0.0517	0.2214
2007 (dummy)	0.3213	0.4670
2008 (dummy)	0.3658	0.4817

Nine sectors of main activities (dummies): Garments, textiles, machinery & equipments, chemicals, electronics, metal, non-metal, agro, other. Twenty-three regional governorates (dummies): Cairo, Alexandria, Port Said, Suez, Damietta, Dakahliya, Sharkiya, Qualyubia, Kafr-El-Sheikh, Gharbiya, Menoufiya, Beheira, Ismailia, Giza, Bani-Suef, Fayoum, Minya, Assuit, Souhag, Qena, Aswan, Loxur, South Saini.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08.

As shown in table 22 in the summary statistics, 25.62 percent out of all firms surveyed in Egypt are direct exporters and 30 firms are export starters (3.05 percent of total number of 982 firms). This number of export starters increases to be 89 firms (9.06 percent of total number of 982 firms) in case of adopting a broader definition for export starters with only two-year windows, in other words, if we are concerned only with those firms that were not exporting in year t-1 (2006) and started to export in year t (2007).

It is worth noting here that the whole panel dataset is exploited in the first and second empirical parts of this chapter for estimating both the probability of exporting and the export intensity of firms while only a cross section analysis was adopted for estimating the export starters in year 2007. More details about the estimation strategy will be found in the next section. In terms of educational attainment the share of permanent workers who have secondary education, some university degree or higher level of education together over the total number of permanent workers is 55.57 percent. Table 22 presents summary statistics for all the independent variables of interest used in the empirical analysis.

5. Estimation Strategy

The primary objective of this chapter is to investigate the link between the exporting activities and the workforce skills-intensity in the manufacturing firms in Egypt. The second objective is to identify the characteristics of exporting firms and the determinants of the exporting behavior in the Egyptian manufacturing sector. The estimation strategy is divided into three parts. In the first part the probability that a firm is exporting will be modeled in a binary-choice framework where the dependent variable takes the value of one if the firm is engaged in exporting activities and zero if otherwise. In the second part, the intensity of exporting (how much firms export?) will be estimated. Export intensity is defined as the fraction of the total value of exports from the total value of sales. The Tobit model and the fractional logit model introduced by Papke and Wooldridge (1996) are used to estimate the exports and sales ratio, which is a percentage variable with usually many observations at the lower limit. The same strategy adopted in the first and second parts will be applied in the third part to estimate at first the probability that a firm is *an export starter* and how much they export. To account for unobserved time invariant firm heterogeneity, there are several potential estimation strategies for this binary-choice framework using ordinary least square (OLS), including pooled linear regression (POLS) as well as random effects linear regression (GLS) and fixed effects linear regression (FEOLS).

The Pooled OLS regression is consistent if the regressors are uncorrelated with the error term. Pooled OLS typically overstates the precision gains, leading to underestimated standard errors and t-statistics that can be greatly inflated. Fixed effects model allows for unobserved individual heterogeneity that may be correlated with regressors. The random effects estimator also exploits the special features of panel data. The random effects estimator is fully efficient under the random effects model, though the efficiency gain compared to pooled OLS need not be great. Random effects model is inconsistent if the fixed effects model is the correct model (Cameron and Trivedi, 2005). Hausman test can be run afterwards to compare an estimator that is known to be consistent with an estimator that is efficient under the assumption being tested. It is worth noting here that linear probability specification is not often the first choice for binary choice problems as the predicted probabilities may be outside of the 0-1 range. Nevertheless such specifications are important as robustness checks and to get stronger evidence.

To avoid the previous shortcoming of linear methods, a random effects nonlinear probit model will also be estimated together with the average marginal effects[43]. The probit model is a binary dependent variable model which is an example of limited dependent variable models (LDV) whose range of values is substantively restricted (Wooldridge, 2009). The panel dataset allows estimating a random effects probit model, which exploits the serial correlation in the error terms generated by unobserved heterogeneity. It should be mentioned here also that no consistent fixed effects models can be estimated for the probit and Tobit models in short panels; that is why only random effects probit model that exploit the between and the within variance can be estimated (Abdelgouad and Pfeifer, 2014). Now we will describe our strategy to estimate the exports and sales ratio. In fact, various methodologies have been used in the literature to model the exports and sales ratio.

[43] While in the linear regression model, the ME equals the relevant slope coefficient, greatly simplifying analysis, there are two kinds of MEs that could be computed. Marginal Effects at the Means (MEMs) which are computed by setting the values of X variables at their means, and then seeing how a change in one of the Xk variables changes P(Y = 1). With Average Marginal Effects (AMEs), a marginal effect is computed for each case, and the effects are then averaged. Many prefer AMEs because they provide a better representation of how changes in Xk affect P(Y = 1). For more information, see Greene (2003), 764-773.

