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

by

Ahmed Fayez Abdelgouad

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

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Abstract

Based on dual labor market theory, fixed-term contracts (FTCs) as an important feature of labor market flexibility were analyzed to test the following hypothesis: 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. Probit and Tobit models were used to estimate the probability and intensity of different kinds of numerical labor market flexibility (FTCs utilization, hiring and firing) in Egypt. 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.

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

JEL classification: J21, J41, J42

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[*] Ahmed Fayez Abdelgouad is research assistant at the Institute of Economics, University of Leuphana Lüneburg, Germany.

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I. Introduction

According to the recent Global Competitiveness Report 2013/2014, Egypt fell behind a number of MENA (Middle East and North African countries) 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[1], with the aim of addressing the shortcomings and the rigidities of the previous law, persistent unemployment; the unemployment rate reached 14.3 percent in the first quarter of 2014, while high informal employment, reached 51.2 percent from the whole employment in 2012. Furthermore, the inadequate scope to increase formal jobs in the private sector is another negative feature of the Egyptian labor market and symptoms of labor market rigidity. Another key problem in the Egyptian labor market is the concentration of unemployment among the educated and 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 bubble with expected 700,000 new entrants to the labor force every year. This suggests that any solution to decrease unemployment will need to boost labor demand which requires a higher quality of the labor supply through educational reforms[2] and greater labor market flexibility

1 A more detailed description of this law will be shown in the next section

2 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.

(Ehab 2012).One instrument of labor market flexibility is using fixed-term contracts FTCs. The international experience especially in Europe and Latin America during 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 specifically during economic upturns (Botero et al. 2004; Kaplan 2008; Aguirregabiria and Alonso-Borrego 2009; Eichhorst and Marx 2009; Dhyne and Mahy 2012; Ricci 2013). According to 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 numbers of temporary workers and the latter will be used in the margin to adjust to demand fluctuations (Saint-Paul 1991).

Based on 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 paper, 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. It investigates a hypothesis saying that the use of temporary employment relationships FTCs is positively correlated with an increase in demand as proposed by dual labor market theory. The paper makes use of a panel dataset at the firm-level provided by the enterprise surveys at the World Bank. The paper is organized as follows: In the next section, some institutional background information about the labor law in Egypt in general and FTCs in specific are presented, 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, which are followed by the empirical results in section six. Section seven concludes.

II. Institutional Background

Until July 2003, when the Labor Law no.12 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 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 stringent rules, many employers developed a practice according to which workers had to sign a resignation letter before being regularly hired.[3] 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 no.12 for 2003 comprises 257 articles that address 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'

3 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 as well as granting employees the right 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. 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 exercise 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/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 contract is

five years. If the employer and employee agree on 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 its 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 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 that "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 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 normally 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 norm, 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 have no limits in the duration of fixed term contracts such as Bahrain, Iran, Iraq, Oman, Saudi Arabia, and Syria while Djibouti, Morocco and Yemen have established a limit of 12 months. Other countries have longer limits for the duration of fixed-term contract ranging from 24 to 60 months such as Qatar, Jordan, and Kuwait, and United Arab Emirates. Some of the countries in the region have no limits for the renewal of fixed term contract such as Algeria, Iraq, Jordan, Kuwait, Oman, and the United Arab Emirates. 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 determines to some extent labor market flexibility.

Table 1 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 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 nature (Urdinola and Kuddo 2010).

Insert table 1 here

III. Theory and Hypothesis

Firms have several options to react to demand-induced output fluctuations (Pfeifer, 2005).Based on the strategies that firms use, Atkinson (1986) differentiated 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 can be acheived by adjusting working hours or schedules of workers already employed within the firm. Third, functional flexibility or organizational flexibility 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 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 cost reflect the supply and demand of labor (Atkinson 1986). This paper focuses only on external numerical flexibility[4] and shows the impact of using FTCs in this regard.

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.

4 Other forms of flexibility are out the scope of this paper.

Both parties would then have to keep an eye on the other to ensure 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. Employers would have to monitor employees' performance to ensure that they provide the contracted amount of labor services. If an employee is found not to do so, 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 (Bosworth et al. 1996).

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 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).

Dual labor market theory argues that market processes tend to produce "primary" (or "non-temporary") jobs characterized by high wages and long job tenure and "secondary" (or "temporary") jobs that offer low wages and short tenure and equilibrium is characterized by an excess supply of qualified workers to primary jobs. Firms may be motivated to hire temporary workers who form a buffer of last-hired, first-fired workers that reduces the layoff probability, and therefore the wage paid to non-temporary 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).

