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POLITICAL PATRONAGE AND ECONOMIC OPPORTUNITY: THE CASE OF VERTICAL INTEGRATION IN THE EGYPTIAN CLOTHING INDUSTRY

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Abstract

This paper investigates the determinants of vertical integration in the Egyptian clothing industry. High-end market segments are a critical determinant of integration. Limited access to finance restricts the possibilities for many firms to undertake the investment required to integrate whilst volatile and uncertain market conditions make firms more likely to rely on the market for their inputs. Business in Egypt suffers from a bureaucracy that is both excessive and inefficient. The ability of businesses to grow through vertical integration, which required licenses, premises and so on, meant using the arbitrary and discretionary decision making system to their favor, negotiating government obstacles to successful business. Those linked to power, prospered, whilst the businesses of others foundered against the wall of bureaucracy and red tape. Access to power is revealed through the pattern of the first Presidential elections to follow the January 2011 revolution.

JEL Classification: L2

Keywords: Vertical integration; determinants: transactions costs; agency, market niche; institutional constraints; monitoring costs; demand variability; financial constraints; credit market imperfections; clothing industry; Egypt; political patronage; access to power; Revolution, January 2011 revolution; National Democratic Party; Mubarak

ملخص

تبحث هذه الورقة محددات التكامل الرأسي في صناعة الملابس المصرية. قطاعات السوق الراقية هي أحد المحددات الهامة للتكامل. محدودية فرص الحصول على تمويل يحد من إمكانيات الكثير من الشركات للقيام بالاستثمارات اللازمة للدمج فى حين جعل الشركات أكثر عرضة إلى الاعتماد على السوق لمدخلاتها الظروف الغير المؤكدة للسوق المتقلبة. تعاني الأعمال في مصر من البيروقراطية المفرطة وعدم الفعالية في آن واحد. تعنى قدرة الشركات على النمو من خلال التكامل الرأسي، الأمر الذي يتطلب التراخيص، وأماكن العمل وهلم جرا، استخدام نظام تصنيع لصالحهم، والتفاوض على العقبات الحكومية وتحويلها إلى أعمال ناجحة. تلك المرتبطة بالسلطة، ازدهرت، في حين أن الشركات الأخرى تعثرت ضد جدار من البيروقراطية والروتين. ونكشف ان الوصول إلى السلطة من خلال هذا النمط من أول انتخابات رئاسية يتماشى مع ثورة يناير2011.

1. Introduction

In the simplest presentations of neo-classical economics, firms buy their inputs from a competitive market through costless transactions. But in Coase's (1937) seminal analysis, the boundaries of the firm are determined by the efficiency gains that can be realized by internalizing transactions that can be costly when carried out with external agents. The costs of undertaking transactions may induce firms to by-pass these transactions by internalizing procurement. Vertical integration is thus one way in which efficiency can be enhanced. The literature has taken forward Coase's basic insight. Williamson (1975, 1985) developed Transaction Cost Theory establishing that vertical integration is a response to market failures such as incomplete contracts, information asymmetries and inadequate institutions.

In developing countries, in which transactions costs of dealing with other firms are likely to be higher, and contract enforceability lower compared to developed countries – it is reasonable to expect that firms are very likely to become vertically integrated, resulting in a small number of large, vertically integrated firms. Indeed, Khanna and Palepu (1997, 2000) provide evidence that, on account of costly contractual relationships, and rigid ill-functioning markets, larger organizational structures have continued to grow in emerging markets such as India, Malaysia and Latin America. By doing so these integrated bodies imitate the functions of institutions that firms in the west often take for granted.

But the very reasons that make firms likely to integrate in developing countries are the same reasons that prevent all firms from having an *equal* chance to achieve just that. Developing countries are described as "limited access orders" (Northet al., 2009) since they have fewer institutions and offer limited access to the polity. As they put it "the polity is based on privilege and unequal treatment." (2009:12). For example, integration requires access to investment funds or to power to sidestep a rigid bureaucracy but that access may be restricted to those in political favor. Hence we may expect a situation in which many firms would seek vertical integration, but not all who wish to are able to do so.

This paper presents an empirical analysis of determinants of backward vertical integration in the Egyptian clothing industry; that is integration into fabrics production. This industry in particular may be expected to be integrated since the whole chain of production - from cotton production to clothing sales to the largely protected domestic market - are to be found within the country. In contrast to the literature stressing technological determinants to integration (Acemoglu et al., 2010)), this analysis focuses on contextual determinants. Specifically, the paper looks at the effect of the operational environment for firms' input and output markets, both those stemming from contractual imperfections and obstacles to efficient production in input markets; and market volatility in output markets. Financial constraints cannot be overlooked. But of most importance is access to power, in particular the close ties vertically integrated firms have with the National Democratic Party, the country's ruling party for over 30 years; and with the government in general. The following section briefly reviews the relevant literature. The set-up of the textiles and clothing industry is then presented along with motivation for the hypothesis. The sampling technique and survey are then described. Finally, the model is presented and results discussed. The last section concludes.

2. Related Literature

This study is situated within three distinct strands of literature. First, the transaction cost literature which emphasizes the role of vertical integration in limiting agency costs by improving incentives in the presence of information asymmetries and contractual imperfections with input suppliers (Williamson 1979, 1985; Masten et al., 1991). El-Haddad (2008) shows that formal channels for dispute resolution amongst clothing industry firms in Egypt are limited and inefficient, characterizing the industry in turn with poor contract

enforcement, a ripe environment for hold up problems. More specific input and output market conditions are also relevant. Risk adjusted property rights theory (Hanson, 1995) - a variant of the influential modern property rights theory developed by Grossman and Hart (1986), Hart (1985), and Hart and Moore (1990) - argues that backward integration exposes the buyer to a higher degree of "natural risk" , which under certain conditions s/he would want to spread. In environments where risk spreading channels are imperfect or absent, uncertain output markets would reduce the likelihood for vertical integration (e.g. Chandler, 1977; Carlton, 1979; Porter, 1980; Blair and Kaserman, 1983; Harrigan 1983; Lieberman, 1991). The same is true of demand variability in the output market which will also deter vertical integration.

Second, is the literature emphasizing credit market imperfections and financial constraints on firm behavior. Financial constraints prevent firms that would otherwise have an incentive to integrate from doing so (e.g. McMillan and Woodruff, 1999). Because of limited financial development in developing countries, entrepreneurs need to present collateral to financial intermediaries (Banerjee and Newman,1993; Legros and Newman,1996), but only a limited number of firms are able to do that. However, cross country evidence has shown a more complicated relationship between financial development, contractual institutions and vertical integration (e.g. Acemoglu et al., 2009; Macchiavello, 2010; Macchiavello, 2012).[1]The latter shows that the relationship between financial development and vertical integration is non-linear and likely to take an inverted U-shape.

Finally, this paper relates to the body of work stressing the importance of network association and institutional substitutes in affecting organizational structure in developing countries. Banerjee and Munchi (2004) show how social ties in high transaction cost environments lower the cost of capital for the Gounders in the Indian town of Tiripur, thus allowing the survival of less efficient firms, inducing vertical integration and contributing to capital misallocation. Banerjee (2004), and Benerjee and Duflo (2005), highlight similar conclusions for industrialization in general in less developed countries. Sociological studies have also focused on social links: Uzzi (1996 and 1999) places a large weight on social relations as a source of power, largely influencing economic actions and outcomes.[2] Connections or institutional substitutes can work in various ways from improving firms' access to finance to enhancing enforceability of contracts and to sidestepping the relatively poor business environment. In the Egyptian context the social network which has been of most importance in the past few decades has been position in the NDP and, increasingly, closeness to the Mubarak family.

3. Set Up: The Textiles and Clothing Industry In Egypt

3.1 Market Niches and Inefficient Upstream Market

The history of Egyptian textiles and clothing falls into two periods: protectionism from the thirties to the seventies and gradual liberalization thereafter. Protectionism was enforced through a number of measures. Trade barriers included a direct ban on imports of both textiles and clothing and direct input subsidies, mainly on cotton, to clothing producers. These policies characterized Egypt's centralized ownership pattern and its socialist policies including import substitution industrialization and the protectionism of mass consumers through subsidised provision of goods and services. During the strict period of protectionism,

[1] This paper presents an alternative model of vertical integration under financial constraints that focuses on the role of uncertainty in input markets.

[2] Although he has not addressed this in the context of vertical integration.

public, vertically integrated, large sized, firms dominated the manufacturing of textiles, their share slowly shrinking in favour of the private sector.[3]

With the reversal of Egypt's state-led development strategy, the government terminated the clothing subsidy in the early 1980s, liberalized cotton trade in 1994 and in 1998 and 2002 terminated the ban on fabric and clothing imports respectively. Nevertheless, the ban was initially replaced by prohibitive tariffs[4] continuing to render the largely protected domestic market artificially profitable. But these policies had other relevant implications on both the efficiency of the upstream market and the distinct niches served in the clothing market.

The clothing market can be divided into domestic and export. With respect to the former, protectionism, through restricting consumers' access to foreign products, meant that demand generated from the domestic clothing market was limited in terms of quality. With the exception of a minor high-end and a slightly larger middle-market, mass domestic demand came from the low value end of the clothing market.[5] Gradual, albeit limited, liberalization and increased media access exposed middle class Egyptian consumers to rapidly changing Western fashions, increasing the demand for quality from Egyptian firms. With respect to the export market, Egypt's traditional export destinations in the Eastern European Block collapsed,[6] causing exporters to look to the more demanding Western market.

The implications on the upstream market were dire: "the continuous production and distribution of subsidized cotton fabrics at such volume and subsidy […] dealt a ruining blow to the commercial and development capabilities of the Egyptian textile industry." (Dahmoush et al. (2001:7). And the quality of production suffered as "carelessly produced coarse yarns, spun from high-quality Egyptian cotton lint were delivered to weavers who in turn produced poorly woven fabrics to be carelessly bleached or printed and delivered to undemanding customers." Despite improvements in this situation quality concerns especially in fabrics remained significant in the industry. Accordingly, producers serving high-end niches had one of two options; either to vertically integrate to ensure desired quality, or import their fabric inputs. Unlike producers for the domestic market, exporters were allowed to import their fabric requirements since the early fifties - through the import temporary admission and the duty drawback systems[7] - provided these will be re-exported in a more processed form such as clothing.

3.2 The Business Environment

The process of creating market friendly institutions following the gradual liberalization of the economy has been largely unsuccessful. Many public institutions continued to be headed by army generals or senior police officials. Business in Egypt suffers from a bureaucracy that is both excessive and inefficient. It is excessive in that the degree and time required for business registration and other reporting requirements are beyond those necessary for a market economy. And it is inefficient because the government has been slow to adopt modern

[3] By 2006 public sector share of fabric production accounted for just 31% and a negligible share of clothing production.

[4] When the ban on textiles was eliminated tariffs of up to 54 percent were imposed on yarns and fabrics of cotton and man-made fibres; and specific tariffs as high as $300 per item on more than 1000 categories of clothing were imposed when the import ban on clothing was lifted (Magder, 2005 in El-Haddad, 2010).

[5] Egypt being a middle income developing country supports this division.

[6] By the 90s exports to the Eastern European block didn't exceed thirty percent.

[7] These systems allow clothing exporters temporary relief of tariff and tax payments and to be reimbursed for incurred insurance (which equals the value of tariffs and taxes that would otherwise be levied were the imported materials not used as export inputs) as long as the imports are used as inputs to their clothing exports within one year of being imported.

technologies, such as IT-based systems, or to reform the bureaucracy itself. Government employees have not changed their mind-set; the old ways, including carelessness, petty corruption and control for control's sake, remained deeply ingrained in the system.