These various methodologies can be categorized into one-step and two-step approaches. In a one-step approach, both the limit observations (the non-exporters) and the rest are used to estimate one equation that models the export and sales ratio empirically, while a two-step approach models the decision to export or not, and the decision as to how much to export (given that exports are positive) separately. It is not an easy mission to find variables that are important for the yes or no decision while not important for the how much decision, and vice versa; that is why a two-step methodology to estimate the export and sales ratio is not appropriate. The Tobit model accounts for potential censoring of export and sales ratio at 0 percent and 100 percent by applying a two-limit variant to take care for both the lower (zero) and the upper (100 percent) limits of the export and sales ratio distribution. For more details, see Wagner (2001, p. 231) who stated, "Tobit is simply not made for a situation when the endogenous variable is bounded to be zero or positive by definition—it is appropriate when the value of the variable can be less than a lower limit but observations with such values of the variable are not observed because of censoring". However, the Tobit model allows us to compute marginal effects for the extensive margin, i.e., for the probability of reporting a positive export and sales ratio, and marginal effects for the intensive margin, i.e., for the expected export and sales ratio in percentage conditional on a positive export and sales ratio (McDonald and Moffitt, 1980). Marginal effects are an informative means of summarizing how change in an outcome is related to change in the explanatory variables in nonlinear models.

Another estimation model is the quasi-likelihood method developed by Papke and Wooldridge (1996) to take into account the bounded nature of fractional dependent variables between zero and one. These boundaries are established by definition and not by censoring (Wagner, 2001). For the sake of robustness checks and models to get stronger evidence, we decided to show and interpret the results of both the Tobit and the fractional logit which surprisingly do not differ so much. As mentioned before in section one, *export starters* are defined as firms that were not exporting in the previous year (t-1) and are exporting in the current year (t) and in the subsequent year (t+1). Export

starter is measured also as a dummy dependent variable that takes the value 1 if the firm is an export starter and zero if otherwise. To check our results, a broader definition for export starters in 2007 was later on adopted using two-year windows only. According to this definition, export starters are firms that did not export in year t-1 (2006) and export in year t (2007).

A cross section analysis was adopted for estimating the export starters in year 2007 by observing the characteristics of firms and the composition of their workforces in year 2004 by taking the lagged values of all the explanatory variables for one period [44]as shown in the next equation:

$$Y_{2007} = \beta_0 + \beta_1 X_{2004} + \varepsilon$$

where:

Y_{2007} refers to firms that were not exporting in 2006 and started to export in 2007 and continued to export in 2008.

X_{2004} represents a row vector of variables that control for the characteristics of firms and the workforce composition.

The workforce skills intensity is the main independent variable of interest and will be measured in terms of the educational attainment level. Since education might be a poor proxy for the skill intensity in developing countries in general and in Egypt in particular[45], training is also included as a dummy variable which shows whether or not firms offer internal or external training to their permanent workers. The independent variables can be categorized into two main groups as follows:

- *Characteristics of firms' workforce composition:*

[44] The lagged values for one period of all explanatory variables in 2007 will give the desired values for year 2004. Remember that our dataset is unbalanced dataset with gaps in year 2005 and 2006.

[45] According to the recent Global Competitiveness Report 2013/2014, Egypt occupies the last rank out of 148 countries in the quality of primary education indicator and ranks 118 in the higher education and training indicator.

- *Share of primary schooling:* Permanent workers (males and females) who have completed primary level of education over the total number of permanent workers.
- *Share of preparatory or incomplete secondary schooling:* Permanent workers (males and females) who have completed preparatory level of education or did not complete secondary level of education over the total number of permanent workers.
- *Share of secondary schooling:* Permanent workers (males and females) who have completed secondary level of education (including vocational education) over the total number of permanent workers.
- *Share of university degree or higher schooling:* Permanent workers (males and females) who have some university degree or higher level of education over the total number of permanent workers.
- *Training* (dummy): Equals one if a firm offers internal or external training to its permanent worker and zero if otherwise.
- *Highly qualified manager (dummy):* Equals 1 if top manager has a Ph.D. or did a post-graduate degree and 0 if otherwise.
- *Female employment share:* Number of permanent female workers over the total number of permanent workers.
- *Temporary employment* (dummy): Equals 1 if a firm is hiring a temporary employee and zero if otherwise.
- *Unionized workforce (dummy):* Equals 1 if worker is affiliated to a trade union and zero if otherwise.

- *Firm Characteristics:*

- *Firm size:* By categorizing firms into small-size firms (50-100 workers), medium-size firms (100-1000 workers), and large-size firms (higher than 1000 workers)

- *Ownership share:* By categorizing firms into four categories: foreign ownership, private ownership, government ownership, and Arab ownership.
- *R&D* (dummy): Equals 1 if there exists an own R&D department in the firm and zero if otherwise.
- *Firm age* (years): Measured by the number of years since the establishment of the firm.
- Branch (dummy): Equals 1 if the firm has other branches or factories and zero if otherwise.
- In addition to regional dummies (23 regions), sector dummies (9 sectors), and year dummies (3 years).

6. Empirical Results

The results of POLS, FEOLS, GLS and the random effects probit model together with their average marginal effects are presented in Table 23.

