ABSTRACT

Title: VERTICAL INTEGRATION AND INSTITUTIONAL
CONSTRAINTS ON FIRM BEHAVIOR: THE CASE OF THE
GARMENT INDUSTRY IN EGYPT

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Internalizing market transactions has been seen by New Institutional Economics (NIE) as a means of over-coming transaction costs. Several specific theories have been put forward as to how the presence of such costs (variously defined), or other institutional factors, motivates firms to vertically integrate (Chapter 2).

However, a review of case study evidence from garment producers in Egypt (Chapter 3) shows that there are also important constraints on vertical integration, though these do not affect all firms equally. Small firms in particular suffer from an underdeveloped capital market which hinders expansion. Other features of the Egyptian setting encourage integration; e.g. problems with fabric quality for high-end garment producers, and the need for timely delivery. Chapter 4 uses the findings from these case studies to adapt the theories presented in Chapter 2 to the Egyptian context, and identifies other institutional factors relevant to the 'make or buy' decision.

This thesis presents analysis of a new data set of 257 private Egyptian garment firms collected for this research. Chapter 5 presents the sample and survey design, and descriptive analysis of the degree and order of integration. Features of the Egyptian business environment, such as imperfect credit markets, are shown to be among the most significant determinants of vertical integration (Chapter 6). However, prominent theories

of vertical integration are also relevant, for example search and switch costs encourage integration while monitoring costs discourage it.

The contributions of this thesis to the existing literature include the analysis of vertical integration in a developing country setting using a new data set. The empirical analysis encompasses all existing theories, rather than simply the one of interest, and introduces context-specific factors not considered elsewhere, which is shown to bias other research's results. Integration is modeled as a fractional response, rather than a dichotomous variable as has been done in other papers, using a model specification that partially gets around the endogeneity problem, which has plagued the literature.

The empirical findings have two methodological implications. First, theories are complementary rather than competitors. Second, empirical work focusing on only one theory suffers from omitted variable bias.

VERTICAL INTEGRATION AND INSTITUTIONAL CONSTRAINTS ON FIRM
BEHAVIOR: THE CASE OF THE GARMENT INDUSTRY IN EGYPT

By

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Dedication

For my husband, Howard White…God only knows what I'd be without you.

Finally, I would like to thank everyone whether in the U.S. or in Egypt, without whose help this work could not have been accomplished.

Amirah El-Haddad

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Chapter 1

Introduction

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. Vertical integration is thus one way in which efficiency can be enhanced, thus promoting growth.

In recent years, the New Institutional Economics (NIE) has taken forward Coase's basic insights. Uncertainty, adverse selection and moral hazard problems, the costs of negotiating, writing, monitoring and enforcing contracts, sequential bargaining over benefits linked to sunk investments all represent transactions costs. NIE also recognizes the role institutional arrangements have in affecting firm-level decisions and performance.

Orthodox Neo-classical economics saw transactions as costless, so that firms could freely obtain inputs from the market. The fact that transactions can in fact be costly means that firms may make rather than buy, i.e. vertically integrate. Hence, the NIE literature considers vertical integration a key organizational structure that moderates transactions costs (e.g. Williamson 1975, 1979; Grossman and Hart 1986; Holmstrom, 1982; Hanson 1995, Gibbons 1998).

The presence of high transaction costs for acquiring inputs provides a strong motivation for firms to vertically integrate. It might be imagined that these costs would be particularly high in developing countries, since markets are commonly perceived to work less perfectly in such settings. Hence, higher degrees of vertical integration might

be expected in the industrial sectors in such countries. However, available data suggest that this is not the case in the Middle East in general.

Forty per cent of private manufacturing firms in the MENA (Middle East and North Africa) region are small enterprises (WBES, 2000). This proportion is much higher than found in most regions. For example, in Latin America and OECD countries this percentage is 23% and 28% respectively (calculated from WBES, 2000). These figures seem to imply a lack of integration, horizontal, vertical or both. If so, what is special about the industrial and institutional environment in this region that leads to this lack of integration?

There are numerous theories of vertical integration. Some of these are competing and some complementary. A variety of empirical studies on the many theories exists. However, these papers usually test just a single in each paper. There have been very few attempts either to test the various theories against one another or to test them together (Joskow, 1988; Whinston 2001, 2002; Williamson 2000). This is especially true in contrasting the standard transaction cost theory (TCT) of Oliver Williamson (1975, 1979) and Alchian *et al.* (1978) and the modern property rights theory (PRT) pioneered by the work of Grossman and Hart (1986) and Hart and Moore (1990) (hence GHM). While TCT has gained, widespread empirical support when examined in a developed country framework it may be that other forms of institutional constraints are more relevant in a developing country context. These constraints may outweigh the motivations for integration provided by high transaction costs, and so help explain the apparent low levels of integration. In other words, the field is ripe for empirical investigation, especially in a developing country context for which there have been few empirical

studies (the exceptions are Woodruff, 2002, and Hanson, 1995 on sub-contracting), and little detailed systematic analysis of firm-level institutional constraints in developing countries.

Using data from a new firm-level survey, this thesis empirically analyses the determinants of vertical integration in the context of the Egyptian garment industry. Two main issues are addressed. First, drawing on both theory and fieldwork undertaken prior to the survey, I present an analysis of how economic and institutional constraints shape the incentive system and feed back into firms' choice of governance structure. Second, within this context, the differing theories are subject to joint empirical testing.

The garment industry was chosen as the sector for study for two reasons. First, it has the potential for vertical integration since all stages of the value chain already take place in Egypt, from growing cotton to selling finished garments to the substantial, protected domestic market. Second, it is has been an important sector to the country's economy, especially export growth during the 1990s. The industry employs over one million workers – making it the largest industrial employer - and the US$800 million of exports in 2002 accounted for just over 10 percent of the country's exports in that year, equal to one-third of all manufacturing exports and the largest single sector after petroleum.

The thesis is organized as follows. Chapter 2 provides an overview of existing theories of vertical integration, and the hypotheses for testing which follow from these theories. Chapter 3 examines the motivations for vertical integration, and the constraints that restrain it, through case studies. Drawing on these case studies, Chapter 4 presents additional hypotheses, both as adaptation and applications of the existing theories and

from additional factors. The empirical analysis is presented in Chapters 5 and 6. The first

of these introduces the survey instrument and the second presents the regression results.

Chapter 2

Theories of Vertical Integration

In the simplest presentations of neo-classical economics firms buy their inputs from a competitive market through costless transactions. The theory thus ignores the role of institutions, transaction costs and property rights in dealing with issues of search, contracting, monitoring, control, execution and enforcement in shaping the incentive structure both within and outside the firm. Hence, optimal firm size was simply the outcome of profit maximization subject to technology (i.e. the firm's exogenously given technical production function). However, work on institutions, incomplete markets, and asymmetric information suggest that there are transaction costs, and that these costs may be sufficiently high for firms to decide to make, rather than buy, their inputs. Such costs include the costs of writing, monitoring and enforcing contracts, and the costs of sequential bargaining over benefits linked to sunk investments. More generally these are costs arising from asymmetric information settings such as adverse selection, moral hazard and bounded rationality. Vertical integration, that is combining two or more stages of a production process under one firm, has been recognized as a key organizational structure that moderates these costs; e.g. Arrow (1975); Alchian *et. al* (1978); Willamson (1979), Joskow (1985), Grossman and Hart (1986) and Hart and Moore (1990).[1]

Recent work thus indicates that the less realistic assumptions of the neoclassical theory of the firm should be relaxed. Two specific applications of these approaches are relevant to vertical integration. First, is the recognition that the costs of undertaking

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[1] The last two references have argued that vertical integration can only -under certain conditions- moderate transaction costs.

transactions may induce firms to by-pass these transactions by internalizing procurement. Second, institutional factors in which the firm operates may encourage, or discourage, the decision to make rather than buy.

This study examines backward vertical integration of Egyptian garment producers into fabric production.[2] This chapter examines the empirical implications of different theories of vertical integration, generating hypotheses to be tested. It also presents some empirical attempts to test the various theories. However, some theories which have little or no relevance to the context under study here (i.e. Egyptian textiles) are not discussed.[3]

2.1 Transaction Cost Theory (TCT) [4]

In his classic 1979 paper, Williamson states that alternative governance structures (i.e. ways of organizing the procurement of inputs) arise due to the presence of transaction costs. If transaction costs were negligible, then switching from one mode of organizational structure to another is costless via costless contracting. But in practice contracting is not costless and therefore transaction costs are non-negligible. Williamson maps the main characteristics of transactions to their optimal governance structures. According to one such mapping, each of the following increases the likelihood of vertical

2 Garment production will be taken throughout the text to imply a firm involved in cutting and assembly operations.

3 For instance, there are vertical integration theories that take advances in information technology (e.g. Bender, 2002) or the differential in technology intensity between the buyer (i.e. downstream producer) and the supplier (i.e. upstream supplier) (e.g. Acemoglu et al., 2004) as influencing decisions of vertical integration.

4 Transaction Cost Economics (TCE) was pioneered by Alchian, Crawford and Klein (1978) and Williamson (1975, 1979, 1985).

integration: the presence of relationship specific investments, a higher frequency and idiosyncrasy of transactions and the higher the degree of uncertainty (Williamson, 1979).