In 2011 Egypt ranked amongst the bottom 40% in the doing business rank and in the bottom 20% in enforcing contracts, and worse than that in preceding years (World Bank various issues). El-Haddad (2008) shows that formal channels for dispute resolution amongst clothing firms in Egypt in particular are limited and inefficient, re-enforcing the country's overall weak contract enforcement environment. Private firms face other sources of high transaction costs, through lengthy import and export procedures, low transparency and inefficiencies in customs and port operations, handling costs and port charges and other non-tariff barriers.[8] In 2008 Egypt ranked 132nd and 118th of 134 countries in terms of tariff barriers and prevalence of trade barriers respectively (World Economic Forum, 2009), a situation that could have only been worse in earlier year.[9]

3.3 Hypotheses

On the one hand, protectionism of the textiles and clothing industry created a quality gap. The quality of fabric input required by the higher segment of the clothing industry could not be easily satisfied by the largely protected domestic fabrics industry. In addition, the uncompetitive traditional fabric industries could not comply with the timely delivery required by firms producing for export to markets with four or more fashion seasons each year.

On the other hand, the business environment created a ripe environment for lock in and potential hold up problems with fabric suppliers. This is especially true of clothing firms serving higher quality segments of the market and those for which timeliness is a pressing concern. For exporters, late delivery fines are often specified per day in the contract between clothing exporters and importers. Some contracts transfer transportation costs from the importer (originally sea freight) to the exporter (as air freight). This cost is at least 10 per cent of the total production cost of the exported merchandise. Suppliers aware of this situation could press for better terms ex-post. The need to ensure input quality and timely delivery induced the desire for vertical integration in the clothing industry. Accordingly, the first hypothesis is as follows:

> *H1: Firms serving higher end markets are more likely to vertically integrate into fabric production*

Other market conditions such as market uncertainty and variability in output demand contribute to the desire to integration, and so:

> *H2: Firms facing a higher degree of output demand uncertainty and variability are more likely to vertically integrate into fabric production.*

Financial constraints and credit market imperfections as determinants have been stressed more recently in the vertical integration literature (McMillan and Woodruff, 1999; Banerjee and Munchi, 2004; Acemoglu et. al., 2009;; Macchiavello, 2010; Macchiavello, 2012).

Limited access to finance is likely to be more severe than in developed countries. Though, informal credit[10] is more likely to have a role, and may in some situations adequately substitute for formal credit. The following hypothesis is related to access to finance:

[8] Poor port services stem from low traffic volumes, poor port management in addition to an inadequate regulatory framework (World Bank, 2002)

[9] These indicators only start in 2008 for Egypt.

[10] The role of informal credit in developing countries has been stressed in McMillan and Woodruff (1999).

H3: Firms with limited access to finance are less likely to integrate

Finally, the quality of the bureaucracy, excessive regulation and the poor business environment created a ripe environment for corruption. In order to survive, firms often had to ingratiate themselves with government thereby gaining access to political networks and key political figures to avoid getting bogged down in the rigid system of controls and to use the arbitrary and discretionary decision making system to their favor. The term "وسطه *wasta*" or connection means that connections are necessary in every walk of life, from getting your children into a good school to obtaining a manufacturing license. Accordingly the last main hypothesis is:

H4: Firms with access to power are more likely to be vertically integrated into fabric production.

The results part will detail these main hypotheses and break them down further.

4. Sampling and Survey Data

This paper analyzes clothing producers' decisions to integrate backward into fabric production. The sampling frame was provided by a list from the Federation of Egyptian Industries of 2,500 private textiles and clothing firms, of which 1,418 firms were clothing firms (i.e. not just textiles). Of those, only 421 were verified through a telephone pre-survey as currently operating and their contact details confirmed. The pre-survey also determined the order of integration to separate out firms who integrated forward from fabric into clothing production.[11]

Data from both the full sample frame of 1,418 firms and the shorter verified frame of 421 firms showed the incidence of vertical integration to be limited (25% and 19% of all firms respectively). Therefore, disproportionate sampling was applied by dividing firms into two groups: all vertically integrated firms in one group and a random sample of un-integrated firms in the other (cf. Maddala, 1992). Disproportionate sampling implies sampling the two groups at different sampling rates to ensure having sufficient observations in the group of interest (i.e. the VI group) (Maddala, 1992). All firms identified as being vertically integrated were purposefully included in the sample, with a random sample taken of the remainder.

Whilst all vertically integrated firms were purposefully sampled, refusals meant that just 95 percent of vertically integrated firms were interviewed. The remaining firms were randomly sampled, resulting in a total sample size of 257 firms, of which 63 were vertically integrated in fabrics.

4.1 Sample Selection Bias

There are two issues concerning representativeness of the sample. The first arises since the sample is not a simple random sample so that mean based sample figures are not unbiased

[11] The definition of the clothing industry implemented here covers ISIC Revision 3 code 1810 which is the manufacture of wearing apparel, except fur. Specifically this class covers manufacture of wearing apparel made of leather or composition leather, manufacture of work wear, manufacture of other outerwear made of woven, knitted or crocheted fabric. It also includes non-woven material for men, women and children such as: coats, suits, ensembles, jackets, trousers, skirts etc. Additionally it includes the manufacture of underwear and nightwear made of woven, knitted or crocheted fabric, lace etc. for men, women and children, so shirts, T-shirts, underpants, briefs, pyjamas, nightdresses, dressing gowns, blouses, slips, brassieres, corsets etc. Manufacture of babies' garments, tracksuits, ski suits, swimwear; manufacture of hats and caps and manufacture of other clothing accessories: gloves, belts, shawls, ties, cravats, hairnets are also included. Finally it includes custom tailoring, manufacture of headgear of fur skins and manufacture of footwear of textile material without applied soles. More generally it includes articles of apparel and clothing accessories, both knitted or crocheted and non-knitted nor crocheted.

estimates of the population means. However, this problem is simply corrected for by the use of sampling weights.[12]

The second issue regarding representativeness is one of sample selection bias, which arises if firms who refused to respond have different characteristics than those who did respond. Selection bias from non-response may arise at two stages of the sampling process employed here. The first is in the selection of those sampled from the 421 who took part in the interview. The second is in identifying the 421 from the 1,418.

The refusal rate from the firms sampled from the 421 was low albeit not negligible, about 12%. In principle, the presence of such bias can be checked for by comparing characteristics of firms in the sample with those who refused to be interviewed. But since data are, by definition, not collected from firms who refuse, it is not possible to compare the characteristics of firms who responded with those who did not.

As to estimating the non-response bias for the full frame (the 1,418), this is not possible. Unfortunately, the data set does not include information on whether non-response from the full frame[13] was due to refusals (the "hard core" non-response), or instead due to firms going out of business or instead due to incorrect phone and address information (the non-coverage response), or instead due to respondent not having the information to answer (the "unable to answer" non-response), or finally due to respondent's persistent unavailability throughout the time of the survey (the "not-at-home" non-response).[14] There is also no reason to believe that refusals came largely from small firms. It is true that small sized firms were often unhappy about agreeing to the interview for fear that enumerators are actually disguised government officials who are after their profits for purposes of taxes. However, large firm owners were time constrained which limited their response rate as well. But the latter type of firms appeared to have more trust in the academic nature of the survey. What matters to obtain unbiased estimates is whether the firms who had to be dropped for refusal or for other reasons do not systematically differ from those who are included. As discussed above, the data are not available to test this, and there is no a priori reason to expect there to be a systematic difference of this sort.

In summary, the sample can be considered as reasonably representative of the smaller sample frame. Although this can be stated with less certainty for the larger frame, the fact that the full frame had a percentage of vertically integrated firms of 25% compared to the 19% of the smaller frame may give indication that the smaller one is reasonably representative of the larger frame. Ideally, the comparison would be made on more firm characteristics,[15] but apart

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[12] Sampling or population weights should be used as they give each observation the weight it deserves relative to the population.[12] Using these weights - provided they are correctly calculated and the sample frame is accurate- ensure that the sample results are representative of the population. Population weights are calculated as the inverse of the probability that each observation is included due to the sampling design[12] (Cochran, 1977). Accordingly, all purposefully sampled firms have a sampling weight equaling to 1. The rest that were randomly sampled have a population weight (PW) of 1.67 calculated as follows:

$$PW = 1 \Big/ \left[\frac{number\ of\ randomly\ sampled\ firms}{(number\ of\ sample\ frame\ firms - purposfull\ y\ sampled\ firms)} \right]$$

The number of sample frame firms utilized to calculate the PW is the 421 firms that were identified as being operative.

[13] The frame that resulted in the 421 firms identified as operative.

[14] Terms used in brackets for the different types of non-response are the terms used in Cochran (1977).

[15] The amount of the non-response bias in the sample mean due to non-response equals the product of the proportion of non-response and the difference between the means in the two groups. The two groups being the responsive and the non-responsive groups respectively (Cochran, 1977). In the data set at hand, the latter group

from the degree and order of integration no other variables are available for the firms of the smaller sample frame.

4.2 Fieldwork

The fieldwork comprised three months of preparation (sample frame, pre-survey, training and piloting) from December 2003-February 2004, with the survey itself conducted in the following four months from March-June, 2004 through face-to-face interviews. Although the survey was contracted out to a market research company based in Cairo, I designed the questionnaire (including translation into Arabic) and pre-tested it myself. I also directly oversaw the preparation of the sample frame, the pilot, training enumerators and monitoring the quality of data collection and entry. Intensive, in depth pre-survey interviews were carried out through November-December 2002, which informed the design of the questionnaire.

The interviewees were either owners or senior managers (which mostly coincide), so if not the decision-maker, then someone close to the decision making process. Different questionnaires were used, depending upon whether the firm (1) was vertically integrated into fabrics and/or retail at the outset, (2) integrated later, or (3) were un-integrated.[16]

Each questionnaire consists of nine modules in addition to a screening section to decide which of the four questionnaire types to implement. Those modules were: 1) general questions on firm characteristics; 2) vertical integration and export status; 3) product quality (investment and temporal specificity issues); 4) demand variability/uncertainty, adjustment and monitoring costs; 5) firm size; 6) institutions and institutional substitutes; 7) lock in and switching costs; 8) contracts and; 9) dispute resolution.

4.3 Model and Estimation

The data were fitted to a simple model with two advantages over vertical integration (VI) models in the current literature. First, VI is usually modeled as a function of the current values of the right-hand side (RHS) variables, but many of these may be endogenous. Second, studies focus on the variable of interest often utilizing a limited number of controls, and so probably suffer from omitted variable bias. The model used here largely overcomes the first problem by using lagged values of the determinants. This makes theoretical sense, as it is the value of explanatory variables at the time the decision to integrate was made which matter. The second problem is addressed since a large range of controls is included in the model.

In most empirical studies, vertical integration is measured as a dichotomous variable: taking a value of 1 if the share of inputs produced internally rather than purchased exceeds some threshold.[17] For example, Woodruff (2002) sets VI at 1 if the manufacturer sells any portion of production through owned stores, and Montverde and Teece (1982) do so if the firm produced 80 percent or more of a component internally. A continuous variable was suggested instead in a review of the empirical literature (Joskow, 1988). Based on the above, the estimated model takes the following form:

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consists of several non-response types (e.g. non-coverage and hard core). This makes it even harder to even reasonably guess the mean of the non-responsive group and in turn guess the size of the bias.

[16] More detail on questionnaire design is available from the author upon request.

[17] This applies in the case of backward integration, which is what is analyzed here. An analogous formulation applies for forward integration. Exceptions are Wernerfelt (1997) who treated the dependent variable as continuous, and Hubbard (2000) who used a categorical dependent variable. In contrast, the literature on franchising, which is a closely related literature to that on VI, has abandoned the use of dichotomous variables. The literature on chain franchising uses the percentage of units franchised (as opposed to company-owned) as its dependent variable (e.g. Lafontaine, 1992). For another interesting article on franchising versus vertical integration see Maness, 1996.

$$VI_t = VI_t(X_{t-i}; \varepsilon_t) \quad (1)$$

in which VI_t is the dependent variable, a fractional response variable: the fraction of fabrics produced internally to the value of the firm's total fabric requirements during the last completed financial year't';[18] X_{t-i} is a vector of the level of the independent variables for the year(s) preceding the vertical integration decision, and by definition, exogenous since it is pre-determined[19]; and ε_t is the error term of the population regression line.

Close to half of all vertically integrated firms are fully vertically integrated (i.e. no longer deal with the upstream market), in which case the dependent variable would take the value of 1. For the remaining firms (i.e. those for which 0<VI<1), the fraction varies between .05 and .97. The median, which is also approximately the mean, is 0.54.