Table 23: Estimation results for export status

	POLS	FEOLS	GLS	Probit (Prob (Y>0))	
				coefficients	average marginal effects
Log of average wage	0.0050 (0.0056)	0.0123* (0.0073)	0.0048 (0.0054)	0.0373 (0.0305)	0.0063 (0.0051)
Share primary schooling (%)	-0.0694 (0.0493)	0.0106 (0.0622)	-0.0565* (0.0477)	-0.3813 (0.3598)	-0.0648 (0.0612)
Share preparatory or incomplete secondary schooling (%)	0.0217 (0.0424)	0.0193 (0.0536)	0.0176 (0.0411)	0.3031 (0.2881)	0.0515 (0.0489)
Share secondary schooling (incl. vocational) (%)	0.0357 (0.0366)	0.0988** (0.0482)	0.0511 (0.0357)	0.4606* (0.2553)	0.0783* (0.0432)
Share university degree	0.1082** (0.0541)	0.2190*** (0.0731)	0.1315** (0.0529)	0.8225** (0.3335)	0.1399** (0.0560)
Training of workers (dummy)	0.0515** (0.0187)	0.0225 (0.0243)	0.0454** (0.0181)	0.2063** (0.0972)	0.0351** (0.0164)
Highly qualified manager (dummy)	0.0312* (0.0172)	0.0063 (0.0243)	0.0255 (0.0171)	0.4423** (0.1326)	0.0752** (0.0226)
Share female employment (%)	0.0995* (0.0352)	0.0645 (0.0538)	0.1049** (0.0355)	0.6095** (0.2123)	0.1037** (0.0357)

Temporary employment (dummy)	-0.0200 (0.0142)	-0.0212 (0.0188)	-0.0211 (0.0139)	-0.1146 (0.0873)	-0.0195 (0.0147)
Unionized employment (dummy)	0.0240 (0.0164)	0.0062 (0.0211)	0.0230 (0.0158)	0.1020 (0.0892)	0.0173 (0.0151)
Government ownership (%)	0.0010 (0.0009)	0.0006 (0.0013)	0.0009 (0.0009)	0.0034 (0.0045)	0.0005 (0.0007)
Private domestic ownership (%)	0.0019 (0.0008)	0.0022 (0.0012)	0.0020 (0.0008)	0.0069 (0.0042)	0.0011 (0.0007)
Foreign ownership (%)	0.0047*** (0.0010)	0.0062** (0.0014)	0.0048*** (0.0009)	0.0192*** (0.0051)	0.0032*** (0.0008)
Arab ownership (%)	0.0030** (0.0010)	0.0025 (0.0014)	0.0028** (0.0009)	0.0100** (0.0049)	0.0017** (0.0008)
Firm age (years)	-0.0008** (0.0004)	-0.0002 (0.0006)	-0.0006 (0.0004)	-0.0037 (0.0026)	-0.0006 (0.0004)
R&D department (dummy)	0.2030*** (0.0181)	0.1920*** (0.0243)	0.1957*** (0.0177)	0.7865*** (0.0954)	0.1338*** (0.0145)
Other branches (dummy)	0.0052 (0.0169)	-0.0229 (0.0232)	0.0010 (0.0167)	0.0296 (0.0927)	0.0050 (0.0157)
Firm size categories (dummies, reference 5- 50 workers)					
51-99 employees	0.1942*** (0.0225)	0.1869*** (0.0329)	0.1909*** (0.0224)	1.0875*** (0.1279)	0.1976*** (0.0279)
100-1000 employees	0.3391*** (0.0183)	0.3076*** (0.0301)	0.3336*** (0.0186)	1.5735*** (0.1189)	0.3407*** (0.0259)
> 1000 employees	0.5311*** (0.0358)	0.5543*** (0.0616)	0.5309*** (0.0363)	2.2986*** (0.2174)	0.5749*** (0.0592)
Survey year (dummies, reference 2004)					
2007	-0.0045 (0.0168)	-0.0050 (0.0169)	-0.0036 (0.0152)	-0.0765 (0.0982)	-0.0130 (0.0167)
2008	-0.0065 (0.0178)	-0.0208 (0.0200)	-0.0077 (0.0165)	-0.0888 (0.1042)	-0.0151 (0.0176)
Sector (9 dummies)	Yes	Yes	Yes	Yes	Yes
Region (23 dummies)	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in brackets. Significant at the * 10, **5 and ***1% level, respectively.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08. Sample: Unbalanced panel (N=3054; n=1634).

Across all models there is concrete evidence that firms which employ higher skilled workforce (i.e., in terms of education and training) are more likely to be exporters. POLS, GLS and FEOLS estimates[46] reveal that when the share of workers with a university degree increase by one

[46] It is worth noting that Hausman test was run and the p value is 0.0487 which suggests that fixed effects model is more consistent than random effects model.