Relationship specific investments and idiosyncratic transactions require some explanation. Idiosyncratic transactions refer to the degree of complexity or alternatively the degree of standardization of the product(s) involved in the transaction – buying an 'off the shelf product' is the least idiosyncratic form of transaction. Relationship specific investments are those which have a lower return (at the extreme no return) in alternative uses (i.e. outside the relation). Such investments create quasi-rents, which are the difference between the returns to the investment inside and outside the relationship. The existence of quasi rents creates a lock-in between the parties involved in that relationship *ex post* (i.e. after the investment is sunk). Because of lock in there is a potential for hold-up, allowing the party that has not made the investment to extract better terms (quasi-rents). When both parties have made relation-specific investments then both possess the threat of withdrawing, leaving the other party held up with his/her specific investment or reliance (referred to as the threat point). Taking advantage of this situation, both parties will attempt to appropriate as much as they can from the existing quasi-rents whenever they have a chance to do so.[5]

Williamson has specified five sources of holdup: asset specificity, site specificity, human asset specificity, dedicated assets and brand name capital (Williamson, 1985; 1991a). Masten (1991) expanded Williamson's 1985 classification by adding temporal specificities.

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5 For example, when the buyer places a new order for inputs from the seller, the seller demands a price increase. The price increase is not based on an increase in the seller's production costs rather on the fact that the buyer is held up by that seller.

In summary, transaction specific investments and idiosyncratic transactions coupled with uncertainty of the environment require assurance of a continuing relation in order to encourage these types of investments. But with Williamson's assumption of bounded rationality, negotiated long term contracts to obtain this are incomplete.[6] Under these conditions, vertical integration - under which decisions are made by fiat - renders frequent sequential adaptations relatively easy, making it the optimal governance structure (Williamson: 1979; 1985). Since both TCT and the modern Property Rights Theory have a lot in common, examples of empirical applications for both will appear at the end of section 2.2.

2.2 Modern Property Rights Theory (PRT)

Property rights theory (PRT) in its modern form was initiated by the work of Grossman and Hart (1986); and Hart and Moore (1990) (hence GHM). Whilst transaction cost theories have gained widespread empirical support,[7] there has been little empirical work on the PRT. Hart (1995) blames the lack of formal testing of the property rights approach on the limitation of the data relevant to GHM. But Williamson (2000) accuses the PRT as being almost purely theoretical, with limited application to actual data, but appeals for more empirical work to examine the premises of the PRT (Williamson, 2000); see also

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6 "A boundedly rational individual attempts to maximize but finds it costly to do so and, unable to anticipate all contingencies, and aware of this inability, provides ex ante for the (almost inevitable) time ex post when an unforeseen contingency will arise. Given this insight, the theory of incomplete contracts emerges as an inevitable development." (Kreps, 1990b, in Furubotn and Richter (2003)).

7 Refer to Joskow, P.L. 1988; Shelanski, H.A. and P.G. Klein. 1995; and Masten, Scott E., ed. 1996 for reviews on the empirical literature.

Whinston (2001 and 2002). To my knowledge, Hanson (1995) and Woodruff (2002) are the only two attempts in the literature to test the PRT formally.[8]

When the owner of the firm and its only manager are the same person then PRT is similar to Standard TCT. GHM predict that in an environment of *ex ante* incontractability, the greater the specificity of investments the greater the chance for opportunistic behavior and hold up problems, and so the more likely it is to observe vertical integration as a way to overcome such problems (Woodruff, 2002), which is the same conclusion as given by TCT.

But PRT and the standard TCT may yield opposite results if the firm is not a simple owner-managed entity. In that case, the actual property rights arrangement in place plays a central role in shaping outcomes. For instance, hired managers of certain units within a firm may seek their own personal objectives (e.g. personal profits) at the expense of stockholders' (joint profit maximization). Thus, the separation of ownership from control becomes an issue. Take the case of an integrated firm that operates its sub-units in the same way as before integration to avoid centralization of management. These sub-unit managers may have "residual control rights"[9] over the assets of the sub-units. Thus, a problem may arise that the managers of the sub-units behave in ways that are not in the interest of the integrated firm (*ibid.*).

As an example, imagine a buyer who is subject to a hold up problem created by a specific investment, which lowers his bargaining position in the relationship. Suppose he

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8 There is a view that the empirical literature on transaction cost determinants of vertical integration automatically provides support for the PRT. However, Whinston (2002) shows this view to be unfounded

9 In other examples it could be assumed that they may not have residual control rights but have revenue based control, instead or a mixture of both.

integrates backwards with his/her basic input provider. Hence, the buyer (now the manager-owner) owns the assets of both firms and so has residual control rights over them, i.e. can decide who can work with and what should be done with these assets. Integration alleviates the buyer's (manager-owner's) hold up problem. But it creates a corresponding hold up risk for the employees in the supplier sub-unit. The managers in this sub-unit –given this ownership structure- now face the risk of being fired (i.e. being separated from the assets), and so do not have the same incentive to undertake quality enhancing investments which they may have been doing prior to integration. Such a situation creates an efficiency loss. This fact is precisely what motivates the importance of asset ownership in their theory, illustrating that the manner by which property rights in the firm are allocated (i.e. how contracts are written) will affect the nature of the firm's objective (function) making it of one form or another (*ibid.*).

Thus, according to GHM, investment incentives should be granted depending on the relative importance of the impact of each manager's investment decisions and on the relative specificity of the investment to the relationship (*ibid.*). Greater incentives should go to the manager with the highest relative importance. In case of non-contractible investments, this cannot be achieved through a contract but only through asset ownership. Ownership of assets matters to the extent that it influences residual control rights ($\neq$ revenue based control), which in turn has an effect on the bargaining positions of the contracting parties once they are locked into the relationship. Bargaining power in turn affects both *ex ante* investment decisions (initial, i.e. before uncertainty of contracting environment is resolved) and each party's relative surplus.

Whilst PRT resembles Williamson's setting by assuming *ex ante* incontractability, asset specificity and uncertainty, it makes a crucial assumption to derive the above result. That is, PRT makes *ex post* (after the uncertainty of the environment has been resolved) negotiation costless. This kind of bargaining is very costly in Williamson's framework. His argument is that if the parties cannot, due to costly haggling, contract or agree on adaptations before the resolution of uncertainty why would they suddenly become able to? For that reason, Williamson describes GHM's setup as one of selective bounded rationality (Williamson, 2000).

Once again, the fundamental difference between PRT and Williamson is that ownership under GHM does not necessarily imply control. In other words in some cases there exist separation of ownership from control.[10] Accordingly, there need not necessarily exist a unified payoff function for the managers involved. [11] The formal implication for this is that each manager has his/her separate payoff function on which s/he bases his/her *ex ante* investment decisions. Williamson, however views unified ownership as the norm as well as the means by which to effect cooperation. He states,

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10 Which results in a principal agent type of problem.

11 This is precisely how Grossman and Hart's model looked like. In their paper "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration", the authors develop a two period, two firm model. In the first period investment decisions (which are characterized by "specificity" that leads to a "hold up problem") are to be made by each of the firms while in the second the firms must undertake a production decision. The setting is such that neither first period investment decisions nor second period production decisions contingent on the investment decisions are contractible. However, *ex post* negotiations about (bargaining over) the gains from integration between the two firms are permissible. The process goes like this: ownership structure determines residual rights of control (=in this case they are decision rights over all second period production decisions≠ revenue based control). This in turn will determine the threat points (non-cooperative payoffs, i.e. payoffs if firms do not agree on integrating) of each of the firms, which in turn will determine each firm's payoff function. This effect on the payoff function will feed back into 1st period's investment incentives and distort them away from the social optimal ones (i.e. get ex ante inefficiency of investment decisions). Hence, the ownership structure does matter. Nevertheless, due to the ex post bargaining ability, production efficiency in the second period is achieved.

"*via* integration a single ownership entity spans both sides of the transaction, and a presumption of joint profit maximization is warranted" (Williamson, 1979).

As presented in sections 2.1 and 2.2 the heart of both TCT and PRT lies in the presence of specific investment(s) in a buyer-seller relationship. Different papers tackled different types of relationship specific investments. Examples of some empirical attempts to test these theories follow. Montverde and Teece (1982) examined human asset specificity in the context of internal production of a certain automobile part versus contracting out. The cost of developing the automobile component was used as a measure of engineering effort required to design that automobile part which in turn infers the degree of human asset specificity related to it. This measure was obtained with the help of an automobile design engineer who rated the engineering investment required for each component on a 10-point scale from "none" to "a lot". They also used a dummy variable to determine whether a component is "specific" to a single assembler or not, which infers the degree of switching costs related with each component and so the degree of potential opportunistic behavior and loss of transaction-specific know how in case of cutting the relationship with the assembler.

Tackling the same question Scott Masten (1984) uses two measures of relationship specific investments for an aerospace firm: design specificity and site specificity. The firm's procurement team gave their rankings of the various components with respect to their "specificity" and "complexity". Design specificity was measured by questionnaire responses as to whether the components were "specific, "somewhat specific," or standard *vis à vis* the whole system. Site specificity was measured by

location. And finally, measures of the degree of component complexity were designed to capture the costs of writing complete contracts.