Temporary employment reacts more strongly to changes in demand than non-temporary employment and the composition of the workforce changes if a firm is confronted with demand fluctuations. This can be easily shown with equation (4) for the share of FTCs in total employment $(0 \leq \mu \leq 1)$, in which total employment (E) consist of temporary employment (F) and non-temporary employment (N) which all depend on some output measures (Y).

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

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

If equation (4) is derived with respect to Y, we obtain (5). It can be seen that the share of temporary employment increases with an increase in demand $\left(\partial \mu / \partial \mathrm{Y} > 0\right)$ if $\partial \mathrm{F} / \partial \mathrm{Y} > \partial \mathrm{N} / \partial \mathrm{Y} \geq 0$ and $\mathrm{N} \geq \mathrm{F} > 0$. The first condition is fulfilled by the theoretical assumption that temporary employment reacts more strongly to changes in demand than non-temporary employment. In the extreme case, non-temporary employment is not adjusted at all $\left(\partial \mathrm{N} / \partial \mathrm{Y} = 0\right)$ so that $\partial \mu / \partial \mathrm{Y} > 0$ is always given. The second condition that $\mathrm{N} \geq \mathrm{F}$, is the more likely case. However, even if $\mathrm{N} < \mathrm{F}$, $\partial \mu / \partial \mathrm{Y} > 0$ can occur if $\partial \mathrm{F} / \partial \mathrm{Y}$ is large enough or if $\partial \mathrm{N} / \partial \mathrm{Y}$ is small enough, respectively. From the contemplated considerations about flexibility

and internal dual labor markets the following hypothesis is generated: Firms use employees with FTCs as a peripheral workforce to adjust their employment to the profit-maximizing level in case of changes in demand (Pfeifer 2009).

IV. Data Description

The World Bank's Enterprise Surveys[5] 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 affect 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 Survey topics 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. Furthermore, there are other interesting questions that ask about the unethical behavior in the Egyptian business. For example:

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

„Did the firm have to present gifts or unofficial payments "to get things done" „with regard to taxes, customs, licenses, regulations, services, etc. Over 90 percent of the questions objectively ascertain characteristics of a country's business environment. The remaining questions assess the survey respondents opinions on what are the obstacles to firm growth and performance (Enterprise Surveys 2008).

The enterprise surveys contain some information that allows measuring 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 affect the decision of changing number of employees. Another question[6] asks about the number of workers that firms would adjust if there were no restrictions in the labor markets for hiring and firing. The surveys include also 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 have also 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

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

set that covers different topics as mentioned. The data set includes 3129 observations and the sample size is 2672 observations. Table 2 displays the probability of using FTCs among Egyptian employees in manufacturing firms in 2004, 2007 and 2008.The probability that firms use FTCs among total employment is 43.7 percent in 2004, 29.8 percent in 2007 and 31.2 percent in 2008. Among male employment, the probability of using FTCs is 31.2 percent in 2004 and 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.

Insert table 2 here

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 dual labor market theory.

V. 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 dual labor market theory. The first part estimates the probability of using a FTCs and the second part focuses on the estimation of the share (intensity) of FTCs. The hypothesis that 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 $\left(F_{it} > 0\right)$ and zero if no employee with a FTC is employed $\left(F_{it} = 0\right)$(Pfeifer 2009).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. Probit model is a binary dependent variable

model. It is an example of limited dependent variable models (LDV)[7] 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 allows estimating 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, the firm index is i (Pfeifer 2009).

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

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'). Per capita wages are calculated by dividing total cost of labor, including wages, salaries and bonuses divided by total employment. Differences in the employment structure of firms are taken into account by the following variables: shares of part-time, 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[8] to control for aggregated influences (like recession inflation…etc.) to find out whether these influences affect the operation and growth of business.

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

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 return to the investment. There are external factors beyond the control of an individual firm, in particular economic policy 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.

iii. Labor regulations effects like social insurance which shows whether or not do 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).

[8] Uncertainty is hard to measure since it is 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).

iv. Hiring willingness which shows whether or not hiring decision restrictions (Minimum wages, social insurance, generous paid leaves and vacations etc.) are constraining the hiring decision of the employer9.

Correlation matrix (see table: 3) shows that there is a very weak correlation between explanatory variables in the model. Now, we turn to the second part of the analysis: the estimation of the FTCs intensity. According to 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 III), that is, the composition of the workforce should change in favor of FTCs. Thus, 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. Since the share of FTC in total employment can only take values between zero (no FTCs) and one (only FTCs), the total sample includes corner solutions. The tobit[10] model is quite convenient for these purposes. 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 using a random effects tobit model. (Pfeifer 2009).