Following Papke & Wooldridge (1996), the conditional distribution of the dependent variable (VI) on the independent variables (X), E(VI|X)=G(.), is estimated by assuming a logistic distribution, i.e. $G(.)= (e^{Xb}/1+ e^{Xb})$, which is then estimated by maximum likelihood (MLE). The attractive feature of this approach is that it can deal with values at the boundaries without the need to use (ad hoc) transformations of the data.

5. Results

The following section provides an interpretation of regression results, specifies the variables used to test the four hypotheses and offers a discussion to the results. A selection of survey questions appears in Annex 2, descriptive statistics and theoretically predicted signs of independent variables appear in Annex 1.

5.1 A Note on Interpretation of Regression Results

Maximum likelihood estimations are given in Table 1. The results of a basic model (regression (1)) containing the main determinants for testing the four main hypotheses discussed above are given as regression (1) and robustness checks as regressions (3-6). Model (2) is a fuller model which disaggregates the variable search and switching costs utilized in regression (1).

Before discussing the results in detail a note on the interpretation of results is warranted. Figure 1 shows the actual (the points) and fitted values (the solid line) from regression (2). The observations are sorted by fitted value, so the fitted fraction integrated increases from left to right. Three-quarters of the observations are not vertically integrated at all (the points lying along the x-axis). For about half the sample, the fitted value is also indistinguishable from zero.[20] At the other end of the spectrum, the majority of fully integrated firms have fitted values of close to one.[21] Finally, virtually all partially integrated firms have fitted values in the mid-range.

The high proportion of firms that are not integrated has important implications for the interpretation of the results. The estimated fraction of vertical integration calculated at the means of the regressors is close to zero (0.014). Varying any one of the regressors by a marginal increment (i.e. to calculate the marginal effects), will leave the estimated fraction

[18] The question was asked separately for clothing manufacturers for the domestic market, and those serving the export market. The dependent variable is the weighted average of these shares.

[19] Cognitive concerns relating to respondent recall, as well as to 'time problems', i.e. the appropriate choice of time period for dependent and independent variables will be discussed in more detail in the robustness section below.

[20] 133 of the fitted values are 0 to two decimal places, and 167 have a fitted value of less than 0.05 (compared to 185 firms for which VI is actually 0 in the sample used for regression 2).

[21] 17 of the 29 fully integrated firms have a fitted value of more than 0.95.

integrated close to zero, since most fitted values are indeed close to zero. The marginal effects calculated at the means thus appear very small. However, as discussed in the previous paragraph, the model does predict the degree of vertical integration across the full range from 0 to 1.

Hence, Table 2 calculates the marginal effects both at the means (which gives a fitted value of VI=0.01), and at a level for the independent variables which gives a fitted value of the fraction integrated of around 0.5 (i.e. VI=50%), which, as will be seen, gives a much larger marginal effect. To obtain the values of the regressors for the latter the average of each regressor was calculated for the ten observations having fitted values closest to 50 percent. The integer values of these averages were used for the calculation, giving an expected fraction integrated of 55 percent. Table 2 shows the marginal effects for these two sets of values of the regressors using the coefficients from the fuller regression regression (2). It shows marginal effects for a one standard deviation increase around the specified values of the regressors (either the mean[22] or the value selected to yield a fitted VI of 0.55).

5.2 Discussion of Results

The results in Table 1 pertain to the four basic hypotheses outlined above. In the following, each will be discussed in turn.

> ***Hypothesis H1:*** *Firms serving higher end markets are more likely to vertically integrate into fabric production*

This hypothesis is concerned with the market niche a firm serves and is tested using the following variables: disputes over quality, exports, search and switch costs, social costs and monitoring costs. The niche indicates the relative quality of firm output. This could be partially measured directly by information on whether the firm served international (export) or domestic markets, alternatively it could be measured by disputes over quality with fabric suppliers in the years preceding the vertical integration decision. Market niche has intricate implications for various agency issues, in particular for lock-in and potential hold up threats. For developing countries, results regarding hold up are not clear cut as will be discussed further below.

5.3 Disputes over Quality and Exports

A history of quality disputes with the firm's repeat fabric suppliers increases the likelihood of vertical integration (Table 1 regression (1)).[23] With a flawed dispute resolution system in Egypt, particularly for TC industry participants (El-Haddad, 2008)[24] the significance of this measure was expected.

Adding exports to the regression confirms the importance of market niche for the vertical integration decision. Exports (percentage of garments[25] a firm exported before it integrated)

[22] The marginal values given by STATA are for a one unit change around the mean for continuous variables, and a change from 0 to 1 for the two dummy variables. These marginal changes have been multiplied by the respective standard deviation for each variable to derive the figures given in Table A.3.1

[23] An ordered categorical response variable (of n categories) may enter the regression in two ways: (1) as a single categorical variable, that is treating it as if it were a continuous variable or (2) as n-1 dummy variables corresponding to all but one of the n categories. The former is a restricted version of the latter, as it assumes equal increments between categories. This restriction was tested for all categorical variables in the model using a log-likelihood ratio test. In all cases the restricted model was accepted. These results are available from the author on request.

[24] The range of dispute resolution mechanisms has been examined in Hendley et al. (2000) for Russia, and Hendley and Murrell (2003) for Romania.

[25] The words clothing and garments are used interchangeably throughout the paper.

clearly distinguish the markets being served: the higher output quality market (export) versus the relatively less (domestic).

The in depth pre-survey interviews provided insights as to how the export variable operates. For both the export market and the local high quality market, low quality fabric inputs can cause problems, but not in the same way. Exporters have the option of importing their fabrics, whereas those serving the domestic market were for many years legally prohibited from this choice[26] – they have to either buy locally or produce the fabric themselves. Hence, it is reasonable to expect: (a) that clothing exporters importing their fabric requirements are less likely to integrate as they have access to desired quality and (b) that clothing exporters not importing their requirements – given upstream market inefficiencies – are more likely to vertically integrate to ensure the desired quality.

Accordingly, the export variable is interacted with an import dummy that would indicate whether a firm imported part or all of its fabric requirements.[27] Regression 2 (Table 1) shows that, (a) the export variable is significant; and (b) the sign of the interactive term's coefficient is negative, indicating that a firm importing some or all of its fabric requirements moderates the positive effect exports have on vertical integration (indeed it appears to nearly fully offset it, see regression (2)). Table 2 indicates that a one standard deviation increase in the percentage exported prior to integration increases the share of inputs produced internally by 0.91% but an equivalent increase in imported fabrics decreases that share by 1.03%.[28]

5.4 Agency Concerns

5.4.1 Hold Up and Lock In

Various agency problems are more severe the more sophisticated the market segment. Market segment is only partially controlled for by the export variable, there is also a quality spectrum in each market. Firms serving the high-end of the domestic market have timeliness and

[26] Until 2002 when the ban was removed but replaced with prohibitive tariffs. They were – as mentioned earlier - largely protected from international competition through high tariffs.

[27] The Import Dummy =1 if fabric imports are more than 0, and 0 otherwise.

[28] Fashion turnover rate has been used as a measure for asset specificity (regression not shown) but was not significant. Asset specificity has widespread support as an important factor in developed economies (for reviews of the literature see Joskow, 1988; Shelanski et al., 1995; Klein, 2004). For example, Montverde and Teece (1982) examined 'human asset specificity' in the automobile industry and concluded that the larger the engineering effort required to design a specific automobile part (their measure of human asset specificity) the more likely is this part to be internally produced rather than contracted out. The same finding was reported in Masten's (1984) study of an aerospace firm: the larger the degree of design specificity (or site specificity) of a component, the more likely the component will be produced internally. Modern property rights theory revolves around the relative specificity of buyer and seller investments. According to Woodruff (2002) and Hanson (1995), the less standardized a garment firm's products, the larger its non-contractible investments in workmanship quality, design and distribution to enhance its ability for obtaining future orders. Some pre-survey interview material suggested that garment firms (compared to their fabric suppliers, i.e. the seller) undertake larger non-contractible investment in their monitoring activity, in human capital investments, and in know-how and skill accumulation. Both the garment and the fabric manufacturers' investments are to some extent specific to the characteristics of the end product and in turn to their relationship. This implies that fabric suppliers can behave opportunistically, exploiting the vulnerability of the garment firm, which has already undertaken the larger specific investment. This local condition could be expected to increase the likelihood of vertical integration to avoid hold up by the supplier. Fashion turnover rate has been used as a measure for investment specificity in the Mexican footwear industry by Woodruff (2002) in his analysis of forward integration into retail; he assumes that the retailer's non-contractible investment is larger and more important to the overall profits from the relationship than that of the manufacturer. Given his assumptions, while transaction cost theory predicts vertical integration, modern property rights theory would predict the likelihood of forward integration to be reduced. In contrast to my findings , Woodruff's results support this variant of the property rights theory. Note that my results did not support either theory, as fashion turnover rate is insignificant.

quality concerns too. For example, in one of the in-depth interviews with a firm solely serving the domestic market, the CEO explained that [when one designs one's own women's and menswear collection, one cannot afford to wait "for the blouse to be produced later while its matching skirt is all set for their 'red and white collection' exhibition". The high quality market segment has to be geared to the fashion cycle, getting products to the market in time for the right fashion season. Yet part of the problem with suppliers has been late delivery and inferior quality which brings us to a discussion related to lock-in with repeat suppliers.

Lock in is a situation in which competitive situations between buyers and sellers are transformed into monopsonistic or monopolistic ones. 'Hold up' hence refers to either buyers behaving opportunistically to exploit their monopsonistic powers or sellers behaving opportunistically to exploit their monopolistic powers. Accordingly firms that serve high quality, high fashion segments of the market are more likely to be subject to "hold up" by their input suppliers.[29] This source of holdup would partly correspond to Masten *et al.*'s (1991) temporal specificities (see also Woodruff, 2002; Pirrong, 1993; and Hubbard, 1999). Situations that give rise to these kind of specificities are situations "where timely performance is critical, [thus] delay becomes a potentially effective strategy for exacting price concessions" (Masten *et al.*, 1991:9). This situation renders vertical integration an attractive solution to the problem. Two variables are used to proxy temporal and quality specificities namely search and switch costs and social costs.

5.4.2 Supplier Search and Switching Costs

With respect to supplier search and switching costs it was clear from preliminary pre-survey interviews that clothing producers react to vertical integration pressures differently depending on whether they are dealing with a domestic or a foreign fabric supplier. Thus, I separate out search and switch costs data with respect to domestic and foreign suppliers. Instead of using the aggregated, weighted[30] search and switch cost variable of regression (1) (Table 1) [which is significant at the 5 percent level], two variables were used: search and switch costs with respect to domestic fabric suppliers, and search and switch costs with respect to foreign suppliers.

Prior to integration, some firms dealt solely with domestic suppliers, some with foreign ones, and the rest with both types of suppliers. Accordingly, each firm will have at least one non-missing disaggregated search and switch cost variable.[31] So as not to lose those observations for which one of these variables is missing, two missing dummy variables were included.[32] One dummy is a search and switch costs dummy for foreign suppliers and another is for domestic suppliers.

The results (Table 1, regression 2) show that the presence of high search and switch costs increases the likelihood for vertical integration *only* if the garment firm was dealing with repeat domestic fabric suppliers. But, contrary to the prediction that high search and switch costs – a sign of lock in – would stimulate a potential hold-up threat to which clothing producers would respond by vertically integrating, when repeat suppliers are foreign (i.e. the

[29] Public sector firms may not hold up firms by attempting to change the terms of the contract to ensure timely delivery. But individual managers of those firms may extract side payments to ensure it.

[30] The weight used for the domestic (foreign) search and switch cost variable is the percentage of the total value of fabric requirements purchased, prior to integration, from domestic (foreign) suppliers.

[31] Either search and switch costs with respect to foreign suppliers or search and switch costs with respect to domestic suppliers.