With respect to uncertainty as stressed in TCT's setting (section 2.1) Anderson and Schmittlein (1984) conducted a study on integration of personal selling. It is an analysis of determinants of using manufacturer representatives (the market) versus direct sale people, which are employees of one manufacturer (integrated governance). In addition to controlling for human asset specificity, the authors distinguished two types of uncertainty Williamson has referred to in his work. First, the one described in his 1979 paper as one form of environmental uncertainty, which is that of environmental unpredictability. Second, they mention that in his later writings (1981a) Williamson recognizes a second form of uncertainty, that is "internal" uncertainty, which is related to monitoring costs associated with group production, multitasking and with agency problems in general.

Based on that, they have adopted two different measures for uncertainty. For the former type of uncertainty, they used the expected deviation between forecast and actual sales in the next year, expressed as a percentage (plus or minus). For the latter type, they used a semantic differential in response to the question "It is very difficult to equitably measure the results of individual sales people".

As for the results, Montverde and Teece (1982), Scott Masten (1984) and Anderson and Schmittlein all have provided support for the hypothesis that variations in relationship specific investment (i.e. asset specificity of various forms) increases the likelihood of vertical integration. Thus, they all provide support for TCT.

Gordon Hanson (1995) examines PRT theory by analyzing the choice of ownership structure (subcontracting versus internal production) using data on Mexican apparel subcontracting. He assumes that the intensity of investments in design and distribution varies with the level of product standardization. Standardized products in this context are those whose designs changes relatively little as product styles change. He therefore describes stockings, underwear, shirts, and uniforms as standardized products. Relying on the Mexican Census's classification of women's and men's outerwear into "batch made" items, which are made for the general public, and "tailor-made" items, which are made for specific clients he adds batch-produced outerwear to his list of standardized products. He accordingly defines a dummy variable that indicates whether the product is standardized or not.

Christopher Woodruff (2002) uses two measures of investment specificity and importance. The first is a measure that divides firms as belonging to one of 10 product segments. The main criterion behind the segments is the speed with which fashion changes (fashion turnover rate) in any one segment. Women's dress shoe are expected to have the highest fashion turnover rate while lower values are estimated for producers of industrial boots, children's shoes and women's basic pumps as they only change styles annually and only 10% of styles are new. According to Woodruff faster style changes corresponds to greater specificity and importance and to greater marginal specificity of the retailer's investment.

The second is a quality index per firm. The index is based on the quality of materials used in the production of the sole and the "upper" of the shoe. The groups of uppers are based on the price of each material per square decimeter. From highest to

lowest, those groups are: 1) exotic and high quality leathers; 2) midrange leathers; 3) low quality leathers and 4) synthetic and cloth. In cases of multi-product manufacturers, there is an issue on which product to rely on when assigning fashion and quality indices to their firm, especially if the products possess very different characteristics. He established two arbitrary rules to come round this problem. The first is to identify the product with the highest fashion turnover and use the quality of materials and heterogeneity (in terms of colors) indicators associated with that product. The second rule is to identify the highest quality product a firm produces and then use the rate of fashion turnover and heterogeneity associated with it.

Gordon Hanson's (1995) results support transaction cost considerations. He had also introduced a variant of the PRT which will be discussed in the next section. Based on differences in the relative importance of buyer-seller investment incentives Woodruff's (2002) context allowed for identifying differences in the implications of the TCT theory and the PRT theory. His evidence supported the PRT but not the TCT.

It is notable that in all above described work, with the exception of Woodruff (2002), and in the empirical vertical integration literature in general, the unit of observation is at the product level and not at the firm level. For example, Montverde and Teece's, (1982) sample comprises of 133 automotive components, for each they try to find the determinants for its internal production versus its market procurement. They use firm level information only to include a dummy variable which distinguishes between two companies: Ford and GM. In this study- as will be seen in later chapters-, the firm is the unit of observation.

2.3 Desire to Avoid Risk[12]

2.3.1 Risk Adjusted PRT

Hanson (1995) develops a version of the GHM model that incorporates risk. Whilst integrating backwards will alleviate hold up problems and opportunistic behavior by the seller, it will create at the same time what Hanson calls a higher degree of exposure to "natural risk" to the buyer, which is risk arising from variance in the state of the nature. Were the buyer to be facing uncertainty in the production environment (e.g. sales uncertainty), s/he would want to spread that risk (via asset ownership spreading, i.e. independent ownership). This is especially so in an environment where risk spreading channels (e.g. equity markets, stock markets, insurance markets) are imperfect or absent. There is thus a trade off between hold up and natural risk considerations and consequently between integration (joint asset ownership) and independent ownership (Hanson, 1995).

Thus, while GHM's model determines the optimal form of integration and asset ownership by balancing the positive and negative effects of integration, Hanson adds the higher degree of exposure to natural risk - which integration subjects the buyer to - to the list of negative integration effects.

2.3.2 Demand Variability Theories

Demand variability incentives to vertical integration were stressed in earlier theories, e.g. Carlton (1979), Chandler (1977), Porter (1980), Harrigan (1983) and Blair and Kaserman

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12 Even though both considerations, demand variability as well as natural risk, discourage integration because they expose firms to higher levels of risk than the market, the term "risk aversion" is not utilized here. Risk aversion refers to economic agents possessing a concave utility function. The desire to avoid risk, however, can be present in "risk neutral" agents as well. Therefore, in order not to constrain the analysis no assumptions need be made concerning agents utility functions.

(1983).[13] Carlton stresses that firms integrate to minimize costs that are due to demand fluctuations. In order to avoid premium payments for inputs induced by other buyers' fluctuating demand, firms with more stable input demand will integrate backwards (Carlton, 1979). In addition, Lieberman interprets Blair and Kaserman's (1983) model of firm risk aversion as implying that a firm is less likely to integrate (backwards) if there exist demand fluctuations in the input (upstream) market that are correlated with fluctuations in that firm's downstream market (Lieberman, 1991).

Moreover, Harrigan (1983) claims that volatility in the downstream industry environment (e.g. downstream demand) may reduce (backward) integration incentives. Lieberman suggested the following hypothesis to test Harrigan's theory: Firms are less likely to integrate backwards when they face large fluctuations in downstream demand; as he puts it: "other things constant, vertical strategies undertaken within volatile industry settings should involve lesser degrees of internal transfer, lower ownership stakes, and fewer integrated activities" Harrigan, (1983). Using the input market in this context increases its risk-pooling benefits as opposed to integrating (Lieberman, 1991). Thus, whereas Williamson (TCT) predicts that uncertainty of environment increases the likelihood of vertical integration Harrigan predicts the opposite.

Both demand variability and natural risk make firms prefer to rely on the market, rather than integrate, because of its risk pooling benefits. Examples of some empirical tests follow.

Hanson (1995) in his research on apparel asserts that, in Mexico, the main risk manufacturers face is frequent changes of product styles. Because the value of

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13 For more references please refer to M.Lieberman, 1991.

investments to create a product line depends on how long the line remains popular among consumers, he states that: "the level of risk depends on the product life cycle, which varies across market segments" (Hanson, 1995). Accordingly, he measures the degree of uncertainty with two dummy variables. WOM takes the value of 1 if the product is a women's outerwear item, as women's fashions are subject to more frequent changes than are unisex, men's or children's. OUT takes the value 1 if the product is an outerwear item. This is so because outerwear is more visible.

In addition to supporting TCT - as pointed out in the previous section- , Hanson's (1995) results also support his natural risk model: the frequency with which fashion changes increases subcontracting levels (i.e. market governance) through increasing the degree of uncertainty.

As to demand variability, Martin Lieberman (1991) tested it in the context of a firm's backward integration decision into the production of 34 of its chemical inputs. He used a variety of demand variability measures. The most relevant to test the hypothesis discussed above was based on the annual industry output of each chemical (downstream) product for which that specific chemical input was required over the 1970-80 period. He ran the regression of total industry downstream output (Q_{it}; where "t" is time and "i" stands for downstream product i) on time (t) and time squared (t^2), where time is an integer increasing each year. He used the sum of squared residual from that downstream product regression as a measure of demand variability for each of the firm's chemical products. His results were consistent with both transactions cost theories and the demand variability model proposed by Carlton (1979).

2.4 Adjustment Cost Theory

Wernerfelt (1997) distinguishes between three different game forms or governance structures of a buyer-seller relationship: the hierarchy (i.e. the firm), the price list and negotiation as needed. Depending on communication costs, the author sets conditions for the efficiency of each governance structure. When many possible adjustments are needed frequently, the author predicts a case for the firm. The price list game form is used when a sufficiently short price list can be constructed *ex ante*. And finally, negotiation as needed will be observed when possible adjustments are many but take place rarely. The author takes this to be an adjustment cost theory in the sense that the choice of optimal governance structure is linked to costs associated with adjustments. The higher adjustment costs are the higher the likelihood for integration.

Birger Wernerfelt (1997) tested his theory by focusing on sales force organization. He contrasts the lower negotiation costs incurred for employees paid a flat wage (integration) versus an independent sales force (the market), who ask for higher commission every time they are asked to adjust their selling effort.[14] Wernerfelt (1997) mailed a five-question questionnaire to 204 firm managers of Steam, Gas, Hydraulic Turbines and Turbine Generator Set Units industries and of Electrical Machinery, Equipment and Supplies industries. Only 51 firms responded. To get a variable that reveals the frequency of adjustments he asked the question "we very often send instructions to the sales force". To measure the importance of diverse adjustments he asked "non-selling tasks are a major component of sales force responsibility". The

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14 A similar approach is adopted in Anderson and Schmittlein's (1984).

answers were given on a seven-point scale from "strongly disagree", through "neutral," to "strongly agree." He concluded that vertical integration or the hierarchy is more likely to be used when diverse adaptations are required, thus, supporting his theory.