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

Because 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). The standard tobit model (tobit I) estimates for the total sample might be biased. An alternative would be

9 Question in the questionnaire: At your current level of production, how many workers would you hire, if there are no restrictions affecting your decisions?

10 While probit and logit models are used for a binary response outcome, tobit model is used for a corner solution outcome.

Heckman's selection model (Heckman, 1979), which is a so called tobit II model if maximum likelihood is applied. The sample selection model assumes that establishments with FTCs are not a random sample and the decision of using FTCs is different from the decision of how many FTCs to employ. There are, however, some problems with Heckman's selection model. One problematic issue is the identification problem, which cannot be solved if the probability and the intensity are determined by the same explanatory variables in both equations. Additionally, the results are very sensitive to changes of the specification (Pfeifer 2009). Marginal effects[11]are informative means for summarizing how change in an outcome is related to change in the explanatory variables. In nonlinear[12] models like probit and tobit, marginal effects are computed after estimations. 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

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

The effect on the observable y is

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

Where a,b specify the limits of a particular interval(Baum 2006).[13]

11 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).

12 In the linear regression model, the ME equals the relevant slope coefficient, greatly simplifying analysis.

13 For more information, see Greene (2003, 764-773)

In 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.

VI. Empirical Results

The results of the probit model together with their marginal effects are presented in Table 4. There is no evidence that firms with a better demand development are more likely to use FTCs. Estimates refers that the impact of demand changes is not significant at any level of significance but has a positive sign. The coefficient of the share of qualified employees is -2.202 and significantly correlated with the probability of using FTCs at the 1 per cent level(Marginal effect: -0.643) which means that, holding all other explanatory variables constant, the probability of using FTCs decreases by this amount(0.643) when the share of qualified employees increases by a one unit. The coefficient of the willingness of employers to hire new workers if there are no restrictions is 0.396 and significant at the 1 per cent which may mean that lowering 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 and large-size firms at 10 percent and 5 percent respectively while it is not significant for medium-size firms at any level. The other control variables are not significant.

Insert table 4 here

The correlation between the share of FTCs in total employment and changes in demand is estimated using tobit model. The results are represented in Table 5.The impact of demand changes is also not significant but has a positive sign. The coefficient of the share of qualified employees is -0.669 and significantly correlated with the probability of using FTCs at the 1 per

cent level. The coefficient of the willingness of employers to hire new workers if there are no restrictions is 0.096 and significant at the 1 per cent. Firm size, like in the probit model, is significantly positively correlated with the probability of using FTCs for small firms at 10 percent while it is not significant for large firms at any level which may mean that small firms are more likely to use FTCs. The other control variables are not significant. These findings confirm the results in the probit model. Across both two models, the share of qualified employees is significant and negatively correlated with the use of FTCs. This finding might indicate that internal labor markets are quite important. For example, hiring and training costs are often larger for qualified employees so that short-term employment relationships are less attractive. Furthermore, qualified employees cannot be replaced easily by temporary employees with lower levels of human capital. From a labor supply perspective, qualified employees have better employment chances (e.g. lower unemployment), which might lead to lower acceptance of FTCs among qualified employees (Pfeifer 2009).

Insert table 5 here

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 (probit and tobit models) that 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.

Insert tables 6,7,8,9 here

It is worth noting that firms' average capacity utilization[14] (in percentages) was used as a proxy for demand changes instead of using the development of sales and no evidence was found that demand changes had effects on using FTCs in the Egyptian manufacturing firms(see tables 10 and 11).

Insert tables 10 and 11 here

VII. Conclusion

The econometric evidence did not support the ideas of 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. Furthermore, in the light of knowing the determinants of using FTCs in Egypt, more incentives should be given to employers in the Egyptian manufacturing firms to use this kind of contracts. An agency for temporary work should be mentioned in the Labor Law. Furthermore, new institutions are still needed to lower hiring restrictions (i.e. social insurance contributions) and thereby improving labor market flexibility in Egypt. This 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. 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).

[14] Capacity utilization is 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.

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Tables included in text

Table 1: 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 %

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

Table 2: The 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.

Table 3: 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.