[32] A missing dummy, DUMX for variable X takes the value 1 if X=missing and 0 otherwise. X itself is replaced with any constant number if X is missing. Hence, a new variable Z is generated such as: Z = constant for X=missing and Z=X otherwise. Both Z and DUMX are added to the right hand side variables of the regression.

fabric was imported prior to integration), no such move occurred (the coefficient on search and switch cost with respect to domestic suppliers variable is significant at the 11% level but is not with respect to foreign suppliers). There are two plausible explanations for this. The first is that when foreign institutions ensure contract enforcement of quality and delivery for a contracted price, suppliers' opportunistic behavior is deterred, reducing the necessity for garment firms to integrate. High search and switch costs with respect to foreign suppliers indicates trust and security in the relationship between the clothing firm and those foreign suppliers it deals with repeatedly. In other words, when it comes to foreign suppliers there is lock in not followed by hold up. This may not be the case with respect to domestic suppliers, since domestic institutions do not guarantee the same level of enforcement.[33]

The second plausible explanation relates to production quality. If search and switch costs are high with respect to domestic suppliers, the clothing firm is able to ensure the desired quality of fabrics if it vertically integrates. However, if these costs are high with respect to foreign suppliers - giving rise to hold-up - the firm may be technologically unable to match the desired quality level hence internal production of inputs is no longer a sensible response. It is likely that the two justifications jointly explain the difference in significance of the search and switch cost variable depending on whether the supplier is domestic or foreign.

Multicollinearity is likely introduced by the missing dummies for foreign and domestic suppliers. [34] Since the dummy represents observations (firms) that, for example, do not deal with foreign suppliers there is a systematic relationship between the missing dummy and vertical integration, hence also with the other variables in the equation which are meant to have a systematic relation with vertical integration. This co-linearity undermines the significance of the quality disputes variable (Table 1 regression (2)). It is also plausible that the foreign search and switch cost variable is picking up (part of) the quality effect of the quality disputes variable.

5.4.3 Social Cost

Social cost is another variable which may be proxying for lock in and potential hold up. In social network settings, the social and moral costs involved in replacing suppliers with whom one has personal or family ties can be so high so as to restrain economic agents from attaining efficiency (refer to exact definition in Annex 3). By restricting their ability to punish poor performance through cutting out suppliers to whom they are related, these costs operate by limiting economic agents' choice set, in turn increasing their desire to integrate. Social and moral costs in all regressions are insignificant, exerting no effect on vertical integration and so quite likely indicating the persistence of personalized exchange. Uzzi argues that embeddedness (the process by which social relations shape economic actions) yields positive returns only up to a threshold point, after which it becomes negative (Uzzi, 1996). Kranton (1996) has also shown that any organizational structure (e.g. the market, vertical integration) can persist even when it is inefficient (Kranton, 1996). The results cannot distinguish whether the perseverance of personalized exchange in the TC industry in Egypt is in fact efficient or has reached the turning point of the efficiency spectrum but they do demonstrate the persistence of personalized exchange.

[33] Or alternatively, when work ethics are different, but this analysis cannot distinguish whether economic agents are responding to the incentive structure or genuinely prefer to behave non-opportunistically.

[34] The missing dummy for foreign supplier search and switch cost takes on the value of 1 if the firm did *not* deal with foreign suppliers, i.e. if it only dealt with domestic suppliers before integration. The correlation coefficient equals (-.30) between the dummy and quality disputes which is considered reasonably large.

5.5 A Developing Country Perspective: Hold up or Excusable Default?

Firms serving segments for which quality and timely delivery is essential are more likely to integrate especially when contracts are costly to enforce and lock-in with current suppliers is ensured through the prevalence of high costs of searching for alternative suppliers and an equally high financial and/or social cost of switching away from current familiar ones.

But in the vertical integration literature, these types of agency problems are generally categorized as hold-up, whereby the supplier may exploit the producer's need for timely delivery and/or superior quality of supplies to improve contract conditions (i.e. opportunistic behavior). However, the questionnaire cannot distinguish whether disputes and lock in are associated with opportunistic behavior or with suppliers' inability to deliver required quality due to circumstances beyond their control such as often occur on account of typical problems of production in a developing country. For instance, during one of the pre-survey interviews, the electricity went off 4 times during the 3 hour appointment (for a total period of 1 hour). The respondent explained that he cannot be harsh on his supplier when it comes to timely delivery: 'see how often the electricity goes out? If this happens to him frequently, even if he is a man of his word, he cannot fulfill on time. It is simply out of his control.'[35] This case and similar cases are in line with Fafchamps' (1996: 61) argument that 'delivery problems are blamed on shocks affecting suppliers and are treated by respondents as cases of excusable default.

5.5.1 Monitoring Costs

A measure of monitoring costs was included to capture the technical complexity of production. Monitoring costs refer to the costs associated with the effort to single out workers' productivity and to measure accurately their contribution to output. A more general definition of monitoring costs are the administrative and managerial costs of coordinating the different stages of production ensuring that quality is adequate, that technical specifications are met and that production is on time: accomplished through matching productivities to inputs and so punishing and rewarding accordingly.

That monitoring costs are a determinant to the "boundaries of the firm" is consistent with agency theory in general and particularly with team agency (Alchian and Demsetz, 1972) and measurement costs (Holmstrom and Milgrom, 1994; Holmstrom, 1999).[36]

Monitoring costs are higher in fabric production, which involves a higher level of team production compared to clothing garment production. Weaving and knitting entail team production and joint use of equipment.[37] In contrast, clothing production involves a 1:1 sewing machine to worker ratio. In team agency, the problem is the difficulty of singling out each agent's productivity from that of the other agents.

The larger these costs, the less likely firms are to integrate. Indeed, vertically integrated firms devise sophisticated production tracking systems to enable them to monitor their workers. Several of the interviewees have indicated the hardship of monitoring workers in just one vertical stage of production, let alone adding and monitoring another stage.[38] Several studies

[35] Interview with Waleed Abdo, Cairo, Egypt (2 December 2002). Respondents' names have been changed to ensure confidentiality.

[36] In a principal-agent framework an agent's private action affects the principal's payoff probability distribution through its effect on output. The principal's problem is the difficulty to separate out the agent's contribution from that of the state of the nature'. In team agency the problem is the difficulty of singling out each agent's productivity from that of the other agents.

[37] Interview material shows that a factory of 1,500 workers may have 500 sewing machines but only 4 knitting machines (Ahmed Ali, November 2002).

[38] For example, Waleed Abdo (November 2002).

have looked at monitoring costs as a determinant of forward integration with reference to costs of organizing the sales force. Using this variable in an agency framework, both Holmstorm and Milgrom (1991, 1994) and Anderson and Schmittlein (1984) found that higher monitoring costs provided a disincentive for integration. In most specifications monitoring costs were insignificant which is consistent with results by Wernerfelt (1997).

Hypothesis H2: *Firms facing a higher degree of output demand uncertainty and variability are more likely to vertically integrate into fabric production.*

The second hypothesis relates to output market conditions. Both market volatility, measured by demand variability, and risk avoidance measured by sales uncertainty prior to integration are highly significant across a range of various specifications (Table 1 regressions (1)-(6)). Calculated at expected VI=0.55 a one standard deviation increase in demand variability reduces vertical integration by 15.8%; a one standard deviation increase in sales uncertainty reduces integration by 14.9% (Table 2). Firms are less likely to integrate backwards when they face large fluctuations in downstream demand (e.g. Carlton, 1979; Chandler, 1977, Porter, 1980; and Blair and Kaserman, 1983). In general, when the market setting is volatile vertical strategies should entail insignificant degrees of internal transfer, lesser ownership stakes and fewer integrated activities (Harrigan, 1983). In such circumstances, using the input market has risk-spreading benefits (Lieberman, 1991). The strong influence of sales uncertainty is to be expected in an environment such as Egypt, where other risk-spreading channels are imperfect or absent. Other studies (e.g. Hanson 1995, Anderson and Schmittlein 1984) have also found that exposure to natural risk which they also measured by sales uncertainty, discourages vertical integration. This result confirms that the higher degree of exposure to "natural risk" [39] on the part of the buyer, the less the likelihood for backward integration. Were the buyer (i.e. the downstream firm which here is the clothing firm) to be facing uncertainty in the production environment (e.g. sales uncertainty), it would want to spread that risk by asset ownership spreading and so by relying on the market, rather than integrating. [40]

Hypothesis H3: *Firms with limited access to finance are less likely to integrate*

In developing countries when limited access to finance is more severe than in developed countries vertical integration maybe hampered even when it's otherwise efficient to do so. Financial constraints - more precisely lack of own funds combined with no access to credit because of the current borrowing restrictions (e.g. interest rate, collateral) - and credit market imperfections as constraints to firm investment have been highlighted in a recent survey by Banerjee and Duflo (2004). Though, informal credit is more likely to have a role, and may in some situations substitute for formal credit. Whilst the role of informal credit in developing countries has been stressed in McMillan and Woodruff (1999), implications of the unequal access to credit have been highlighted in Banerjee and Munshi (2004), who show how social ties lower the cost of capital for the original inhabitants of the town of Tiripur compared to their new-comer counterparts, thus allowing the survival of less efficient firms, inducing vertical integration and contributing to capital misallocation.

As discussed above, the literature has taken a more sophisticated view of financial constraints than simply lack of funds restricting integration. Following both Acemoglu et al. (2009) and Macchiavello (2010), financial constraints induce vertical integration for some firms more than others. In Acemoglu et al. (2009) they do so only for firms for which contracts with

[39] "Natural risk" is risk arising from variance in the state of the nature.

[40] The pre-determined nature of the variables largely takes care of endogeneity concerns. Nevertheless, sales risk and demand variability may still be endogenous if firms that are not vertically integrated find it difficult to build good reputation with (foreign) buyers and, therefore, face more uncertain demand.

input suppliers are sufficiently incomplete. In Macchiavello (2010), at intermediate levels of investor protection more financial deepening *reduces* vertical integration when contract enforcement is better. In other words the relationship between financial development and vertical integration takes an inverted U-shape.

In this study financial constraints are measured by a group of three self-reported variables.[41] One indicates the extent to which high cost of finance limited the growth of the firm prior to integration, the higher the value the more severe the constraint. Issued capital signals firm size[42] but is also a measure of access to finance. Finally, the third variable captures how costly it would be to establish a fabrics unit. The three variables are robustly significant across a wide range of specifications (Table 1 regressions 1-6).[43] A one standard deviation increase in the cost of finance around predicted VI of 55% decreases the share of fabrics produced internally by 10.9% and an equivalent increase in fabrics unit investment cost by 23.0% (Table 2). Attempts to interact the cost of finance variable with any other variable to examine whether the cross country evidence on financial development provided in Acemoglu et al. (2009) and Micheavello (2010) is valid at the micro level were unsuccessful.[44] All interactions are insignificant while the set of these three variables are always significant in their own right.

As a result, financial constraints have a negative *unambiguous* effect on vertical integration in the TC industry in Egypt. The results are also robust to a number of alternative specifications. Coefficients in regressions (3) and (4) remain stable to different specifications of the size variables (log clothing sales and log net assets). The relationship between size and vertical integration is well established in the literature as vertical integration requires higher fixed costs (see, e.g.,Antras and Helpman,2004). More recent systematic evidence has been proposed by Hortascu and Syverson (2008). These relationships are also robust to removing insignificant variables (regression 5) and adding additional controls (regression 6).

> ***Hypothesis H4:*** *Firms with access to power are more likely to be vertically integrated into fabric production.*

This fourth hypothesis is the most difficult to assess. Many essential institutions, such as well-functioning legal systems, equity, stock and insurance markets; and an impartial bureaucracy are usually missing or poorly functioning in developing countries. Hence individuals rely upon institutional substitutes to mitigate these institutional deficiencies, most usually by access to social networks (c.f. Macaulay 1963, Haley 1997, Greif 1997, McMillan 1997, McMillan and Woodruff 1999). Such a variable could work in a direct manner or interactively with either the obstacles or motives for vertical integration. In this study access to social networks is measured by three variables: 1) access to foreign institutions; 2) membership to the garment commodity council and 3) location as will be discussed below.