2.5 Agency Theory

2.5.1 Team Agency

In a principal-agent framework an agent's private action affects the principal's payoff probability distribution through its effect on output.[15] In such a setting of asymmetric information shirking and so moral hazard,[16] become viable threats. Neo-classical agency theory has assumed that output is perfectly observable and so incentive contracts will solve this problem. The size of the firm - through which these contracts are created – is taken as given. Team agency, however, introduced by Alchian and Demsetz (1972), can be used to gain more insights into the determinants of integration.

Team agency is summarized by a setting in which 1) several types of resources are used, 2) production accrues through a team production technology,[17] 3) resources do not belong to a single principal, and 4) marginal product of any one resource (i.e. team member) is not costlessly observable. It is straight forward how this setting gives rise to moral hazard and shirking of team members. The authors suggest that a contractual structure, that is the firm, permits the appointing of a monitor who 1) is specialized in

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15 The principal's basic problem here is the difficulty to single out the agent's contribution from that of the state of the nature's contribution to any specific realization of output.

16 "Moral hazard refers to the problem of inducing agents to supply proper amounts of productive inputs when their actions cannot be observed and contracted for directly" (Holmstrom, 1982).

17 That is, output is not the sum of separable inputs, indicating the interaction between the inputs (i.e. agents) and the inseparability of their individual efforts.

monitoring (i.e. observes resource or input behavior), 2) is made residual claimant, 3) is the central party common to all contracts with resources (i.e. fires, hires and revises contracts of any member of the team). The residual claimant is seen to be the owner of the firm whose existence enhances detection (i.e. reduces costs of detection) of shirking among team production members and makes the discipline provided through contract revision ability more economic (*ibid.*). Thus, *ceteris paribus* the boundaries of the firm are drawn by the extent to which the cost of detection is smaller or equal than the residual claim the monitor is entitled to.

2.5.2 Monitoring Costs

Horizontal monitoring costs are the administrative and managerial costs of ensuring that quality is adequate, that technical specifications are met and that production is on time: accomplished through matching productivities to inputs[18] and so punishing and rewarding accordingly (i.e. providing the right incentives). Vertical monitoring costs on the other hand are the administrative and managerial costs associated with coordinating the different stages of production and distribution whilst ensuring that quality is adequate, that technical specifications are met and that production is on time. Accordingly, the higher these costs the less likely are firms to integrate.

Using an almost identical variable to Anderson and Schmittlein's (1984) uncertainty variable (section 2.2), Wernerfelt (1997) used dis/agreement responses on: "it is hard for us to evaluate the performance of the sales force" as a monitoring cost measure. This question is much more appropriate to test monitoring costs as opposed to

18 And so singling out each worker's contribution to output.

uncertainty. As opposed to Anderson and Schmittlein's (1984) results monitoring costs were insignificant and took the wrong sign.

2.6 Vertical Forclosures and Small Numbers Bargaining

From this point of view, the incentive to vertically integrate is influenced by market structure. If there is only a small number of input suppliers (maybe because of economies of scale or government policy) each with market power, input buyers will fear potential or actual exploitation. In order to avoid dependence on monopoly suppliers, downstream firms may integrate backwards (e.g. Hart and Tirole (1990); Ordover *et al.* (1990); Fontenay and Gans (2004), Williamson (1975, 1986) and Alchian *et al.* (1978)).

Most empirical work in this area has focused on efficiency gains and losses associated with vertical foreclosures (e.g. Baake *et al.* (2004); Aydemir and Buehler (2002)) as opposed to testing whether market structure induces integration. However, Lieberman (1991) used a market concentration measure per product that is the reciprocal of the number of upstream suppliers in the chemical industry at the end of a certain financial year. Similar measures were used by McDonald (1985), Levy (1985), Martin (1986), Walker and Weber (1987) and Caves and Bradburd (1988). All these studies obtained evidence in support of the aforementioned hypothesis. In contrast, Lieberman's (1991) concentration measure was insignificant in three quarters of his specifications. Accordingly, he concludes that there is no strong support for the hypothesis predicting that firms will integrate backwards when a limited number of suppliers characterize the upstream market.

2.7 Concluding Note

This chapter has reviewed the various theories of vertical integration and the variables required to test these theories. Some theories, which appear to have limited applicability to the Egyptian garment sector, are not discussed. Each theory focuses on a different aspect that may explain vertical integration. These aspects fall under the following headings: relationship specific investment (asset specificity), risk aversion, agency issues, adjustment costs and upstream market concentration. All but the desire to avoid risk and agency issues are meant to increase the likelihood for vertical integration. The empirical review concludes - as have other reviews - that, whilst transaction cost theory on vertical integration, in particular relationship specific investment, has gained vast empirical support, there is limited evidence in support of other theories simply because they have rarely been tested.

Chapter 3

The Egyptian Garment Industry: Motivations and Constraints for

Vertical Integration

Chapter 2 presented various theories as to why firms may seek to vertically integrate. For the large part these theories suggest that the presence of transaction costs will encourage firms to vertically integrate, though some of the theories also suggest circumstances under which integration is less likely, e.g. variability in downstream demand. It might be expected that in a developing country context the transactions costs of dealing with other firms are likely to be high and contract enforceability low. Thus, it seems plausible that firms are very likely to become vertically integrated. But a preliminary review of the garment sector in Egypt suggests that vertical integration is the exception rather than the norm. The survey data reported below find that only 24 percent of firms are integrated into fabric production. Chapter 1 showed that the MENA region is characterised by very small firm size, far lower than that in other regions at comparable levels of development, suggesting a lack of integration, be it horizontal, vertical or both. The garment sector in particular may be expected to be integrated since the whole chain of production - from cotton production to garment sales to the large protected domestic market - are to be found within the country.

This chapter uses data from case study material collected during a preliminary field visit for two purposes: (1) a preliminary assessment to determine the applicability of the various vertical integration theories in the Egyptian setting, including any adaptations which seem necessary, and (2) to identify additional institutional factors relevant to the integration decision. These different factors are organized into those which provide a

motivation to integrate, and those which act as a constraint on the ability to do so. It is shown that transaction costs and related theories do indeed induce firms to desire vertical integration, but that constraints exist which limit the possibility of their doing so. The strength of both the motivations toward vertical integration and the constraints on it are different depending on a firm's size and market segment.

The next chapter (Chapter 4) links Chapters 2 and 3, re-emphasizing the relevant theories in the light of the Egyptian context as illustrated in this chapter (section 3.1). Other factors that emerged from the case studies were stressed. Based on this discussion, the chapter will identify the main variables (not their measures) that to be tested later in the empirical chapter (Chapter 6).

This chapter begins by providing three pieces of context: an overview of the garment 'value chain' (section 3.1.1), a brief outline of the garment sector in Egypt (section 3.1.2), and finally an introduction to the firm data used in this paper (section 3.1.3). Section 3.2 shows that the major motivations for vertical integration are three-fold: (1) quality, (2) timeliness, and (3) non-payment. Whilst these factors are concerns for all firms (though the first two particularly so for those in the high quality and export sectors) there are countervailing tendencies from demand variability, monitoring costs and institutional constraints which limit the extent of vertical integration. These constraints, which are discussed in section 3.3, operate most forcibly on small firms who thus become trapped in a vicious circle unable to expand their operations. Section 3.4 concludes.

3.1 Background on the Garment Industry

3.1.1 The Garment Industry Value Chain

The value chain shows how the design, production and marketing of a product involve a chain of value adding activities required to bring the product from its conception to the final consumer. Vertical integration takes places when different stages are carried out by a single firm, even though they may be carried out in different countries (a global commodity chain, see McCormick, D. and H. Schmitz, 2002). Hence, the value chain shows the possibilities for vertical integration in a particular industry.

The garment industry commodity chain extends from producing raw materials (cotton or synthetic fibers), followed by textile production and then the design and product development stage. Next come cutting, assembly, laundering and finishing of the garments. Finally is the distribution, marketing, wholesale and retailing stage (Appelbaum and Gereffi (1994); Corbman and Potter, (1967)). At every stage, services such as transport or finance may be needed to complement the process. Figure 3.1 depicts the garment value/commodity chain. The ordering of stages may be different if, for instance, design has implications for the nature of the inputs, so design precedes input production. Whatever the perceived order, there are four main stages of garment manufacture, namely: design, inputs, production and distribution.