percentage point, firms are more likely to export by these percentage points 0.108, 0.098, and 0.131, respectively. The size of the average marginal effect in the random effects probit regression is 0.1399 which means that, holding all other explanatory variables constant, the probability that firms export increase by that amount when the share of the higher skilled workers increase by one skilled worker. All these results are statistically significant at the 5 percent level across all models. The empirical results suggest also that firms which employ workers with a university degree tend to be more likely to export (and more intense) than firms which employ workers with secondary and vocational education and the latter tend to be more likely to export (and more intense) than firms which hire preparatory or incomplete secondary schooling. Firms which hire workers with primary schooling are less likely to export (and less intense to export). The previous results are not in line with previous results of Fakih and Ghazalian (2014) who found, using the same dataset, different evidence for the MENA region, including Egypt. They found a significant negative relationship between the ratio of skilled production workers and the probability of exporting. The authors stated while publishing their results that they found some evidence that confirm the neo-classical Heckscher-Ohlin (H-O) trade theory, arguing that MENA countries are relatively less endowed in skilled workers compared to their export destinations and that they possess a higher comparative advantage in exporting goods that use unskilled workers. The authors' analysis was confined to total production workers by comparing skilled to unskilled production workers; it neglected the characteristics of the permanent workers. My results are in line with the results of Alvarez and Lopez (2005) who found that exporting firms in Chile are characterized by higher levels of skill intensity compared to non-exporters.

Firms that provide internal or external training programs for their workers are 5.1 percentage point and 4.5 percentage point more likely to export as shown in the POLS and in the GLS regressions, respectively. The results are statistically significant at 10 percent in the POLS and at 5 percent in the GLS and the size of average marginal effect in the random effects probit regression is (0.035) in

the random effects probit regression and statistically significant at 5 percent. These results provide additional evidence that firms which employ a higher skilled workforce in the manufacturing sector in Egypt are more likely to be exporters.[47] Moreover, all models except the FEOLS refer to an interesting result concerning the share of female workers—firms that add one female worker to their workforce are more likely to export by the following amounts 0.099, 0.104, and 0.609 in POLS, GLS and the random effects probit model, respectively. All results are statistically significant at 5 percent.

These results are in line with the results of (Fakih and Ghazalian, 2014) that MENA's manufacturing firms engaged in exporting activities have higher proportions of female workers compared to non-exporting firms and with the results of (Al-Azzawi, 2014) that exporting industries are more likely to hire female workers. These results are also consistent with the results of (Abdelgouad and Pfeifer, 2014) that exporting firms and especially firms with longer export experience are also more likely to employ females and have a higher female employment share, which points to potential international spillover effects, such as, learning and adapting management practices that also promote female employment (Abdelgouad and Pfeifer, 2014). All models except the FEOLS also indicate that firms with higher qualified managers (in terms of educational attainment) are more likely to export than firms with lower qualified managers by 3.12 percentage points and 2.5 percentage points in POLS and GLS, respectively, and the size of the average marginal effects of the random effects probit model is 7.5 percentage points. The results are statistically significant at 10 percent in the POLS regression and at 5 percent in the random effects probit regression. These results are also in line with the results of Pfeifer (2015) who found a positive correlation between productivity in the Egyptian firms in the manufacturing sector and top managers who have some kind of university degree.

[47] Because it may be argued that education alone is a poor proxy for measuring skills in a developing country like Egypt.

Concerning the firm characteristics, across all models and in terms of the number of permanent workers, firms that are larger in their size are more likely to export. Firms that employ more than 50 workers and less than 100 workers are more likely to export than firms that employ less than or equal to 50 workers. All results are statistically significant at 1 percent. These results are in line with previous studies that exporting firms are characterized by larger size than non-exporters (e.g., Bernard and Jensen (2004); Alvarez and Lopez (2005); and Fakih and Ghazalian (2014)). Firms that have R&D departments are more likely to export than other firms that do not have. All results are also statistically significant at 1 percent across all models. Firms that are owned by non-Arab foreigners are also more likely to export than firms owned by Egyptian and Arab owners. All results are statistically significant at 5 percent. These results are consistent with those found in some previous studies (e.g., Aitken et al. (1997); Bernard and Jensen (2004); Alvarez and Lopez (2005); and Fakih and Ghazalian (2014)). These results are in line with a recently published study Abdelgouad, et al. (2015) that firms in the manufacturing sector in Egypt with foreign ownership are significantly more productive and have higher capacity utilization than purely Egyptian-owned firms.

Furthermore, non-Arab foreigners are expected to have stronger networks to export in foreign markets, and hence more information about exporting to foreign markets. To sum it up, the previous results suggest that firms in the manufacturing sector in Egypt whose workforce are characterized by higher levels of skill intensity are more likely to export compared to other firms with lower levels of skill intensity. Firms that hire female workers are more likely to export than other firms which do not employ women. Furthermore, firms that are larger in their size are more likely to export than firms of lower size. Firms that have R&D departments are more likely to export than other firms that do not have. Finally, firms that are owned by foreigners are also more likely to export than firms owned by Egyptian or Arab owners. Now, we turn to interpret the results of the determinants of export intensity of manufacturing firms.