5.5.2 Interactions

Interactively one would expect substitutes to work as follows: if, for instance, a particular institutional substitute mitigates the limited access to or cost of finance, then one would

[41] The Central Bank of Egypt only provides information on private credit at the aggregate level and unfortunately, it does not provide it by governorate

[42] Firm size has been used in some studies as control variable. For example, Anderson and Schmittlein (1984) found that size is a significant determinant of the adoption of direct sales force (integration) as opposed to the use of a manufacturer's representative (i.e. using the market). In essence, size if not considered as a financial constraint, represents a standard economies of scale argument: the larger the scale of operations preceding integration the more cost effective vertical integration can be.

[43] Many more regressions are not shown for space limitations but are available from the author upon request.

[44] Regressions are not shown but available from author upon request.

expect a larger likelihood for vertical integration in its presence. Conversely, if it mitigates an inferior legal system by providing an alternative dispute resolution mechanism, it would reduce the likelihood of integration via reducing the positive effect of, for instance, disputes over quality on vertical integration. Accordingly, the foreign ownership variable – proxying for foreign institutions[45] – and the garment commodity council[46] variable were interacted with the limited access to finance variables as well as quality disputes. In all specifications the coefficient on the interactive term was insignificant.[47]

5.5.3 Direct Effects

Entered without interactive terms these two variables remain insignificant[48] as are other measures such as having a company lawyer. However, the most remarkable result is that pertaining to governorates. Governorates are broadly divided into 3 dummies: Greater Cairo,[49] Alexandria – which are the two largest cities of Egypt – and four more governorates which are lumped together because of their geographical proximity and their similar characteristics namely Sharkia, Gharbia, Munufia and Dakahlia. Table 1 regression (2) and Table (2) indicate the strong significant, robust and influential effect of the four governorate dummy. Compared to Greater Cairo, a one standard deviation increase around the mean increases the share of fabric inputs produced internally by a substantial 40%, outperforming any other determinant.

The governorate variable is not simply a mere geographical location variable. All four governorates cultivate cotton, the main raw input of production for the majority of clothing firms. But these governorates don't just proxy for that. My argument is that these governorates largely proxy for access to power in particular for membership to the National Democratic Party (NDP). The NDP was the country's ruling party for over 30 years. It exercised uncontested power in state politics and is considered a *de-facto* single party characterized by authoritarian governance inside an "officially" multi-party system.[50] The party was dissolved on 16 April 2011 by court order in the wake of the Egyptian revolution of January 2011. This argument is based on the pattern of round one of the presidential elections (May 2012), the first to take place after the January 2011 revolution. This round included 13 candidates all of which represent revolutionary forces except two: 1) General Ahmed Shafiq, appointed prime minister by Mubarak during the revolution having earlier served as minister of Civil Aviation under Mubarak's reign. As such, is closely identified with the old regime; and 2) Dr. Mohamed Moursy, the Muslim Brotherhood (MB) candidate.[51] In the first round all eleven lost to the two non-revolutionary candidates who carried on to a second round of elections. General Shafiq topped the votes in just 4 governorates of Egypt's 27. These votes were sufficient to tip the scales in his favour against the most popular revolutionary figure, Hamdeen Sabahy, placing Shafiq second after the MB

[45]Foreign institutions are an institutional substitute since they substitute for domestic institutions such as the domestic legal system or domestic financial intermediaries.

[46] Members of the 'Garment Commodity Council' are non-elected (i.e. appointed by the minister). The Council is a quasi government institution established by the 'Ministry of Trade' to act as a link between the industry and the ministry. Member garment firms introduce recommendations to the minister. Thus, members of the council are influential businessmen and their membership reflects their possession of power. The variable is a dummy variable that takes the value of 1 if a firm is a member and 0 otherwise.

[47] Not shown but available from author.

[48] Regressions not shown.

[49] Greater Cairo includes Cairo, Giza and Kaliubia.

[50] It was also the organic successor of the Arab Socialist Union established in 1962.

[51] MB's civic political party is called "Freedom and Justice" but they follow orders of the supreme guide, i.e. the "Murshid". These orders are meant to be made through an internal democratic process.

candidate. Fifty percent of Shafiq's total votes came just from these four governorates which are the ones represented by the NDP governorate dummy.

In the absence of a conflict of interest law in Egypt the most successful businessmen - sometimes referred to by political forces as the "cronies" of the system - were tightly linked to political circles with the relationship blurred as to whether they became successful on account of their strong links or vice versa or a bit of both. These were thus accompanying the president on his tours abroad and a number of them were active members of NDPs "policies committee" where all economic policies and decisions were made. Several ministers themselves were practicing businessmen.

Many TC firms in these four Middle Delta governorates belonged to the businessmen who pushed for the Qualifying Industrial Zones (QIZ) Agreement in 2004 with the US and Israel. Companies located in Qualifying Industrial Zones enjoy duty free and quota free access to the US market. This free access however is conditional upon ensuring that 11.7% (10.5% since first quarter of 2008) of exported products' value is of Israeli origin. In contrast to Jordan which also signed a QIZ agreement Egyptian terms were unfavorable.[52]

The agreement had been earlier rejected in 1999 by the government on political grounds. But the set date for the complete phase out of export quotas (January, 2005) in accordance with the WTO Agreement on TC and the end of the Multi-Fiber Agreement (MFA) that governed TC trade for 20 years (1974-1994) was a cause for severe fear for the relatively non-competitive Egyptian TC firms. As the industry is placed into direct competition with more competitive countries such as China, India, Pakistan, Bangladesh, Vietnam and Turkey - which were earlier quota constrained under the former MFA - the phasing out of the quota system was foreseen to have dire implications on Egypt's TC industry. Aware of this threat Egyptian businessmen pressured the government into signing the protocol, the latter consequently rushing into accepting its relatively unfavorable[53] terms and conditions[54] (Institute of National Planning, 2006). This episode demonstrates how influential the largest of these firms were. In fact in a middle income country such as Egypt this labor-intensive industry should have faded away long ago to higher value added sectors. But the continuous protection the biggest players tightly linked to the government received allowed them to continue to grow.

The survey didn't incorporate an explicit question as to the membership status to the NDP neither on the active involvement of the firm CEO if s/he was indeed a member, such data being unlikely to be reliable. But the ability to mobilize that many citizens from those four governorates to collectively vote for a symbol of the old regime can only come from the largest beneficiaries of that regime. This successful mobilization can only come from an organized body that has access to the thousands of workers of those firms and their families a body that possesses organizational skills that match those of the MB movement. Membership to the NDP was thus inferred from the observed election pattern.

An alternative explanation could be that different governorates indicate different institutions.[55] But it is precisely the strong ties with the NDP which were the favorable

[52] The Israeli content for Jordan doesn't exceed 8%.

[53] Compared to Jordan.

[54] Other conditions include legal and legislative reform, enhanced gender equality, discouraging anti-semetic attitudes in the Egyptian press and media and improving the political environment, inducing civil society cultural changes via Egyptian media (i.e. politically correct ways of thinking).

[55] Key judicial informants have strongly opposed the idea that there are significant differences in the quality of the judiciary across governorates since "it abides by the same central rules applicable to all governorates. In

institutions allowing connected firms to sidestep a largely rigid bureaucracy to integrate and to grow. These results confirm Egypt as belonging to North's et al. "limited access" states, which offer "limited access to the polity, because the polity is based on privilege and unequal treatment" (North et al. 2009: 12).

6. Controls

Other controls included whether the firm was listed on the stock market before integration, the extent to which it was believed that integrating could reduce a firm's tax burden, firm's age, whether it is a family business, and finally the percentage of fabrics provided by a sister company or a branch.[56] Firms that obtain their fabrics from sister companies or branches are less likely to be integrated: a one standard deviation increase in the percentage of fabric inputs provided by a branch or sister company reduces the share procured internally by 1.3% (Table 2).[57,58] The remaining control variables were insignificant in the majority of model specifications. The following section discusses the modelling of the dependant variable (the VI variable), and cognitive concerns that maybe associated with long periods of recall.

7. Modeling Vertical Integration[59]

7.1 Temporal Problems

Modeling vertical integration suffers from a number of temporal problems. Existing literature uses current firm characteristics to model a decision usually made some years previously. This study collects data on the year(s) immediately preceding the integration decision. The use of pre-determined variables largely removes endogeneity.[60] However, other problems remain. The first is that the vertical integration measure is the current vertical integration status, not that in the first year after the decision was made. The problem would be solved if the independent variable were dichotomous. But that approach would be at the expense of losing the additional information provided by the continuous nature of the dependent variable (i.e. the fractional response variable).

Looking at the data shows the problem to be more apparent than real: 74 percent of firms who integrated since establishment have not changed their percentage of integration since integration.

This result justifies using the level of integration in the last completed financial year as the dependent variable. In addition, the decision to embark on integration with all the costs involved - such as the investment cost associated with buying the machines, buying or renting the space for the new production operation, learning the production process, and hiring new employees -makes that decision a major strategic decision. By contrast, the decision made every year thereafter - to remain vertically integrated - is only marginal. This argument justifies using the value of the independent variables immediately prior to the first integration

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addition, judges rotate so any one serving in Cairo or Alexandria will serve in the other governorates. However, in reality this rotation may not necessarily be implemented, thanks again are due to "wasta" or connections.

[56] A selection of the survey questions appears in Annex 2.

[57] By definition, if a firm obtains some of its total input requirements from a branch/sister company it reduces the volume of those inputs it produces internally.

[58] A sister company is a company owned by some or all of the same owners of the interviewed company but not registered under the same name.

[59] A discussion of the definition of the dependent variable and how these relate to questionnaire design is in Annex 3

[60] Using lagged explanatory variables helps, but is not a complete solution to endogeneity since errors might be serially correlated and persistent. Endogeneity may also come from unobservable heterogeneity in the skills of the manager, for example, which could in turn correlate with access to capital, risk aversion and so forth. Unfortunately, data on these characteristics of the owner/manager are not available.

decision rather than independent variables of the current time, as has been done in the literature.

It is of interest to know how different the results would be if one uses dichotomous response models instead (i.e. probit and logit). Regressions (1)-(6) in Table 3 show these results.

The dependent variable in these three regressions is a dichotomous variable taking a value of 1 if VI>0 (regressions (1) and (4)), if VI >0.2 (regressions (2) and (5)), if VI >0.8 (regression (3) and (6)) and 0 otherwise. The results are similar, with the NDP governorate dummy being significant for higher levels of vertical integration stressing the role of membership to the ND party for more powerful firms. The size of the coefficients cannot be compared due to their different interpretations. This result has two implications: 1) Due to the fact that in this particular sample only half of all vertically integrated firms have 0<VI<1; i.e. have fractional response values, the significance of the results is not greatly altered by using logit or probit. This, in addition to the fact that 74% of the sample firms have maintained the same integration share from establishment until the last completed financial year, supports using current vertical integration shares as opposed to the vertical integration share at the first year of integration. 2) However, the results also show that there is a difference in the outcome between using dichotomous response models and the more appropriate fractional response model on account of the accuracy of the dependant variable's measure. Utilizing more information enhances precision and the demand uncertainty variable to be significant, for example; whereas for VI>0 regressions (1) and (4) that would be insignificant using the conventional approach.[61]

A second issue is deciding when the decision not to integrate was made by firms that are not vertically integrated. The fact that they are not integrated means that they decided not to integrate last year, so that the last completed financial year (LCFY) values are valid determinants to use for the decision not to integrate. Whilst it might be argued that the firm has decided not to integrate in each year of its existence, so that the values used should be an average of all values since the firm's existence, these data would be onerous to collect and probably unreliable.

7.2 Cognitive Concerns

Various sub-samples were used to test if the results are robust to various possible 'cognitive concerns'. First regressions were estimated separately for cases when the respondent was in the company at the time of the decision to integrate and those where they integrated before the respondent's involvement (Table 4, regressions (2) and (3)). Second, equations were estimated separately for those integrating more recently or longer ago (with the median year, 1989 as the cut off, regression (4)). Finally, regressions were separately estimated according to timing of the integration decision (regressions (5) and (6)).