3.1.2 The Egyptian Setting

Egypt's Development Strategy (1952-2002): Under the regime of Gamal Abdel Nasser (1952-1971) Egypt pursued a public-sector-led and an inward-looking development strategy based on centralized ownership and a command economy. In 1973, under the

presidency of Anwar El-Sadat the "Open Door Policy" or "The Infitah Policy" as it was called in Arabic was initiated, it brought about a partial liberalization of the Egyptian economy. In spite of this, the development strategy, continued to be based on import substitution financed by large foreign assistance and borrowing, oil-related exports, worker remittances, tourism, Suez Canal revenue and direct foreign investment (State Council Report, 1986). Reform was deepened with the adoption of a comprehensive economic reform and structural adjustment program in the spring of 1990 (ERSAP). This program aimed at achieving macroeconomic stability while starting a comprehensive structural reform, promoting market orientation through decentralizing and privatizing the economy. The newly liberalized regime encompasses full decontrol of the foreign exchange market, flexible and market determined exchange rate, a reduction in tariff rates and the elimination of all non-tariff barriers.

Figure 3.1: Garment Commodity and Value (Adding) Chain

```
                ┌──────────────────────────┐
                │ Raw materials (e.g. cotton,│
                │ petrochemicals…etc.)     │
                └──────────────────────────┘
                            │
                            ▼
                ┌──────────────────────────┐
                │ Natural (e.g. cotton, jute, wool,│
                │ silk…etc.) or man-made  fibers  │        Inputs
                │ (Rayon, Nylon, Acrylic…etc.).   │
                └──────────────────────────┘
                            │
                            ▼
                     ┌──────────┐
                     │ Textiles │
                     └──────────┘
                            │
                            ▼
                ┌──────────────────────┐
                │ Design and Product    │          Design
                │ Development           │
                └──────────────────────┘
                            │
                            ▼
                     ┌──────────┐
                     │ Cutting  │
                     └──────────┘
                            │
                            ▼
                    ┌──────────┐
                    │ Assembly │
                    └──────────┘
                            │                      Production
                            ▼
                    ┌──────────────┐
                    │ Laundry and  │
                    │ Finishing    │
                    └──────────────┘
                            │
                            ▼
                    ┌──────────────┐
                    │ Distribution │
                    └──────────────┘
                            │
                            ▼
                    ┌──────────────┐
                    │ Marketing    │            Distribution
                    └──────────────┘
                            │
                            ▼
                ┌──────────────────────┐
                │ Wholesale and Retail  │
                └──────────────────────┘
```

28
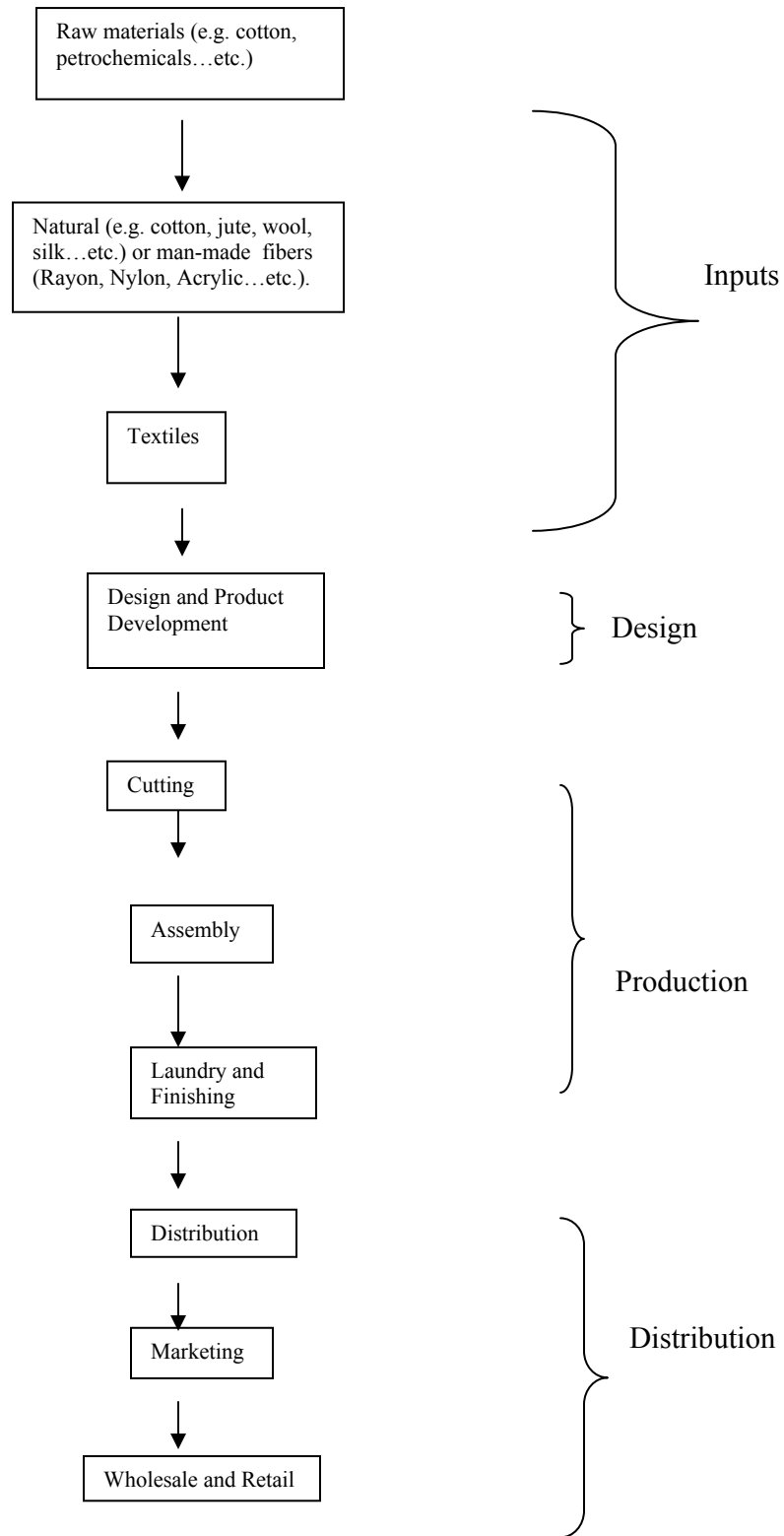
<u>Liberalization of Trade under the GATT:</u> Historically the pattern of textile trade has been influenced by the multilateral fiber agreement (MFA), designed to protect developed country textile producers. The MFA was a basic departure from the liberalization principles of GATT, particularly the principle of non-discrimination. Under MFA textile exports from developing countries were subject to country specific quotas. Attempts to remove these restrictions resulted in the agreement on textiles and clothing (ATC) in 1994, which is the basis for the eventual incorporation and integration of textiles and clothing into a liberalized trade regime. Under (ATC) export quotas are being phased out, to become subject to GATT's non-discriminatory rules. However WTO member countries - including Egypt - have retained the right to use transitional safeguards[19] which allow the imposition of temporary measures to protect local industry.[20]

The ATC should in principle affect Egypt as both importer and exporter. What is relevant to the current study though is the former. Imported inputs have either been prohibited altogether, or made very expensive by tariffs. Hence most producers have been facing the choice to make or buy from the domestic market. Buying from the foreign market (i.e. importing inputs) is not an option. However, the exception has been exporters who enjoy duty drawback (see below) and so in principle can import at world market price. Hence if there are concerns about the quality and price of domestic inputs, exporters who have access to or more precisely use international markets for inputs, may

19 Safeguards are temporary protection (generally quantitative restrictions) given to domestic industries in order to allow them the time required to adjust to damaging import surges. Most safeguard measures are regulated by Article XIX of GATT 1994 (as interpreted by the WTO Agreement on Safeguards), but some agreements have their own rules, for example textiles and clothing, and agriculture.

20 The period allowing for temporary protection expired at the start of this year (2005).

be less likely to be vertically integrated. The new customs regime changes the nature of the make or buy decision as foreign inputs, other than fabric, are freely available. Now the ATC integration process is completed in 2005, fabrics will also be more freely imported, which will weaken the motivation toward integration for quality reasons.

The Egyptian Textile and Garment Industry (1930-2002): From the 1930s onwards the textile and garment industry in Egypt was protected. Imports of cotton yarn, fabrics and garments were subject to outright bans and/or prohibitive tariffs. During the 1930s-40s the production of cotton textiles was growing but only in the following two decades did the textile industry experience significant growth in production and exports. Exports, comprising of cotton yarn and fabrics, were mainly directed to the Eastern European Block through bilateral barter agreements (Bulbul and Neguib, 2000; Sakr and Abdel-Latif, 2000; SEAM, 1999). Growth of the industry was maintained throughout the seventies as part of the public sector.

Up to the end of the seventies quality and fashion were in general alien concepts in the Egyptian garment industry. The dominance of state-ownership limited the extent to which producers were responsive to consumer preferences. But both export markets and the domestic market made limited demands anyway. The former because it was to centrally planned economies, and the latter because of limited access to foreign products.

The nature of the industry began to change with the initial reversal of the state-led development strategy which began with the open door policy in the early seventies, which resulted in the emergence of joint-ventures with modern technologies and advanced management and marketing techniques (Sakr and Abel-Latif, 2000). Further

changes were required to adjust to the collapse of the country's traditional export markets. Exports of textiles started to fall with the decline of the Eastern European Block in the late seventies. After the collapse of the Soviet Union, exports of textiles and textile articles decreased from nearly 50 per cent of Egypt's total export earnings during the 50s-70s to 33 per cent in 1991-92 (Bulbul and Neguib, 2000).