Table 4: Probability of FTCs; Probit and Marginal Effects

	Probit	Average Marginal effects
Development of Sales $\left(\log Y_{it}^{e} - \log Y_{i,t-1}\right)$	0.027 (0.031)	0.007 (0.009)
Wages Per capita	-0.00004 (0.00005)	-0.00001 0.00001
Share of qualified employees	-2.202*** (0.153)	-0.643*** (0.037)
Share of female employees	0.278 (0.151)	-0.081 (0.043)
Share of unionized employees	-0.031 (0.030)	-0.009 (0.008)
Labor regulations	-0.102 (0.063)	-0.029 (0.018)
Hiring willingness	0.396*** (0.058)	0.115*** (0.016)
Macroeconomic uncertainty	0.124 (0.067)	0.036* (0.019)
Firm size: 51-99 employees (dummy)	0.256* (0.095)	0.077* (0.029)
100-1000 employees(dummy)	0.020 (0.069)	0.005 (0.020)
> 1000 employees(dummy)	0.059** (0.130)	0.017* (0.038)
Constant	0.643 (0.154)	
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% level, respectively.

Source: enterprise surveys 2004, 2007 and 2008, World Bank.

Table 5: 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 $\left(\log Y_{it}^{e} - \log Y_{i,t-1}\right)$	0.002 (0.007)	0.003 (0.008)	0.001 (0.007)
Wages per capita	-5.25e-06 (0.0001)	-5.77e-06 (0.00001)	-7.82e-06 (0.014)
Share of qualified employees	-0.669*** (0.035)	-0.073*** (0.032)	-0.671*** (0.035)
Share of female employees	0.084 (0.035)	0.093 (0.038)	0.067 (0.035)
Share of unionized employees	-0.005 (0.007)	-0.005 (0.008)	-0.003 (0.007)
Labor regulations	-0.014 (0.014)	-0.015 (0.016)	0.016 (0.015)
Hiring willingness	0.096*** (0.013)	0.105*** (0.014)	0.102*** (0.013)
Macroeconomic uncertainty	0.014 (0.015)	0.016 (0.017)	0.016 (0.015)
Firm size:			
51-99 employees (dummy)	0.038* (0.021)	0.043 (0.025)	0.029 (0.021)
100-1000 employees(dummy)	-0.045* (0.016)	-0.049* (0.018)	0.057** (0.006)
> 1000 employees(dummy)	-0.038 (0.031)	-0.041 (0.034)	-0.050 (0.032)
Constant	0.269 (0.035)		
Year (dummies)	Yes	Yes	Yes
Industry (dummies)	Yes	Yes	Yes
Region (dummies)	Yes	Yes	Yes
Number of observations	2672		
Number of left-censored observations	1842		
Number of uncensored observations	830		
Number of right-censored observations	0		

Note: standard errors in brackets. Significant at the * 10, **5 and ***1% level, respectively.
Source: enterprise surveys 2004, 2007 and 2008, World Bank.

Table 6: Probability of hiring employees; Probit and Marginal Effects

	Probit	Average Marginal effects
Development of Sales $\left(\log Y_{it}^{e} - \log Y_{i,t-1}\right)$	0.025 (0.030)	0.009 (0.011)
Wages Per capita	-1.10e-06 (0.00004)	-4.06e-07 0.00001
Share of qualified employees	-0.693*** (0.130)	-0.256*** (0.047)
Share of female employees	0.235* (0.125)	-0.087* (0.046)
Share of unionized employees	-0.057* (0.034)	-0.021* (0.012)
Labor regulations	-0.106* (0.059)	-0.039* (0.021)
Macroeconomic uncertainty	-0.071 (0.062)	0.026* (0.022)
Firm size: 51-99 employees (dummy)	0.021* (0.091)	0.007* (0.034)
100-1000 employees(dummy)	0.151** (0.065)	-0.056** (0.024)
> 1000 employees(dummy)	0.482*** (0.127)	0.174*** (0.043)
Constant	0.477 (0.117)	
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% level, respectively.

Source: enterprise surveys 2004, 2007 and 2008, World Bank.