8.Conclusion

This paper investigates the determinants of vertical integration in the Egyptian clothing industry. High-end market segments, more volatile output market conditions and political power all increase the likelihood of vertical integration whilst limited access to finance stands as an obstacle.

[61] These two points appear to be contradictory. The point, however, is that given this particular sample, dichotomous response models do not give drastically different results (which along with the fact that 74% maintained their share of integration throughout the years) which served the logic of the first point. Nevertheless, in cases where the dependent variable has a larger share of non-boundary values (i.e. 0<V I<1) the results are expected to significantly differ due to the higher precision provided by fractional response models..

The pattern of protection in the sector has resulted in inefficient upstream production and in an institutional setting conducive to agency problems. These problems are particularly severe for firms that serve high quality, high fashion segments of the market for which timeliness and quality are an issue. These firms are typically exporters or serve the high-end of the domestic market. Thus, a number of variables indicating market niche are important determinants of vertical integration. This relationship is clear and straightforward for measures of quality and exports, but there are some nuances related to lock-in with suppliers. The presence of high search and switch costs – a sign of lock in - increases the likelihood for vertical integration *only* if the garment firm was dealing with repeat domestic fabric suppliers prior to integration. Contrary to expectations when repeat suppliers are foreign no such move occurred. This result possibly reflects the higher quality of foreign institutions or foreign production.

Measures of the nature of input and output markets also affect integration. If demand is volatile, buying rather than making inputs has risk-spreading benefits, especially in the Egyptian context as there are few other risk-spreading mechanisms available and contracts are incomplete. . Hence variables capturing sales uncertainty and demand variability limit vertical integration. As expected, financial constraints exert a downward pressure on integration.

Business in Egypt suffers from a bureaucracy that is both excessive and inefficient. The inward looking development strategy employed by Egypt since the 1950s resulted in an inflated bureaucracy. Liberalization since the 1970s has been largely unsuccessful in reducing the administrative burden on business. Government employees have not changed their mind-set, the old ways, including carelessness, petty corruption and control for control's sake, remained deeply ingrained in the system. In order to survive firms often have to ingratiate themselves with government, gaining access to political networks and key political figures to avoid getting bogged down in the rigid system of controls, using the arbitrary and discretionary decision making system to their favor. Under these circumstances, those who have done best in business have been those close to the center of political power. Those directly linked to the party, including the relatives of the former President's family and their strongest supporters, prospered, whilst the businesses of others foundered against the wall of bureaucracy and red tape.

The ability of businesses to grow through vertical integration, which required capital, licenses, premises and so on, meant being able to negotiate these government obstacles to successful business. Those with access to political power are those best placed to do so.

In the Presidential elections of May 2012 the only four governorates to return a majority for the candidate identified with the former ruling party were precisely those four governorates with a significant positive dummy in the VI regression. The implication is that these areas have owners of large factories who benefitted from NDP patronage. And these owners mobilize their workers and their families to vote for the 'NDP candidate'.

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Figure 1: Actual versus Fitted Values

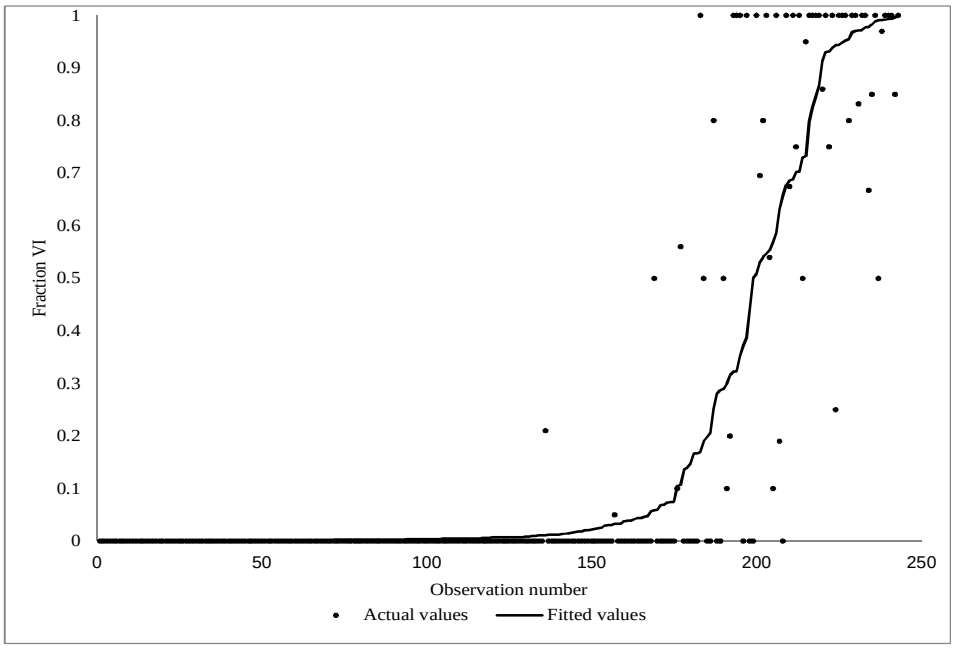

Table 1: Maximum Likelihood Estimation Results

	Basic Regression (1)	Fuller Regression (2)	Different Size Measures (3)	(4)	Removal of Insignificant Variables (5)	Addition of other Controls (6)
Market Niche and Agency						
% Exported		0.037***			0.037***	
		(0.009)			(0.009)	
% Exported*Import Dummy		-0.042***			-0.042***	
		(0.014)			(0.014)	
Quality disputes	0.456*	-0.199	0.407	0.473*	-0.176	0.452*
	(0.260)	(0.284)	(0.263)	(0.264)	(0.256)	(0.264)
Monitoring Cost	-0.251	-0.12	-0.183	-0.269*	-0.127	-0.288*
	(0.156)	(0.149)	(0.167)	(0.158)	(0.150)	(0.164)
Search & switch cost	0.383**		0.515***	0.371**		0.343**
	(0.164)		(0.176)	(0.158)		(0.160)
Search & switch cost w.r.t. domestic suppliers		0.188			0.133	
		(0.184)			(0.189)	
Search & switch cost w.r.t. foreign suppliers		0.156			0.252	
		(0.247)			(0.243)	
Missing dummy (domestic)		-1.451			-1.687	
		(1.194)			(1.156)	
Missing dummy (foreign)		-2.254**			-1.864*	
		(1.047)			(0.970)	
Social & moral cost	0.112	0.041	0.071	0.116	-0.007	0.143
	(0.178)	(0.199)	(0.168)	(0.173)	(0.194)	(0.158)
Output Market Conditions						
Demand variability	-0.841***	-0.638***	-0.681***	-0.743***	-0.627***	-0.839***
	(0.222)	(0.225)	(0.209)	(0.234)	(0.231)	(0.237)
Demand uncertainty	-0.551**	-0.604***	-0.615***	-0.548***	-0.577***	-0.555**
	(0.217)	(0.199)	(0.211)	(0.196)	(0.196)	(0.219)
Financial Constraints						
High cost of finance	-0.296*	-0.441**	-0.312**	-0.356**	-0.483***	-0.280**
	(0.153)	(0.182)	(0.137)	(0.148)	(0.170)	(0.142)
Log issued capital	0.253***	0.189*			0.170*	0.295**
	(0.095)	(0.107)			(0.103)	(0.128)
Fabrics unit investment cost	-0.947***	-0.931***	-0.935***	-1.004***	-0.919***	-0.936***
	(0.204)	(0.186)	(0.221)	(0.235)	(0.184)	(0.205)
Access to Power						
Alex (D)	1.049	0.22	0.733	1.243*	0.352	1.006
	(0.727)	(0.699)	(0.666)	(0.744)	(0.673)	(0.744)
NDP gov (D)	1.309*	2.052***	1.048	1.106	2.085***	1.181*
	(0.787)	(0.667)	(0.895)	(0.873)	(0.674)	(0.755)
Controls						
% Foreign ownership	0.012	0.003	0.012	0.014		0.01
	(0.010)	(0.010)	(0.010)	(0.009)		(0.010)
Listed on stock market (D)	-0.778	-1.087	-0.857	-0.627		-0.783
	(0.741)	(0.710)	(0.687)	(0.628)		(0.830)
Tax incentive	-0.005	-0.036	-0.001	0.08		-0.057
	(0.180)	(0.196)	(0.165)	(0.168)		(0.209)
% Fabrics provided by sister company or branch	-0.081***	-0.053**	-0.071***	-0.077***	-0.047**	-0.078***
	(0.010)	(0.026)	(0.009)	(0.009)	(0.021)	(0.010)
Others						
Log garment sales			0.290***			
			(0.106)			
Log net assets				0.258***		
				(0.092)		
Age						-0.004
						(0.021)
Family inherited business (D)						-0.125
						(0.531)
Garment Commodity Council						-0.703
						(0.939)

Table 1: Continued

	Basic Regression (1)	Fuller Regression (2)	Different Size Measures (3)	(4)	Removal of Insignificant Variables (5)	Addition of other Controls (6)
Constant	2.613	6.843***	0.712	2.084	6.761***	2.592
	(2.084)	(2.587)	(2.492)	(1.934)	(2.479)	(2.128)
Number of Observations	242	242	236	241	243	242
Log likelihood	-47.36	-39.766	-49.6	-47.185	-40.451	-47.051
Chi2	161.163	120.859	129.479	137.47	117.072	164.251
Degrees of Freedom	15	20	15	15	17	18

1) Following Papke and Wooldridge (1996), the conditional distribution of the dependent variable (VI) on the independent variables (X), E(VI|X)=G(.), is estimated by assuming a particular distribution of the conditional distribution, which is then estimated by maximum likelihood (MLE). The conditional distribution of VI on X is assumed to be the logistic distribution, i.e. G(.)= (eXb/1+ eXb). 2) Coefficients are marginal effects (percentages); robust standard errors in parentheses, variables followed by (D) are dummy variables. 3) p-weights are used in all regressions. 4) * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level. - For purposes of replication of the results: estimation is carried out using the STATA generalized linear models (glm) function which fits models of the general form: $(E(y)) = x\beta$. To use this command to estimate the fractional response model the logit is specified as the "link function", with the "family" binomial. The marginal effects are then given using the mfx command, which is a post estimation command giving marginal effects estimated at the means of the independent variables.

Table 2: Marginal Effects of a one SD Change in % for Regression (2) at Different Points

	Marginal effect of 1 SD change (x100)	
	At mean values	**At predicted value VI9 =.55**
Market Niche and Agency		
% Exported	0.039***	0.91***
% Exported*Import Dummy	-0.044***	-1.03***
Quality disputes	-0.213	-4.92
Monitoring Cost	-0.128	-2.96
Search & switch cost w.r.t. domestic suppliers	0.201	4.64
Search & switch cost w.r.t. foreign suppliers	0.166	3.84
Missing dummy (domestic)	-0.873	-33.12
Missing dummy (foreign)	-5.422**	-50.78**
Social & moral cost	0.044	1.01
Output Market Conditions		
Demand variability	-0.682***	-15.78***
Demand uncertainty	-0.646***	-14.93***
Financial Constraints		
High cost of finance	-0.472**	-10.91**
Log issued capital	0.202*	4.66*
Fabrics unit investment cost	-0.995***	-23.00***
Access to Power (missing category Greater Cairo)		
Alex (D)	0.253	5.38
NDP governorates (D)	6.290***	40.20***
Controls		
% Foreign ownership	0.003	0.08
Listed on stock market (D)	-0.734	-26.37
Tax incentive	-0.038	-0.88
% Fabrics provided by sister company or branch	-0.056**	-1.30**

Notes: All marginal effects are shown for a one standard deviation increase from the mean and from the used regressor values respectively. Variables followed by (D) are dummy variables. * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level. For purposes of replication of the results: estimation is carried out using the STATA generalized linear models (glm) function which fits models of the general form: $(E(y)) = x\beta$. To use this command to estimate the fractional response model the logit is specified as the "link function", with the "family" binomial. The marginal effects are then given using the mfx command, which is a post estimation command giving marginal effects estimated at the means of the independent variables.