To respond to the changing climate the government took steps in the 1990s to encourage export production for other markets (*ibid*.). In order to encourage exports the government offered two types of incentives. The first is the "drawback" and "temporary relief" systems, which allow garment exporters to be reimbursed for incurred tariffs and relief of tariff payments respectively as long as the imports are used as inputs to their garment exports. The second incentive was associated with the adoption of the Economic Reform and Structural Adjustment Program (ERSAP) in 1991. Current account transactions were liberalized and so foreign exchange could be traded freely. Moreover, the Egyptian pound was devalued by about 20-25 per cent and pegged to the US dollar at £E 3.4 (El-Haddad, 1997). Consequently, garment production and exports grew substantially during the late nineties.

Despite the adoption of the ERSAP the textile industry remained highly protected - until this year. The pace of privatization is very slow: public, vertically integrated, large size firms dominate the basic group, 3211[21] (Spinning, weaving and finishing) (Sakr and Abel-Latif, 2000). The public sector accounts for 100% of spinning (mainly of cotton

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21 According to the International Standard Industrial Classification (ISIC), the textile and garment industry (ISIC 321-322) comprises six major groups: (1) Spinning, weaving and finishing of textiles group (ISIC 3211), (2) Manufacturing of made-up textile goods, (3) except wearing apparel (3212), (4) Knitting articles (ISIC 3213), (5) Production of carpets and rugs (ISIC 3214), (6) Manufacturing of specialized products (3215), and (7) Textiles articles not elsewhere classified (3219).

yarn), 70% of weaving but only 40% of knitted output (SEAM, 1999, CAPMAS 2001/02). However, the private sector dominates garment production, which is the focus of this study. I am concerned with backward integration by these firms into fabric production. The decision by these state-owned fabric producers to forward integrate into garment production may result from different motivations than those influencing the privately-owned garment firms. Hence, forward integration from fabrics to garments is excluded from this study.

3.1.3 Different Market Segments: Case Study Examples

The garment industry may be divided in two ways: (1) high quality (fashion) segment and medium quality (middle class) versus production for mass consumption, and (2) export versus domestic market. Combining these two dimensions means that a firm can be located in one (or possibly more than one) of four cells (Table 3.1). The first two upper cells in the export column are empty by definition. Export production is either high or very high quality (fashion).

Table 3.1 Market segments in the Egyptian garment industry

	Domestic market	Export
Low quality (mass market)	Waleed Abdo Walaa Ghueba*	No firms operate in these cells
Medium quality (middle class market)	Walaa Ghueba*	
High quality (fashion market)	Ahmed Ali**	Mohamed Abdel Fatah Sameh Nasr** Walaa Ghueba*
Note: * partially vertically integrated; ** fully vertically integrated.		

Table 3.1 also classifies the five firms discussed in this paper by their market segment, and whether or not they are vertically integrated. The firms were chosen so as to

cover all market segments and differing degrees of vertical integration. Only private sector firms are included. Data were collected from these firms through semi-structured interviews conducted in November 2002.

Waleed Abdo serves the domestic market only and is not integrated into fabric production, dying, printing, finishing, wholesaling or retailing but has two failed vertical integration attempts. Mohamed Abdel Fatah is an exporter who is not vertically integrated but imports all his fabric requirements. Sameh Nasr is a very large scale garment exporter and is vertically integrated in virtually all stages of production. Ahmed Ali produces mainly high fashion and quality clothes for the domestic market and is vertically integrated into nearly all production stages as well. He started exporting very recently (2001). Finally, Walaa Ghueba produces mainly for the domestic market but also exports some of her production. She is vertically integrated into knitting and weaving but at a relatively low scale. Table 3.2 depicts the background of each firm in terms of nature of products, markets, age and size.

During the survey, for every possible integration stage the general manager (who is also an owner in all five cases) was asked about his firm's integration status. Whether integrated or not, s/he is then asked about the reasons that led to this status, whether this is the currently desired status and why (or why not), what is the desired status and why, whether there were any unforeseen benefits or drawbacks to the current status, whether there have been any unsuccessful attempts in the past to integrate, and finally the difficulties the company faced in the process of integrating. A mixture of open and closed ended questions were also asked on relevant issues as they relate to vertical integration such as dispute resolution, supplier switching costs, contracts and institutions.

Table 3.2 Overview of Surveyed Firms

	Mohamed Abdel Fatah (Tanta-Italy Company)	Waleed Abdo (El-Haiat Factory)	Sameh Nasr (Clothing Industries Company)	Ahmed Ali (AAS)	Walaa Ghueba (El-Suez Factory for ready made garments and weaving)
Products	Cotton wear (shirts, pants for women, men and children)	Cotton wear (women blouses, men t-shirts and training suits for children)	Cotton & mixed knitted garments. (large diversified production range for women, men and children. E.g. T-shirts, polo shirts, tops, pants and dresses).	Cotton, wool & mixed knitted and woven garments. For men: suit, pants, shirt, sweatshirt, sweater, pajama, polo shirt, shorts; for women: dress, skirt, blouse, jacket, wedding dress, pullover.	Cotton & mixed woven garments. Form men: shirt, pants. Women: pants (mainly jeans). Children: pants.
Market Orientation	* Export Market. Leftovers sold domestically. * serves middle class foreign market.	*Domestic Market: Cairo & neighboring governorates *targets female university students who buy two t-shirts or blouses every month. *Cost of those blouses range between £E20-25 (i.e. serves lower middle class people).	* Exports 100% of its production to US markets. Leftovers sold domestically. *Produces for brands such as Tommy Hilfiger, Liz Claiborne, Calvin Klein products. *Price range btw $20-60 (i.e. serves upper middle class foreign market).	*Domestic Market: several large governorates in Egypt. * Started exporting only in 2001 when domestic market slowed down to utilize his high capacity. * serves middle high income class.	* Domestic & Foreign Market. *serves middle middle domestic class and low middle class foreign market.
Age, Size/ Productive Capacity.	* 14 years old. * 1500.000 piece per year.	*7 years old. *30 sewing machines. * 52 workers. *600-700 piece a day. *£E 150.000 current value. * Initial value £E40.000.	* A family business more than 100 years old. * With new name and modernization status 25 years old. *600 sewing machines. * 1500 workers. *10.000 piece a day. *Production value: $12.000000 a year.	* A 42 year old family business. * Started out as a dye & printing house. * 500 sewing machines. *50.000 piece a month.	* A 25 year old family business. * 200 sewing machines. * 9.450 piece a month. * Initial value £E25.000.

3.2 Motivations for Vertical Integration

Of the five textile firms interviewed, two were vertically integrated and one partially so. Clearly, then, there are reasons to become vertically integrated in Egypt. The interviews revealed three main reasons: (1) quality, (2) timely delivery, and (3) non-payment. Each of these factors is now discussed in turn.

3.2.1 Quality Concerns

The protective, publicly-dominated environment resulted in poor quality yarns and fabrics and limited flexibility in the type of products firms produce. For the mass domestic market standardized low quality output was acceptable. But for both the export market and the local high quality market, meeting demand from middle and upper class consumers, low quality fabric inputs can cause problems. Exporters have the option of importing their fabrics. But those serving the domestic market are prohibited from this choice – they have to either buy locally or produce the fabric themselves.

Of the three firms in the sample who serve the domestic market two are vertically integrated. Ahmed Ali, who serves the high quality, high fashion segment of the domestic market is virtually vertically integrated in all stages of production, except for spinning. Walaa Ghueba who serves a lower segment of the market (see table 3.2) is partially vertically integrated into knitting and weaving, producing about one third of her woven production requirements in-house using old style and non-modernized machines. Waleed Abdo, who serves the lower middle class, is specialized in garment assembly. While Waleed Abdo denied any benefits to him vertically integrating at any stage of production, both Ahmed Ali and Walaa Ghueba stressed the ability to control product quality when

they were asked about the reason for and benefits of vertical integration. In addition, Ahmed Ali mentioned the ability to produce unique designs that distinguish his name in the market, which can be seen as another aspect of controlling the quality of inputs. In the past the limited flexibility of public sector companies have meant that production managers have had to fit their designs to what was available, rather than making their designs and then requesting what they needed (El-Khahky, 1993).

As for producers serving the high quality market segment, input quality is a concern for exporters. All exporters report stringent quality control systems they are subject to by foreign importers. Garment exporters receive the so called Quality Control Schedules (QL) that specifies the number of acceptable defects per piece (e.g. accept 5 mistakes per 300 pieces) and major and minor defects (e.g. jump stitch, shade difference, mistake in the ticket, oil stain). However, some retailers treat all defects as major. Mohamed Abdel Fatah mentions that after the garment exporter has produced the order the importer performs approximately three random checks for every 100 carton. If the three checks failed the specified quality standards, there is no chance for the order to be accepted unless severe price reductions are imposed.   Given these considerations exporters are unlikely to rely on domestic fabric producers.

Of the three firms who serve the export market in the sample two are vertically integrated and one imports 100 per cent of his main input requirements (fabrics and most accessories). While Sameh Nasr is virtually vertically integrated in all stages of production (apart from yarn production (i.e. spinning) and retailing), Walaa Ghueba, who also serves the domestic market, does not rely on her factory's own production of woven and knitted fabrics for her exported garments. For export production she imports those

inputs as her machines are not up to date. Both Sameh Nasr and Walaa Ghueba emphasize quality assurance as one of the main benefits of being vertically integrated. They, along with Ahmed Ali, also added as a further reason for backward integration the need for timely delivery of inputs (see next section).