Table 7: 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 $\left(\log Y_{it}^{e} - \log Y_{i,t-1}\right)$	0.129 (0.171)	0.0005 (0.0006)	0.0002 (0.0003)
Wages per capita	-0.00008 (0.00027)	-3.33e-07 (1.12e-06)	-1.60e-07 (5.40e-07)
Share of qualified employees	-3.053*** (0.725)	-0.0123*** (0.0029)	-0.0059*** (0.0014)
Share of female employees	0.392 (0.698)	0.0015 (0.002)	0.0007 (0.0013)
Share of unionized employees	-0.348 (0.210)	-0.0014 (0.0008)	-0.0006 (0.0004)
Labor regulations	0.301 (0.335)	0.0012 (0.0013)	0.0005 (0.0006)
Macroeconomic uncertainty	-0.056 (0.349)	0.0002 (0.0014)	0.0001 (0.0006)
Firm size:			
51-99 employees (dummy)	-0.778 (0.503)	0.0030 (0.002)	-0.0015 (0.0009)
100-1000 employees(dummy)	-1.290** (0.372)	-0.0053* (0.0016)	0.0025** (0.0007)
> 1000 employees(dummy)	-2.698*** (0.771)	-0.012 (0.0039)	-0.0052 (0.0015)
Constant	-0.258 (0.641)		
Year (dummies)	Yes	Yes	Yes
Industry (dummies)	Yes	Yes	Yes
Region (dummies)	Yes	Yes	Yes
Number of observations	2650		
Number of left-censored observations	1414		
Number of uncensored observations	1236		
Number of right-censored observations	0		

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

Source: enterprise surveys 2004, 2007 and 2008, World Bank.

Table 8: Probability of firing employees; Probit and Marginal Effects

	Probit	Average Marginal effects
Development of Sales $\left(\log Y_{it}^{e} - \log Y_{i,t-1}\right)$	0.0129 (0.0336)	0.0029 (0.0075)
Wages Per capita	-0.00005 (0.00007)	-0.000012 0.000017
Share of qualified employees	-0.1983 (0.1453)	-0.0445 (0.032)
Share of female employees	0.3902* (0.1477)	-0.087* (0.033)
Share of unionized employees	0.0096 (0.0306)	-0.002 (0.006)
Labor regulations	0.0143 (0.067)	-0.0032 (0.0152)
Macroeconomic uncertainty	0.128* (0.071)	0.0289* (0.0161)
Firm size: 51-99 employees (dummy)	-0.032 (0.105)	0.0071 (0.0227)
100-1000 employees(dummy)	-0.022 (0.074)	-0.0049 (0.016)
> 1000 employees(dummy)	0.319** (0.129)	0.082** (0.036)
Constant	-0.595 (0.126)	
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% level, respectively.

Source: enterprise surveys 2004, 2007 and 2008, World Bank.

Table 9: 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 $\left(\log Y_{it}^{e} - \log Y_{i,t-1}\right)$	-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% level, respectively.

Source: enterprise surveys 2004, 2007 and 2008, World Bank.

Table 10: 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	2672	2672

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

Source: enterprise surveys 2004, 2007 and 2008, World Bank.

Table 11: 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	0.00044 (0.00056)	0.0004 (0.0006)	0.0001 (0.0001)
Wages per capita	-3.62e-06 (0.00010)	-3.98e-06 (0.00001)	-1.97e-06 (0.014)
Share of qualified employees	-0.6585*** (0.03423)	-0.724*** (0.0310)	-0.185*** (0.0095)
Share of female employees	0.0749 (0.0336)	0.0825 (0.0370)	0.0168 (0.0095)
Share of unionized employees	-0.0046 (0.0070)	-0.0051 (0.0077)	-0.0013 (0.0020)
Labor regulations	-0.00783 (0.0142)	-0.00862 (0.0157)	0.0027 (0.0040)
Hiring willingness	0.09545*** (0.01321)	0.1050*** (0.0141)	0.0286*** (0.0037)
Macroeconomic uncertainty	0.0270 (0.0151)	0.0297 (0.0166)	0.0077 (0.0042)
Firm size:			
51-99 employees (dummy)	0.0267* (0.0207)	0.0306 (0.02406)	0.0063 (0.0063)
100-1000 employees(dummy)	-0.0520* (0.0162)	-0.0566* (0.0175)	-0.0168** (0.0043)
> 1000 employees(dummy)	-0.0406 (0.0316)	-0.0446 (0.0339)	-0.0146 (0.0083)
Constant	0.2447 (0.0347)		
Year (dummies)	Yes	Yes	Yes
Industry (dummies)	Yes	Yes	Yes
Region (dummies)	Yes	Yes	Yes
Number of observations	2672		
Number of left-censored observations	1842		
Number of uncensored observations	830		
Number of right-censored observations	0		

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

Source: enterprise surveys 2004, 2007 and 2008, World Bank.

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Leuphana Universität Lüneburg
Institut für Volkswirtschaftslehre
Postfach 2440
D-21314 Lüneburg
Tel.: ++49 4131 677 2321
email: brodt@leuphana.de

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