Table 24: Estimation results for export intensity using fractional logit and Tobit models and their average marginal effects

	Fractional logit	Average marginal effects	Tobit	Average marginal effects(AMEs)	
				AMEs Prob(Exp>0)	AMEs E(Exp share|Exp>0)
Log of average wage	0.0685 (0.0458)	0.0051 (0.0034)	0.0144 (0.0108)	0.0049 (0.0036)	0.0023 (0.0017)
Share primary schooling (%)	-0.5271 (0.4788)	-0.0393 (0.0356)	-0.0805 (0.1342)	-0.0273 (0.0456)	-0.0130 (0.0218)
Share preparatory or incomplete secondary schooling (%)	0.5750 (0.4216)	0.0428 (0.0315)	0.1892* (0.1059)	0.0642* (0.0359)	0.0307* (0.0171)
Share secondary schooling (incl. vocational) (%)	0.4941 (0.3679)	0.0368 (0.0274)	0.2533** (0.0941)	0.0860** (0.0318)	0.0411** (0.0152)
Share university degree	0.1351 (0.4425)	0.0100 (0.0330)	0.2685** (0.1172)	0.0911** (0.0396)	0.0436** (0.0189)
Training of workers (dummy)	0.3237* (0.1208)	0.0241* (0.0090)	0.0752** (0.0332)	0.0255** (0.0112)	0.0122** (0.0053)
Highly qualified manager (dummy)	0.4308* (0.2237)	0.0321* (0.0166)	0.1629** (0.0499)	0.0553** (0.0167)	0.0264** (0.0080)
Share female employment (%)	0.7308** (0.2331)	0.0545** (0.0172)	0.3166*** (0.0765)	0.1075*** (0.0257)	0.0514*** (0.0123)
Temporary employment (dummy)	-0.0662 (0.1127)	-0.0049 (0.0084)	-0.0682** (0.0315)	-0.0231** (0.0106)	-0.0110** (0.0051)
Unionized employment (dummy)	0.0640 (0.1106)	0.0047 (0.0082)	0.0373 (0.0314)	0.0126 (0.0106)	0.0060 (0.0051)
Government ownership (%)	-0.0020 (0.0081)	-0.0001 (0.0006)	-0.0003 (0.0016)	-0.0001 (0.0005)	-0.00005 (0.0002)
Private domestic ownership (%)	0.0036 (0.0082)	0.0002 (0.0006)	0.0013 (0.0015)	0.0004 (0.0005)	0.0002 (0.0002)
Foreign ownership (%)	0.0157* (0.0084)	0.0011* (0.0006)	0.0063*** (0.0018)	0.0021*** (0.0006)	0.0010*** (0.0002)
Arab ownership (%)	0.0042** (0.0087)	0.0003 (0.0006)	0.0020* (0.0018)	0.0006 (0.0006)	0.0003 (0.0002)
Firm age (years)	-0.0092** (0.0041)	-0.0006** (0.0003)	-0.0021** (0.0009)	-0.0007** (0.0003)	-0.0003** (0.0001)
R&D department (dummy)	0.7840*** (0.1198)	0.0584*** (0.0089)	0.2605*** (0.0329)	0.0884*** (0.0109)	0.0423*** (0.0052)
Other branches (dummy)	-0.0904 (0.1207)	-0.0067 (0.0090)	-0.0166 (0.0335)	-0.0056 (0.0113)	0.0026 (0.0054)

Firm size categories (dummies, reference 5- 50 workers)					
51-99 employees	1.1126***	0.0629***	0.4492***	0.1782***	0.0717***
	(0.2039)	(0.0134)	(0.0483)	(0.0211)	(0.0079)
100-1000 employees	1.7275***	0.1261***	0.6286***	0.2704***	0.1060***
	(0.1715)	(0.0122)	(0.0421)	(0.0184)	(0.0068)
> 1000 employees	2.1818***	0.1894***	0.8373***	0.3737***	0.1495***
	(0.2263)	(0.0267)	(0.0684)	(0.0305)	(0.0135)
Survey year (dummies, reference 2004)					
2007	-0.0846	-0.0063	-0.0245	-0.0083	-0.0039
	(0.1416)	(0.0106)	(0.0349)	(0.0118)	(0.0056)
2008	-0.0492	-0.0037	-0.0296	-0.0100	-0.0048
	(0.1488)	(0.0112)	(0.0373)	(0.0126)	(0.0060)
Sector (9 dummies)	Yes	Yes	Yes	Yes	Yes
Region (23 dummies)	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% level.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08. Sample: Unbalanced panel (N=3054; n=1634).

As mentioned before, export intensity is defined as the total value of exports out of the total value of sales. The estimation is carried out using the Tobit and the fractional logit models of Papke and Wooldridge (1996). The estimated coefficients and the corresponding marginal effects are displayed in Table 24. Across the two models, firms that are larger in size, younger in age, have more qualified managers, hire more female workers, provide training programs for their employees, have R&D departments, and are owned by non-Arab foreigners have statistically significant effect on export intensity. The Tobit model results only reveal a positive and statistically significant effect of permanent workers with a university degree on export intensity. The average marginal effect on the probability to export of 9.11 percentage points and 4.36 percentage points show a higher intensity to export. All results are statistically significant at 5 percent. Finally, the results of the export starters using the OLS and the probit regressions are presented in tables 25 and 26.