Quality concerns are a different issue from idiosyncratic products in both TCT and the PRT (sections 2.1 and 2.2). A product may be quite standard (such as a T-shirt). But if the desired output is of very high quality then the door is opened to quality concerns which are entirely unrelated to the hold up problem discussed in sections 2.1 and 2.2.

3.2.2 Timeliness

Every fashion season Ahmed Ali Group (AAS & Samia Ali) designs its own women and menswear collection at a specific time and so 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, and to get products to the market in time for the right fashion season. Yet part of the problem with suppliers has been late delivery.

Hence, firms that serve high quality, high fashion segments of the market are likely to be subject to "hold up" by their input suppliers (sections 2.1 and 2.2).[22] This source of holdup corresponds to Masten et al's (1991) temporal specificities (see also Woodruff, 2002; Pirrong, 1993; and Hubbard, 1999). Situations that give rise to these

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22 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 bribes to ensure it.

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).[23] Therefore, vertical integration given Egypt's garment industry environment becomes an attractive solution to potential hold up problems related to temporal specificities.

Timeliness is also a pressing concern for exporters. Late delivery fines are sometimes specified per day in the contract between the garment exporter and the importer. According to Sameh Nasr, in the case of late delivery some contracts transfer transportation costs from the importer to the exporter. This cost can represent at least 10 per cent of the total production cost of the exported merchandise.

3.2.3 Payment: Dispute Resolution and the Legal System

Institutional factors, especially in developing countries, may have an effect on integration. Some may induce vertical integration and some may impede it. When asked about the relative power between upstream and downstream producers, Waleed Abdo emphasized that downstream buyers are more powerful for two reasons. First, they possess the demand for the upstream market. Second, he asserts "the upstream supplier is the one who is left with the "papers" (e.g. check, bill of exchange or draft)". He explained if a downstream buyer has fraudulent intentions not to pay the bill he can simply say to the supplier: "you want your money, then go deal with the courts for 3-4 years until you get your "discounted" money". Meanwhile the downstream buyer will

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23 While it may be that the cause of public firms' late deliveries is mere inefficiency, delaying deliveries with the intention of extracting more money, favors or bribes cannot be ruled out.

have his machines up and running and so will be making money out of the money he owes the supplier. He stresses: "whoever has the papers is weakest". He believes that people in Egypt don't respect "checks": "a check is ought to be viewed as money, it ought to be respected, but unfortunately in this country it isn't. It is hopeless, to the extent that if someone owes you £E50.000, you are willing to request they just give you £E30.000 back and you would be willing to drop the case. This is so because in the meantime you can take the £E30.000 and in two years make £E50.000 out of them."

The inability to rely on the legal system to resolve disputes is the sole direct reason behind Ahmed Ali's forward integration into retailing. Ahmed Ali owns 19 retail stores across the country and one in Germany. He opened the first one in 1989. Before vertically integrating, he had 300 clients (i.e. wholesalers and retailers) now he only distributes through his stores. Even though this reduced his overall distribution, he believes that it was necessary for him to make that step at the time. He said he had endless problems with his clients over non-payments and delayed payments: "the reason for payment problems varied from real distribution and financial problems of my clients to fraud and theft. From 1983-1989 my money was all over the place. I turned to the legal system. One case took 5 years. Finally, the verdict was that the defendant could not be located. In any case, it is either the defendant pays or he is put in jail. I do not benefit if he is in jail, all I want is my money back. I do not trust the litigation system to do this for me. Even if I get my money back, the value is greatly discounted. So owning my own stores seemed like the only solution to me."

Waleed Abdo too had a case with a retailer who owed him merchandise in the amount of £E36.000. He received eight checks from the retailer but was then unable to

cash them. He suggested another way out of non-payment problems that is to use a private lawyer. The lawyer receives a percentage of the check amount but gets his client the money back. Nevertheless, he states: "I don't trust the legal system, but I trust God". At the same time he pointed out that if the plaintiff doesn't have the money to pay a private lawyer then he can't recover his money. In fact Waleed Abdo attempted forward integration into retailing but he lost £E16.000 and so shut down the store.

In brief, when the legal system is dysfunctional, or trust in it has diminished, vertical integration by internalizing transactions under a unified governance structure reduces transactions cost otherwise incurred when dealing with external economic entities. Transaction cost theory has emphasized incomplete contracts resulting from bounded rationality (section 2.1) as a driving force to vertical integration. It has generally also stressed difficulties in enforcing contracts as a transaction cost item that induces vertical integration at the extreme but hybrid forms of contracting such as long-term contracts, franchises or partial ownership at intermediate levels (Williamson, 1991b). However, this has always been linked to some sort of asset specificity (section 2.1) and no empirical work has ever considered simple enforcement issues such as payment-which are likely to be predominant in developing countries- as a determinant to vertical integration. Chapter 7 will present which dispute resolution mechanisms are dominant in disputes over non-payment as well as over quality within the garment industry in Egypt.

3.2.4 Summary on Motivations for Vertical Integration

Three factors – quality, timeliness and payment problems – all encourage garment firms in Egypt to become vertically integrated. However, the first two of these apply particularly to exporters and those firms serving the high quality domestic market.

Garment exporters have severe quality and temporal specificity concerns, which mostly rules out the use of domestic upstream markets. Because they enjoy duty drawback and so can import at world market prices, garment exporters have two options round their quality and temporal specificity concerns: either to import their input supplies or to alternatively vertically integrate. Therefore, the three exporters are either importing their input supplies, or are vertically integrated but none use the domestic upstream market. Domestic producers cannot import fabrics. But for them concerns regarding quality and on time delivery are larger the more distinctive and sophisticated the segment of the market they represent. Consequently, it is more likely for firms serving that segment to be vertically integrated.

The strength of these forces for vertical integration is shown by the apparent inefficiency – in terms of idle capacity – of the integrated production. The two huge vertically integrated companies in the sample suffer from idle capacity, technical difficulties and specialization loss problems. Sameh Nasr says: "I have 70 per cent idle capacity in both my knitting unit and dye house. Given the demand level it is not economical to have them. Had there been a supporting industry that supplies me with the desired quality I'd have rather bought my requirements from the market". He adds: "I face enormous problems employing and training the right personnel and technicians to operate my sophisticated machinery. I'd rather be specialized in what I know best and buy my production requirements from other efficient and specialized markets." Ahmed Ali confirms the same problems and adds that if he buys his supplies from the market he

always has the option to reject the product. In contrast he states that: "if my own product is defected, I will have to live with it".[24]

The absence of an efficient supporting upstream industry is caused by government intervention in trade and custom policy throughout the history of the textiles industry in Egypt and it is this which has provided the impetus toward vertical integration despite the costs of being integrated. But not all firms become integrated. This is partly because the strength of the motivation varies by market segment. But it is also because there are constraints to integration.

3.3 Constraints on Vertical Integration

The previous section showed that transactions costs induce firms to desire vertical integration. However, several constraints exist that limit the ability of firms of doing so. Of the two firms of the sample that are not vertically integrated one had two failing vertical integration attempts. Of the three firms that are vertically integrated, the firm that is partially integrated desires higher and more advanced levels of integration but cannot afford to do so. The interviews revealed three main obstacles to integration: (1) monitoring costs, (2) size and demand uncertainty, and (3) finance. What follows is a discussion of each of these factors in turn. Institutional substitutes are discussed with finance as their presence is essential if this constraint is to be overcome.

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24 In fact, recent research shows that the world's textile and garment industry have become progressively more disintegrated (e.g. Loo, 2002). Similarly, global value chains-which are common in the textiles and garment industry- are based on the idea that design of, inputs for, product and marketing of a product involve a chain of activities divided among enterprises located in different places and is often governed by "networks" (McCormick and Schmitz, 2002). This gives impression that while the world is moving away from vertical integration in its narrow textbook given definition of unified ownership and same country location, the textile industry in Egypt may be moving towards it.

3.3.1 Monitoring Costs

Monitoring costs represent an impediment to vertical integration. When asked about the reason for non-integration Waleed Abdo stressed their importance as did Mohamed Abdel Fatah. Waleed Abdo emphasized that he has garment production specific know-how and skill and that he is not so well informed on fabric production operations nor on dying techniques. The same is true for his workers. Given his personal skills monitoring costs become too high for him to bear.

In fact, he did have an integration experience. He tried to produce jeans at some point in the past. And so, he purchased specialized machines but failed. He claims that his workers were not up for it and that he was subject to deceit from them; and that for him to get specialized workers would have cost him a lot of money. Two factors inflated monitoring costs in his case. The first is the expansion in the size of the firm due to integration. In his own words: "I have a hard time monitoring the 50 workers I have, small size is easier to monitor and manage". The second is the higher monitoring cost due to moral hazard. Because he does not possess fabric production specific knowledge, he is unable to distinguish whether his workers deceive him or whether they too are not well informed about fabric production.[25]

A simple definition of horizontal (vertical) monitoring costs would be: the administrative and managerial costs of (associated with coordinating the different stages of production) and distribution whilst) ensuring that quality is adequate, that technical

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25 In a principal-agent framework an agent's private action affects the principal's payoff probability distribution through its effect on output. Hence, the principal's basic problem is the difficulty to single out the agent's contribution from that of the state of the nature's contribution to any specific realization of output. And so in this context, the workers being ill informed as opposed to intentionally not supplying the proper amount of effort parallels the "unknown" contribution of the state of the nature.

specifications are met and that production is on time. And so, whilst the above described the case for those who are not integrated those who are integrated achieve quality control through an extensive quality control system. For example, Sameh Nasr's company is ISO 9002 certified and a precise quality assurance system is applied throughout all stages of the production process. These systems are quality control, quality assurance, total quality management, statistical process control (SPC), cost of quality, accepted quality level (AQL), production tracking system, organizational charts, filling records, and calibration of measuring and weighing. But given how costly these processes are, finance seems to be one of the most important determinants to which I will soon turn.