Table 3: Dichotomous Response Models

	Logit			Probit		
	VI>0	VI>=0.2	VI>=0.8	VI>0	VI>=0.8	VI>=0.2
	(1)	(2)	(3)	(4)	(5)	(6)
Market Niche and Agency						
Quality disputes	1.662***	0.805*	0.250	0.771***	0.108	0.416**
	(0.590)	(0.471)	(0.313)	(0.219)	(0.156)	(0.185)
Monitoring Cost	-0.581**	-0.314	-0.111	-0.260**	-0.057	-0.15
	(0.289)	(0.214)	(0.230)	(0.127)	(0.122)	(0.110)
Search & switch cost	0.651*	0.547**	0.697***	0.306**	0.386***	0.273**
	(0.358)	(0.267)	(0.219)	(0.153)	(0.114)	(0.127)
Social & moral cost	0.258	0.063	-0.255	0.106	-0.128	0.025
	(0.240)	(0.220)	(0.229)	(0.117)	(0.112)	(0.116)
Output Market Conditions						
Demand variability	-0.960***	-0.889***	-0.977***	-0.477***	-0.539***	-0.488***
	(0.321)	(0.251)	(0.278)	(0.127)	(0.129)	(0.130)
Demand uncertainty	-0.426	-0.630*	-0.745**	-0.279**	-0.403***	-0.374**
	(0.270)	(0.326)	(0.291)	(0.133)	(0.150)	(0.147)
Financial Constraints						
High cost of finance	-0.452**	-0.521***	-0.273	-0.252***	-0.143	-0.314***
	(0.190)	(0.184)	(0.229)	(0.096)	(0.117)	(0.093)
Log issued capital	0.554*	0.299*	0.261**	0.234**	0.147**	0.145*
	(0.293)	(0.165)	(0.129)	(0.104)	(0.068)	(0.076)
Fabrics unit investment cost	-1.746***	-1.247***	-0.990***	-0.830***	-0.531***	-0.662***
	(0.590)	(0.400)	(0.310)	(0.209)	(0.136)	(0.148)
Access to Power						
Alex (D)	1.77	1.573	1.255	0.673	0.566	0.718
	(1.322)	(1.069)	(0.964)	(0.575)	(0.468)	(0.468)
NDP gov (D)	0.770	1.531*	1.870*	0.463	1.033*	0.877*
	(0.906)	(0.826)	(1.185)	(0.566)	(0.611)	(0.525)
Controls						
% Foreign ownership	0.033*	0.027	0.003	0.014*	0.001	0.012*
	(0.018)	(0.017)	(0.013)	(0.008)	(0.007)	(0.007)
Listed on stock market (D)	-1.416	-0.564	-1.755*	-0.707	-0.974*	-0.391
	(1.321)	(1.029)	(1.000)	(0.627)	(0.543)	(0.576)
Tax incentive	0.247	0.23	-0.144	0.102	-0.08	0.113
	(0.224)	(0.275)	(0.262)	(0.104)	(0.130)	(0.112)
% Fabrics provided by sister company or branch	-0.073**	(omitted)	(omitted)	-0.033***	(omitted)	(omitted)
	(0.034)			(0.013)		
Others						
Constant	-0.836	2.895	3.422	0.483	1.759	2.116
	(3.300)	(3.343)	(3.149)	(1.621)	(1.591)	(1.539)
Number of Observations	242	237	237	242	237	237
Log likelihood	-38.003	-46.049	-46.403	-39.951	-45.718	-46.044
	28.978	61.54	53.351	54.77	65.779	84.22
Degrees of Freedom	15	14	14	15	14	14

Notes: 1) Following Papke and Wooldridge (1996), the conditional distribution of the dependent variable (VI) on the independent variables (X), E(VI|X)=G(.), is estimated by assuming a particular distribution of the conditional distribution, which is then estimated by maximum likelihood (MLE). The conditional distribution of VI on X is assumed to be the logistic distribution, i.e. G(.)= (eXb/1+ eXb). 2) Coefficients are marginal effects (percentages); robust standard errors in parentheses, variables followed by (D) are dummy variables. 3) p-weights are used in all regressions. * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

Table 4: Cognitive Regressions for Different Sub-Samples

	Basic Regression (1)	Respondent awareness year after VI (2)	Respondent awareness year before VI (3)	Firms integrated after mean year 1989 (4)	Backward integrated firm (5)	Vertically integrated at establishment (6)
Market Niche and Agency						
Quality disputes	0.456*	1.186***	0.383	1.348***	1.072**	1.485***
	(0.260)	(0.360)	(0.336)	(0.356)	(0.512)	(0.418)
Monitoring Cost	-0.251	-0.253	-0.682***	-0.571**	-0.479*	-0.255
	(0.156)	(0.184)	(0.188)	(0.251)	(0.260)	(0.193)
Search & switch cost	0.383**	0.214	0.543**	1.064***	0.982**	0.119
	(0.164)	(0.226)	(0.227)	(0.332)	(0.410)	(0.259)
Social & moral cost	0.112	0.242	0.247	-0.231	0.056	0.425*
	(0.178)	(0.208)	(0.206)	(0.190)	(0.279)	(0.231)
Output Market Conditions						
Demand variability	-0.841***	-1.435***	-0.824***	-0.626***	-0.600**	-1.579***
	(0.222)	(0.321)	(0.237)	(0.236)	(0.293)	(0.367)
Demand uncertainty	-0.551**	-0.753***	-0.606**	-0.372	-0.365	-0.580**
	(0.217)	(0.264)	(0.304)	(0.297)	(0.346)	(0.271)
Financial Constraints						
High cost of finance	-0.296*	-0.216	-0.186	0.009	-0.206	-0.235
	(0.153)	(0.159)	(0.177)	(0.176)	(0.223)	(0.171)
Log issued capital	0.253***	0.226**	0.228**	0.400***	0.412**	0.298**
	(0.095)	(0.113)	(0.116)	(0.130)	(0.188)	(0.121)
Fabrics unit investment cost	-0.947***	-0.976***	-1.253***	-2.143***	-1.705***	-0.810***
	(0.204)	(0.246)	(0.340)	(0.533)	(0.550)	(0.246)
Access to Power						
Alex (D)	1.049	1.728*	1.011	0.574	-13.728***	2.125*
	(0.727)	(0.948)	(1.043)	(0.748)	(1.665)	(1.106)
NDP gov (D)	1.309*	1.425*	1.441*	1.862*	1.259*	1.634**
	(0.787)	(0.901)	(0.872)	(1.06)	(1.351)	(0.813)
Controls						
% Foreign ownership	0.012	0.033**	0.022**	0.017	-0.004	0.046**
	(0.010)	(0.015)	(0.010)	(0.010)	(0.013)	(0.019)
Listed on stock market (D)	-0.778	-0.086	-0.789	-14.584***	-3.961*	-0.284
	(0.741)	(0.858)	(0.571)	(1.498)	(2.407)	(1.084)
Tax incentive	-0.005	-0.007	0.312	0.578**	0.293	0.107
	(0.180)	(0.190)	(0.221)	(0.239)	(0.325)	(0.205)
% Fabrics provided by sister company or branch	-0.081***	-0.570***	-0.078***	-0.076***	-0.090***	-0.536***
	(0.010)	(0.032)	(0.009)	(0.011)	(0.026)	(0.036)
Others						
Constant	2.613	2.119	3.369	-1.861	-2.348	-1.517
	(2.084)	(2.715)	(2.867)	(2.204)	(3.265)	(3.156)
Number of Observations	242	226	225	214	203	223
Log likelihood	-47.36	-29.816	-29.781	-20.725	-17.635	-26.413
	161.163	1226.071	295.071	424.388	7168.783	1032.506
Degrees of Freedom	15	15	15	15	15	15

Notes: 1) Following Papke and Wooldridge (1996), the conditional distribution of the dependent variable (VI) on the independent variables (X), E(VI|X)=G(.), is estimated by assuming a particular distribution of the conditional distribution, which is then estimated by maximum likelihood (MLE). The conditional distribution of VI on X is assumed to be the logistic distribution, i.e. G(.)= (eXb/1+ eXb). 2) Coefficients are marginal effects (percentages); robust standard errors in parentheses, variables followed by (D) are dummy variables**.** 3) p-weights are used in all regressions. * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

Annex 1: Variable Statistics and Expected Signs

	Mean			Standard Deviation			Minimum			Maximum			Expected
	VI	Non-VI	All	VI	Non-VI	All	VI	Non-VI	All	VI	Non-VI	All	sign
Degree of VI													
All firms: 0≤VI≤1	0.78	0.00	0.19	0.30	0.00	0.36	0.05	0	0	1	0	1	
0<VI<1	0.53	n.a.	n.a.	0.30	n.a.	n.a.	0.05	n.a.	n.a.	0.97	n.a.	n.a.	
Quality													
Quality disputes	3.87	2.96	3.17	1.08	1.09	1.16	1	1	1	5	5	5	+
Non-available desired fabric quality	4.57	3.20	3.53	1.51	1.73	1.78	1	1	1	6	6	6	+
Lock in & hold up (TCT)													
Search & switch cost	4.62	3.37	3.67	1.57	1.67	1.73	1	1	1	6	6	6	+
Social & moral cost	3.45	2.92	3.05	1.85	1.55	1.64	1	1	1	6	6	6	+
Temporal specificity (D)	0.91	0.83	0.85	0.28	0.37	0.36	0	0	0	1	1	1	+
Lock in & hold up (MPRT)													
Fashion turnover rate (in weeks)	111.81	48.02	63.24	171.08	85.35	114.78	4.4	1	1	522	522	522	+
% sold to women	29.74	44.69	41.15	33.51	44.83	42.84	0	0	0	100	100	100	+
Agency Theory													
Monitoring cost	3.19	4.46	4.16	1.36	1.58	1.62	1	1	1	6	6	6	-
Desire to Avoid Risk													
Demand variability	2.59	4.83	4.29	1.30	1.29	1.61	1	1	1	6	6	6	-
Demand uncertainty	2.45	3.51	3.26	1.17	1.46	1.47	1	1	1	6	6	6	-
Firm Size													
(in log constant prices, yr 2000)													
Issued capital (in logs)	13.04	9.83	10.60	2.61	2.20	2.68	8.07	5.90	5.90	17.86	18.65	18.65	+
Net assets (in logs)	14.64	11.66	12.40	2.63	2.32	2.72	8.73	6.82	6.82	19.76	18.74	19.76	+
Garment sales (in logs)	16.04	12.07	13.07	2.76	2.36	3.01	9.27	6.56	6.56	23.21	19.36	23.21	+
Financial constraints													
Fabrics unit investment cost	3.69	5.67	5.20	1.49	0.75	1.29	1	2	1	6	6	6	-
Institutional substitutes													
Membership to Garment Commodity Council (D)	0.00	0.04	0.03	0.00	0.19	0.17	0	0	0	0	1	1	+/-
Current membership to Garment Commodity Council (D)	0.21	0.04	0.08	0.41	0.19	0.27	0	0	0	1	1	1	
% of foreign ownership	8.62	2.08	3.64	28.31	13.37	18.24	0	0	0	100	100	100	+/-
Lawyer (D)	0.21	0.34	0.30	0.41	0.47	0.46	0	0	0	1	1	1	+/-
Current lawyer (D)	0.57	0.35	0.40	0.50	0.48	0.49	0	0	0	1	1	1	
Other controls													
Listed on stock market (D)	0.05	0.02	0.03	0.22	0.15	0.17	0	0	0	1	1	1	+/-
Tax incentive	3.00	2.56	2.67	1.52	1.44	1.47	1	1	1	6	6	6	+
% of fabrics provided by sister company or branch	1.55	1.24	1.32	11.84	9.39	10.00	0	0	0	90	90	90	-
Age	22.31	20.68	21.07	13.75	13.40	13.48	2	1	1	57	69	69	+/-
Family Business (D)	1.67	1.73	1.72	0.47	0.45	0.45	1	1	1	2	2	2	+/-

Notes: 1. Level of (dis)agreement variables are coded from "strongly disagree=1" to "strongly agree=6". For the disputes question the answers were coded "absolutely no disputes=1" to "very frequent=5" . 2. All variables refer to the period prior to integration with the exception of the percentage of fabrics provided by sister company and/or branch. 3. VI= Vertical Integrated, TCT=Transaction Cost Theory, MPRT=Modern Property Rights Theory. 4. Variables followed by (D) are dummy variables. 5. n.a.= not applicable.