Table 25: Estimation results for export starters in 2007

	OLS	Probit	Average marginal effects
Log of average wage	0.0034	0.2122	0.0111
	(0.0047)	(0.2066)	(0.1099)
Share primary schooling (%)	- 0.0033	- 0.3015	- 0.0158
	(0.0368)	(1.1213)	(0.0590)
Share preparatory or incomplete secondary schooling (%)	0.0123	0.8244	0.0433
	(0.0337)	(0.9796)	(0.0517)
Share secondary schooling (incl. vocational) (%)	0.0041	- 0.2318	- 0.0121
	(0.0282)	(0.9602)	(0.0505)
Share university degree	0.0473	1.7477	0.0919
	(0.0522)	(1.4938)	(0.0795)
Highly qualified manager (dummy)	0.0150	0.6582	0.0346
	(0.0142)	(0.5192)	(0.0279)
Share female employment (%)	- 0.0138**	- 0.2257	- 0.0118
	(0.0310)	(0.8434)	(0.0443)
Temporary employment (dummy)	- 0.0037	0.0631	0.0033
	(0.0120)	(0.0357)	(0.0188)
Unionized employment (dummy)	- 0.0005	- 0.2986	- 0.0157
	(0.0152)	(0.4726)	(0.0249)
Firm age (years)	- 0.00009	- 0.0033	- 0.0001
	(0.0003)	(0.0114)	(0.0006)
R&D department (dummy)	- 0.0203*	- 0.5092	- 0.0267
	(0.0174)	(0.5349)	(0.0283)
Other branches (dummy)	0.0220	0.4762	0.0250
	(0.0161)	(0.3881)	(0.0207)
51-99 employees	0.0041	0.3280	0.01535
	(0.0189)	(0.5313)	(0.0294)
100-1000 employees	0.0439***	1.2070	0.1074
	(0.0187)	(0.4879)	(0.0639)
> 1000 employees	0.0963***	2.9324	0.5381
	(0.0437)	(1.2182)	(0.3130)
Sector (9 dummies)	Yes	Yes	Yes
Region (23 dummies)	Yes	Yes	Yes

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08. Sample: (N=982; export starters=30). All explanatory variables are lagged one period.

Table 26: Estimation results for export starters in 2007 (broader definition[48])

	OLS	Probit	Average marginal effects
Log of average wage	0.0080	0.0997	0.0101
	(0.0077)	(0.0859)	(0.0087)
Share primary schooling	0.0240	0.2273	0.0230
(%)	(0.0604)	(0.7057)	(0.0715)
Share preparatory or	0.0044	0.3891	0.0394
incomplete secondary	(0.0555)	(0.6623)	(0.0671)
schooling (%)			
Share secondary	0.0118	0.1485	0.0150
schooling (incl.	(0.0464)	(0.5809)	(0.0589)
vocational) (%)			
Share university degree	0.0558	0.7980	0.0809
	(0.0859)	(0.9326)	(0.0947)
Highly qualified	0.0397	1.07323	0.1088
manager (dummy)	(0.0234)	(0.4563)	(0.0468)
Training of workers	0.0166	0.2174	0.0220
(dummy)	(0.0310)	(0.2651)	(0.0268)
Share female	0.0463**	0.3981	0.0403
employment (%)	(0.0510)	(0.4965)	(0.0503)
Temporary employment	0.0286	0.3837	0.0389
(dummy)	(0.0198)	(0.2138)	(0.0217)
Unionized employment	- 0.0083	- 0.1577	-0.0160
(dummy)	(0.0250)	(0.2443)	(0.0247)
Foreigners	- 0.0743	- 0.7587	- 0.0769
	(0.0477)	(0.5476)	(0.0556)
Firm age (years)	0.00008	0.0012	0.0001
	(0.0006)	(0.0060)	(0.0006)
R&D department	0.0478*	0.4172	0.0423
(dummy)	(0.0286)	(0.2373)	(0.0240)
Other branches	0.0673	0.5216	0.0529
(dummy)	(0.0265)	(0.2265)	(0.0229)
51-99 employees	0.0367	0.3814	0.0395
	(0.0310)	(0.2851)	(0.0335)
100-1000 employees	0.0728***	0.5043	0.0565
	(0.0308)	(0.2672)	(0.0340)
> 1000 employees	0.0547***	0.3859	0.0401
	(0.0718)	(0.5931)	(0.0746)
Sector (9 dummies)	Yes	Yes	Yes
Region (23 dummies)	Yes	Yes	Yes

Note: Standard errors in brackets. Significant at the *10, **5 and ***1% levels.

Data source: World Bank Enterprise Survey, Egypt, 2004/07/08. Sample: (N=982; export starters=89). All explanatory variables are lagged one period.

The results indicated that firms that are larger in their size in 2004 are more likely to start to export in 2007 by 4.39 percentage points in OLS regressions results; it is 9.63 percentage points for firms

[48] A broader definition for export starters in 2007 using only two-year windows. Firms that did not export in year t-1 (2006) and export in year t (2007).

that employ more than 100 workers and less than 1000 workers (medium size firms), and 10.74 percentage points for firms that employ more than 1000 workers (large-size firms). It is by 53.81 percentage points in the probit regression for medium and large size firms. The OLS results are statistically significant at 5 percent and the probit results are statistically significant at 10 percent. If the broader definition of export starters is adopted, more significant results could be obtained as shown in table 26.

Firms that are medium in their sizes, have R&D departments, have other factories or branches and have higher qualified managers in 2004 are more likely to export in 2007. All results are statistically significant at conventional levels.

7. Conclusion

The empirical results suggest that firms in the manufacturing sector in Egypt whose workforce are characterized by higher levels of skill intensity are more likely and more intense to export compared to other firms with lower levels of skill intensity. This result casts doubts on the argument that firms in less developed countries like Egypt, which are relatively abundant in unskilled workers, export products that are consistent with this comparative advantage. The results also reveal that firms that hire female workers are more likely to export than other firms which do not employ women. Firms that are larger in their size are more likely to export than firms with smaller size. Furthermore, firms that have R&D departments are more likely to export than firms that do not have, and firms that are owned by foreigners are also more likely to export than firms owned by Egyptian and Arab owners. All results are statistically significant at the conventional levels. Firms that are larger in their size, have R&D departments, and are owned by foreigners have statistically significant effects on export intensity as well. The results also suggest that firms that are larger in their size are more likely to start to export than others. Industrial, trade, investment and labor market policies should be designed in light of these determinants of exporting activities. This might help enhance trade at the firm level in the manufacturing sector in Egypt.

This can be achieved by adopting a strategy that seeks to upgrade the skills levels of the workforce in the manufacturing sector in Egypt via designing efficient training programs that target lower skilled workers to increase the competitiveness of firms in the exports market. Furthermore, the positive effects of hiring female workers on firms' exporting activities suggest that the international competitiveness of the Egyptian firms in the export market might be improved via adopting policies that target increase in women employability in the manufacturing sector in Egypt. This can be achieved by removing all barriers that hinder female participation in the Egyptian labor market (i.e., better transportation networks and more decent nursery schools, etc.)[49] The positive effects of foreign ownership on firms' exporting activities reveal the significant role of investment policies that are needed to improve the ease of doing business in the Egyptian manufacturing sector by removing the conventional barriers of foreign direct investment (i.e., starting a business, getting credit and electricity, etc.).

The empirical results shed lights also on the positive effects of firm size and the possession of an R&D department on firms' propensity to export. This study lends itself to investigate the impact of trade liberalization on the demand for skilled workers. The impact of entering the export market could be analyzed in the future to test whether exporting activities stimulate the demand for higher skilled workers in the Egyptian manufacturing sector (i.e., the role of "skill enhancing trade").

[49] For more details, please see (Abdelgouad and Pfeifer, 2014).

References

Abdelgouad, A.F. (2015). Determinants of using fixed-term contracts in the Egyptian labor market: Empirical evidence from manufacturing firms using World Bank firm-level data for Egypt. *Journal of Empirical Economics* 4, 1, 29-48.

Abdelgouad, A.F., Pfeifer, C., Weche Gelübcke, J.P. (2015). Ownership structure and firm performance in the Egyptian manufacturing sector. *Economics Bulletin* 35, 4, 2197-2212.

Abdelgouad, A.F., Pfeifer, C. (2014). Determinants of female employment in Egyptian firms. *The Empirical Economics Letters 13, 12, 1267-1275.*

Aitken, B., Hanson, G., Harrison, A. (1997). Spillovers, foreign investment, and export behavior. *Journal of International Economics* 43, 1, 2, 103–132.

Al-Azzawi, S. (2014). Trade liberalization, industry concentration and female workers: The case of Egypt. *IZA Journal of Labor Policy*, 3:20 (URL: http://www.izajolp.com/content/pdf/2193-9004-3-20.pdf).

Alvarez, R., López, R.A. (2005). Exporting and performance: Evidence from Chilean plants. *Canadian Journal of Economics* 38, 4, 1384–1400.

Araújo, B., Bogliacino, F., Vivarelli, M. (2009). The role of skill enhancing trade in Brazil: Some evidence from Microdata. *IZA Discussion Paper No. 4213*.

Aw, B.Y., Chung, S., Roberts, M.J. (1998). Productivity and the decision to export: Micro evidence from Taiwan and South Korea. National Bureau of Economic Research Working Paper No. 6558.

Balchin, N., Edwards, L. (2008). Trade-related business climate and manufacturing export performance in Africa: A firm-level analysis. Paper presented at the 2008 Conference of the

African Econometric Society (AES), Pretoria, South Africa. Available at: http://www.africametrics.org/documents/conference08/day2/session5/balchin_edwards.pdf

Bernard, A.B., Wagner, J. (1997). Exports and success in German manufacturing. *Weltwirtschaftliches Archiv* 133, 1, 134-157.

Bernard, A.B., Jensen, J.B. (1999). Exceptional exporter performance: Cause, effect, or both? *Journal of International Economics* 47, 1, 1–25.

Bernard, A.B., Jensen, J.B. (2004). Why Some Firms Export? *The Review of Economics and Statistics* 86, 2, 561–569.

Bernard, A.B., Jensen J.B., Schott, P.K. (2006). Survival of the best fit: Exposure to low-wage countries and the (uneven) growth of US manufacturing plants. *Journal of International Economics* 68, 1, 219-237.