Annex 2: Selected Survey Questions

<table>
<tr><th>Variable</th><th>Corresponding Survey Question</th></tr>
<tr><td>Vertical Integration</td><td>
With respect to fabrics used for garments sold on the domestic market: During the last completed financial year/prior to internal production of fabrics, what percentage of total requirements of these fabrics did you produce internally, what percentage did you purchase from domestic producers and what percentage did you purchase from foreign producers (i.e. imported)?
<table>
<tr><td colspan="3">The Domestic Market</td></tr>
<tr><td></td><td>Last Completed Financial Year (1)</td><td>Prior to Internal Production of Fabrics (2)</td></tr>
<tr><td>Internal Production</td><td>%</td><td>0%</td></tr>
<tr><td>Domestic Suppliers</td><td>%</td><td>%</td></tr>
<tr><td>Foreign Suppliers</td><td>%</td><td>%</td></tr>
<tr><td>TOTAL</td><td>100%</td><td>100%</td></tr>
</table>
With respect to fabrics used for garments sold on the export market: During the last completed financial year/prior to internal production of fabrics, what percentage of total requirements of these fabrics did you produce internally, what percentage did you purchase from domestic producers and what percentage did you purchase from foreign producers (i.e. imported)?
<table>
<tr><td colspan="3">The Export Market</td></tr>
<tr><td></td><td>Last Completed Financial Year (1)</td><td>Prior to Internal Production of Fabrics (2)</td></tr>
<tr><td>Internal Production</td><td>%</td><td>0%</td></tr>
<tr><td>Domestic Suppliers</td><td>%</td><td>%</td></tr>
<tr><td>Foreign Suppliers</td><td>%</td><td>%</td></tr>
<tr><td>TOTAL</td><td>100%</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Quality Disputes</td><td>Prior to producing your own fabrics, how frequent did you encounter disputes over quality with your domestic/foreign fabric suppliers? 5 point scale from “absolutely no disputes” to “very frequent”.
Note: the variable is a weighted average, where the weights are the % of domestically purchased fabrics and the % of imported fabrics in total fabrics requirements.</td></tr>
<tr><td>Non-available desired fabric quality</td><td>Give the level of dis/agreement with the following statement: The answer was given on a 6 point scale from “strongly disagree” to “strongly agree”.
Prior to producing your own fabrics, it was difficult to find the fabric quality level and specifications that match your standards on the domestic market.</td></tr>
<tr><td>Supplier Search & Switch Costs</td><td>Give the level of dis/agreement with the following statement: The answer was given on a 6-point scale from “strongly disagree” to “strongly agree”.
Prior to producing fabrics internally, search and switch costs involved in altering fabric suppliers, rendered it difficult for you to switch from any of your repeated (domestic/foreign) fabric suppliers at the time.</td></tr>
<tr><td>Fabric Supplier Social Cost</td><td>Give the level of dis/agreement with the following statement: The answer was given on a 6 point scale from “strongly disagree” to “strongly agree”.
Prior to producing fabrics internally, social and moral costs involved in altering fabric suppliers, rendered it difficult for you to switch from any of your repeated (domestic/foreign) fabric suppliers at the time (e.g. the cost of losing a friend, family rejection for cutting dealings with a family supplier or a supplier who is a family friend).</td></tr>
<tr><td>Fashion turnover rate</td><td>In the years prior to producing your own fabrics, on average, how long did you expect the demand on a new style the company will be introducing to the market during its first few years of integration persist?
Codes: 1.Day 2. Week 3. Month 4. Year 5. Season
Note: Answer was converted to weeks.</td></tr>
<tr><td>% sold to women</td><td>% of garment sales to women in the last completed financial year prior to vertical integration.</td></tr>
<tr><td>Monitoring Cost</td><td>Give the level of dis/agreement with the following statement: The answer was given on a 6 point scale from “strongly disagree” to “strongly agree”.
Prior to producing your own fabrics you thought that monitoring workers undertaking fabrics production is a very difficult task. (i.e. time, money and hassle involved in monitoring the workers)</td></tr>
<tr><td>Demand Variability</td><td>In the years prior to producing your own fabrics, on average, how variable did you expect the demand on your products to be during the first few years of integration? The answer was given on a 6 point scale from “absolutely invariable” to “very variable”.</td></tr>
<tr><td>Uncertainty</td><td>Was this sales value (remind the respondent of his sales answer)….?
1) Absolutely expected
2) Expected
3) Somewhat expected
4) Somewhat unexpected
5) Unexpected
6) Absolutely unexpected</td></tr>
<tr><td>Size Variables</td><td>In the given years, how much was the value of the company’s issued capital (garment sales; net assets)?
1=£E 2=$</td></tr>
<tr><td>Fabric Unit Investment Cost</td><td>Give the level of dis/agreement with the following statement: The answer was given on a 6 point scale from “strongly disagree” to “strongly agree”.
Prior to producing your own fabrics, you thought that opening up a fabric production unit in the company is a very expensive undertaking (that refers to all investment costs of buying the machines, the extra space required, preparing the space as well as any other costs involved in opening up the fabric production unit).</td></tr>
</table>

Variable	Corresponding Survey Question
% Foreign ownership	% of foreign ownership in the last completed financial year prior to vertical integration.
Stock Market Status	If company was listed on the stock market prior to vertical integration. 1. Yes 0. No
Tax Incentive	*Give the level of dis/agreement with the following statement: The answer was given on a 6 point scale from "strongly disagree" to "strongly agree".* Prior to producing your own fabrics, you thought that producing fabrics internally**,** instead of purchasing them from the market, may reduce the company's tax burden.
% Fabrics provided by sister company or branch	% of value of firm's total fabric requirements currently provided by a sister company or branch.
Family Inherited Business	Is this company considered an inherited family business? (not necessarily literally inherited, father may be -thanks are due to God (Alhamdu li Allah) –still alive.) 1. Yes 0. No

Annex 3: Definition of Vertical Integration

The definition of vertical integration included several decisions which affected questionnaire design. Are companies whose sister companies provide them with their fabric requirements considered vertically integrated or not? Should the status of vertical integration be collected in an aggregated manner lumping it for both the domestic as well as the export market? Or should the question allow disaggregation instead. This question arose as the case study evidence showed that some firms produced their own fabrics for their domestic output, but imported the materials used in their production for export. For which periods should the vertical integration status be collected: establishment year, first year of vertical integration, last completed financial year (LCFY) or all of these? The following section deals with these issues in turn.

Narrow or Wide?

A question such as "Do you dye in house?" is not a straightforward one to answer. Some respondents would base their reply solely on their company, but others would base it on sister companies and branches as well. The dye question (in the pre-survey) was designed to inquire about dye services in either the company investigated or any of its branches and sister companies. This is so as the incidence of vertical integration into dying was expected to be very low (as indeed turned out to be the case) due to the high investment cost involved in the process. Therefore, I wanted to widen the definition of vertical integration in this case.

However, with respect to integration into fabrics different factors came into play. Widening the definition to include sister companies and branches makes sense when the sister company is essentially an extension of the company under investigation, as is the case when management is unified among them. However, if management is not unified, dealings with sister companies are a step removed from the market, but not identical to vertical integration, under which decisions are made by fiat (Williamson: 1979; 1985). Indeed, managers may find the costs of dealing with relatives owning sister companies high compared to dealing with the market, but are unable to change their source for social reasons.

From the respondents' replies to the phone interviews in the pre-survey it was clear that some firms having sister companies and/or branches have unified management but that also some have separate or semi-separate management.[62] This finding created a practical problem if the integration definition were to be widened to take the unit of observation to be the company and all its branches and sister companies. Specifically, the respondent may be unaware of all the relevant factors in the production and market environment in sister companies and branches on which data are required since they may affect the vertical integration decision. For example, vertical integration is likely to increase if the size of the firm increases or decrease if the demand on the firm's products is uncertain. If management is semi-separate then the respondent might not know the answer to these questions with respect to the sister/branch company at all or at least not know them with the required precision.

Moreover, treating a firm and its sister company as a single company reduces sample size. This matters in particular if both firms are vertically integrated, since there are not that many vertically integrated firms to be included in the sample in the first place.

Accordingly, for the sake of information precision as well as of raising the vertical integration incidence to its maximum possible limit, a decision was made to narrow the definition of vertical integration. In other words, any question directed to a certain interviewed company will pertain only to that specific physical[63] and administrative

[62] Semi-separate management means that only some members of the management board are the same.

[63] In some cases the factory was located away from the administration building; the vertical integration status in this case pertained to the factory corresponding to that particular interviewed administration.

existence. Separate questions were included in the questionnaire to reveal the percentage of fabrics provided and the percentage of garments distributed by sister companies and branches respectively. These are to be used later as control variables in the vertical integration equation.

Aggregated or Disaggregated?

During the interviews for the case studies, it became evident that it is likely that while firms integrate with respect to their domestic market fabric requirements, they may rely on the foreign market for their export market fabric requirements (i.e. import their fabrics). It is very important to ask questions to which the answer makes sense to the respondent, i.e. questions that do not require complex calculations on the respondent's part. Consequently, the vertical integration question was asked in a disaggregated manner. The skip pattern allowed the vertical integration questions for the export market to be entirely skipped if the firm had never exported garments. Appendix B shows the vertical integration question for firms that have integrated into fabrics production subsequent to garment production.

Which Periods?

The main purpose of this research is to look into the determinants of the current vertical integration status of firms. Naturally then, vertical integration status in the LCFY was the key piece of information and the dependent variable of my model. But the heart of this research is based on the assumption that firms' characteristics and decision makers' perceptions prior to integration are the direct cause for firms to embark on vertical integration. Such information was particularly important since using pre-integration characteristics would deal with the problem of endogeneity

The literature on vertical integration is plagued with endogeneity. Chiappori *et al.* (2002) state "…it is hard to feel satisfied with the methodology of [the literature testing transaction cost theory]…it usually does not control for the possible endogeneity of the right-hand side variables." Current vertical integration status has been modelled as a function of current characteristics. But then one can never tell whether the firm is vertically integrated because it has these characteristics (e.g. it exports) or it has these characteristics because it is vertically integrated (i.e. cannot disentangle cause from effect). Moreover, currently observed characteristics do not describe the state of the firm at the time the integration decision was made. What really matters are firm characteristics, and the decision maker's perceptions of costs and benefits of vertical integration, immediately prior to making the integration decision. The questionnaire collected current information but most importantly information on the firm, its characteristics and decision maker's perceptions immediately prior to vertically integrating.

Given respondent fatigue considerations and time constraints, information on firm characteristics was only collected for two points in time. One of these had to be the LCFY. The other had to be a year prior to integration, preferably the year immediately preceding the integration decision. As a result, for firms who have integrated into fabrics subsequent to garment production, I only inquired about the vertical integration status for the LCFY.[64]

However, for firms that integrated at the onset information was collected for two points in time: for the LCFY and at establishment (which corresponds to the first year of vertical integration).

Firms that are not vertically integrated are not integrated given their current characteristics and the current perceptions of their decision makers. Therefore, for this type of firm, information was collected for the current period, more precisely for the last completed

[64] As prior to integration the vertical integration status is zero by definition.

financial year (2002) or the last few completed financial years. Firms that integrated at establishment were asked some hypothetical questions regarding facts and characteristics of the firm, the same questions as backwardly integrated firms with respect to perceived costs and benefits. For example, with respect to disputes with fabric suppliers that subsequently integrated into fabric production, they were asked about how frequent their disputes over quality with their suppliers were before they vertically integrated. Firms that integrated at establishment (i.e. embarked on both garment and fabric production at the onset) were asked about the expected frequency of their disputes with their suppliers had they not been integrated at the onset. In all cases the respondent was the owner or a senior manager (which mostly coincide), i.e. someone close to the decision making process if not the decision maker him or herself.