Black, S.E., Lynch, L.M. (1996). Human-capital investments and productivity. *The American Economic Review* 86, 2, 263-267.

Cameron, A.C., Trivedi, P. K. (2005). Linear panel models: Basics. In: *Microeconometrics*, 697-742. Cambridge University Press.

Clerides, S.K., Lach, S., Tybout, J.R. (1998). Is learning by exporting important? Micro-dynamic evidence from Colombia, Mexico, and Morocco. *Quarterly Journal of Economics* 113, 3, 903-947.

Fakih, A., Ghazalian, P. (2014). Which firms export? An empirical analysis for the manufacturing sector in the MENA region. *Journal of Economic Studies* 41, 5, 672–695.

Fakih, A., Ghazalian, P. (2015). Female labour force participation in MENA's manufacturing sector: The implications of firm-related and national factors. *Journal of Economic Change and Restructuring* 48, 1, 37-69.

Greene, W.H. (2003). Econometric Analysis, 5th edn. Prentice Hall, New York.

Haltiwanger, J.C., Lane, J.I., Spletzer, J.R. (1999). Productivity differences across employers: The roles of employer size, age, and human capital. *The American Economic Review* 89, 2, 49-98.

Kiendrebeogo, Y. (2014). Export activity and productivity: New evidence from the Egyptian manufacturing industry. Document de travail de la série Etudes et Documents E 2012.20, Centre d'études et de recherches sur le développement international (CERDI).

Suarez Burguet, C., Martinez-Zarzoso I., Para, M.D. (2012). Learning Networks in South Mediterranean Countries. Available at: http://www.etsg.org/ETSG2012/Programme/Papers/35.pdf.

Martinez-Zarzoso, I. (2012). Exporting and productivity: Evidence for Egypt and Morocco. Center for European, governance and economic development research. *Discussion Paper Number 136*.

https://ssrn.com/abstract=2045538 or http://dx.doi.org/10.2139/ssrn.2045538 .

McDonald, J.F., Moffitt, R.A. (1980). The uses of Tobit analysis. *Review of Economics and Statistics* 62, 2, 318-321.

Melitz, M.J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica* 71, 6, 1695-1725.

Meschi, E., Taymaz, E., Vivarelli, M. (2011). Trade, technology and skills: Evidence from Turkish microdata. *Labour Economics* 18, 1, 60-70.

Molina, D., Muendler, M. (2013). Preparing to export. NBER WP18962

http://www.nber.org/papers/w18962.

Ottaviano, G., Martincus, C.V. (2011). SMEs in Argentina: Who are the exporters? *Small Business Economics* 37, 3, 341–361.

Papke, L.E., Wooldridge, J.M. (1996). Econometric methods for fractional response variables with an application to 401(k) plan participation rates. *Journal of Applied Econometrics* 11, 4, 619–632.

Parra, M.D., Martinez-Zarzoso, I., Suarez Burguet, C. (2014). Businees environmental constraints for Egyptian firms. Available at: http://www2.uah.es/iaes/sermed/Parra_Martinez_Suarez.pdf

Parra, M.D., Martinez-Zarzoso, I., Suarez Burguet, C. (2013). Imports, Innovation and Egyptian Exports. Available at: http://www.uibcongres.org/imgdb/archivo_dpo12628.pdf

Parra, M.D., Martínez-Zarzoso, I. (2015). Imported inputs and Egyptian exports: Exploring the links. *Economics: The Open-Access, Open-Assessment E-Journal*. Available at: http://www.economics-ejournal.org/economics/journalarticles/2015-38

Pfeifer, C. (2015). The nexus between top managers' human capital and firm productivity. *Applied Economics Letters* 22, 12, 982-986.

Roberts, M., Tybout, J. (1997). The decision to export in Colombia: An empirical model of entry with sunk costs. *The American Economic Review* 87, 4, 545-564.

Seker, M. (2010). Rigidities in employment protection and exporting. *World Bank Policy Research Working Paper 5323*.

Seker, M. (2012). Importing, exporting, and innovation in developing countries. *Review of International Economics* 20, 2, 299-314.

Wagner, J. (2001). A note on the firm size—Export relationship. *Small Business Economics* 17, 4, 229–237.

Wagner, J. (2002). The causal effects of exports on firm size and labor productivity: First evidence from a matching approach. *Economics Letters* 77, 287-292.

Wagner, J. (2011). Exports and firm characteristics in German manufacturing industries. *Applied Economics Quarterly* 57, 2, 107-143 and 145-160.

Wagner, J. (2012). Average wage, qualification of the workforce and export performance in German enterprises: Evidence from KombiFiD data. *Journal for Labour Market Research* 45, 2, 161-170.

Wagner, J. (2015). Firm age and the margins of international trade: Comparable evidence from five European countries. *Economics Bulletin* 35, 1, 145-158.

Wooldridge, J.M. (2009). *Introductory Econometrics: A Modern Approach*. 4th edn, Mason, OH: South-Western CENGAGE Learning.

Yeaple, S.R. (2005). A simple model of firm heterogeneity, international trade, and wages. *Journal of International Economics* 65, 1, 1-20.