That monitoring costs are 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 and Holmstrom, 1999). Those costs are costs associated with attempts to single out each worker's effort and to accurately measure output respectively.

3.3.2 Size and Demand Uncertainty

The higher the fixed investment cost involved in any vertical integration stage of production the more important is the scale of operations. The larger the scale of operations the more cost effective is vertical integration[26]. This is a standard economies of scale argument associated with a firm's expansion whether horizontal or vertical.

Indeed, when one compares the size of garment producers for the domestic market, one finds that while Waleed Abdo's production capacity is approximately only

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26 Except if have increasing returns to scale.

16,000 pieces per month that of Ahmed Ali, with a production capacity of 50,000 pieces per month, is more than three times as much. The same is true when comparing garment exporters. While Mohamed Abdel Fatah's factory's productive capacity is only 125,000 pieces per month that of Sameh Nasr is 250,000 pieces per month[27] (see table 3.2 for more details on size). The same is true when one compares the size of vertically integrated export firms just before vertically integrating with their non-vertically integrated counterparts and that of vertically integrated garment producers fulfilling the domestic market with their non-vertically integrated counterparts.

It is important to point out that the export market size is far larger than the domestic market. Exporting firms mainly export to the EU and the USA both of which are characterized by their huge market demand compared to the Egyptian market. Since exporting firms in Egypt have the additional option of importing their production supplies, the effective size of operation at which vertical integration would pay off is expected to be higher for export firms than that for firms that mainly serve the domestic market.[28]

In addition to size, demand uncertainty affects the incentive to vertically integrate negatively. Describing why it doesn't make sense for him to integrate, Mohamed Abdel Fatah points out: "There is no point in giving up on specialization especially if demand is at a relatively low scale and is uncertain. If I face demand variability, I would get a

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27 Note that the size here is not adjusted for quality. In the above example, while quality of garment exports is nearly identical that of domestically sold garments is not. Since Ahmed Ali's market segment and prices are far higher than those of Waleed Abdo's, adjusting size for quality differences only enforces the implication of size on vertical integration.

28 Compare production capacity of Mohamed Abdel Fatah, a non-integrated exporter, to Ahmed Ali a highly integrated producer who mainly serves the domestic market.

trickle down effect. If there is low garment demand there will be no garment production and in turn this will reduce my profits. And with low garment demand there will be low fabric production as well which will in turn reduce my profits even further. This is a big risk that I'd rather avoid by importing rather than vertically integrating to ensure quality."

Risk aversion as a barrier to vertical integration is consistent with both Harrigan's (1983) demand variability theory and Hanson's (1995) risk adjusted property rights theory (section 2.3).[29]

3.3.3 Financial Constraints and Credit Market Imperfections

The general managers of the two largest vertically integrated firms list the large investment cost of vertical integration among the major drawbacks to and difficulties of being vertically integrated. Walaa Ghueba expressed her desire to modernize and expand her fabric production machines but said she is impeded by financial constraints: "I can't afford the cost of buying modern machines and so for my domestic market production, I just accept whatever quality the market has to offer."

The firms in the sample illustrate the correlation between financial ability and both the number and type of vertical integration stages of garment production. Financial

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29 The former states that firms are less likely to integrate backwards when they face large fluctuations in downstream demand, as he puts it: "other things constant, vertical strategies undertaken within volatile industry settings should involve lesser degrees of internal transfer, lower ownership stakes, and fewer integrated activities" Harrigan, (1983). Hanson (1995) indicates that integrating backwards as much as it alleviates hold up problems and opportunistic behavior by the input supplier it will create a higher degree of exposure to "natural risk" to the buyer, which is risk arising from variance in the state of the nature. Were the buyer to be facing uncertainty in the production environment (e.g. unstable demand), s/he would want to spread that risk (via asset ownership spreading as opposed to vertically integrating). This is especially so in an environment where risk spreading channels (e.g. equity markets, stock markets, insurance markets) are imperfect or absent, which is the case in nearly all developing countries to which Egypt is no exception.

ability refers to the fact that funds are available or can be made available through credit, for example, when needed. And so market failure of the credit market[30] creates financial constraints. In fact, the two firms with the largest financial ability among the sample's firms are integrated into nearly all stages of garment production operations. In addition they are both integrated into dying, a very large investment. Sameh Nasr points out: "Dying is a very large investment that a small firm cannot bear. A dye house can serve a 100 garment factories." Both Sameh Nasr and Ahmed Ali regard it as the hardest vertical stage of production in terms of cost of investment, personnel training, latest technology acquisition, required chemicals, waste due to dying defects and idle capacity.

While financial ability relates directly to vertical integration, financial constraints on firm size affect vertical integration indirectly. As mentioned earlier the size of the firm (in terms of its scale of operations, production capacity, number of machines and/or number of workers at the time just before it vertically integrated) may have a significant positive effect on vertical integration. Financial constraints simply put are described by a state of lack of own funds combined with no access to credit. Hence, financial constraints may be creating a vicious circle or an inertia locking firms into small size and so negatively affect their ability to vertically integrate. For instance, small firms' lack of sufficient collateral renders credit unaffordable to them which in turn constraints their ability to expand reinforcing yet again their small size and in turn their capability to vertically integrate.

All three vertically integrated firms started out as a family business many years ago extending to more than a century in Sameh Nasr's case. Hence, inherited funds and

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30 Whether formal or informal.

businesses helped them out in their initial establishment. Besides, the three of them come from wealthy family backgrounds. And while the two smallest firms of the sample (Waleed Abdo and Walaa Ghueba) mentioned that they do not borrow from banks the largest two reveled that they do, though stressed that they'd rather not be overexposed.

Additionally, the complicated quality control system Sameh Nasr has in place makes it clear that financial ability helped overcome monitoring problems an impediment to desired levels of vertical integration. It is also likely to make alternative dispute resolution mechanisms (e.g. private lawyers) affordable.

Theories of vertical integration are mainly describing firm choices in a developed country setting and so they do not stress financial obstacles. Equity, stock and insurance markets in Egypt are not well developed, therefore most firms are liquidity constrained unless they are extremely profitable, their owners come from a wealthy background and/or have the appropriate connections to make funds available and reduce the cost of finance. This illuminates the role of institutional substitutes to which I will now turn.

Institutional Substitutes

Since many essential institutions that are present in developed countries are usually missing or malfunctioning in developing ones (Fawzy, 1998), individuals rely upon institutional substitutes to mitigate this deficiency. Social networks, family ties and influential connections (e.g. strong government officials) are all possible proxies for such substitutes. Since not everyone has equal access to these substitutes, financial constraints will fall disproportionately on certain firms than on others as the following reveals.

One the one hand all three vertically integrated firms in the sample bluntly revealed that they bribe government officials (e.g. tax and customs employees) and use

connections to reduce the amount of taxes levied on them and/or to facilitate bureaucratic duty drawback and temporary relief systems procedures. On the other hand, Waleed Abdo the managing director of the smallest non-vertically integrated firm said: "I pay whatever taxes are levied on my business. I do not try to get myself in trouble with the government. This is the government's right anyway". This may be so because he simply does not possess the right connections either to reduce the tax estimates or to back his bribery in case it is exposed.[31]

Several of the interviewees complained about government inspectors and labor officials. The former is meant to ensure that the employer pays social security for his workers and the latter checks on working conditions and under-age workers. They claim that these officials come frequently to collect bribes. If not satisfied they can file a bad report so powerful that it can put small firms out of business. Bulbul and Neguib (2000) confirmed the same complaint by textile firms in the city of Shubra El-Khema, a textile center in Egypt (Bulbul and Neguib, 2000). Firms that have connections may pay fewer bribes whereas smaller firms managers' whose concern of going out of business is larger, who are liquidity constrained and who may not have connections may have to pay (relatively) more.

Earlier it was mentioned that only the two largest firms borrow from banks whilst the rest doesn't. None of the two has mentioned though that they use bank connections that allow them, for instance, to acquire loans with lower than usual collateral or lower

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31 Or is lying as scared to tell the truth. The possibility that he is simply an honest man is not ruled out of course.

than usual interest rates. But one can imagine that this is a possibility. In my interviews I had not asked that directly.

Moreover, all three vertically integrated firms' managers had available inherited funds and businesses that assisted in their firms' initial foundation. They also had a wealthy background to back them up.

Finally, the two largest ones are both members of the 45 "Garment Commodity Council's" non-elected (i.e. appointed by the minister) members. The Council is established by the ministry of trade as a quasi government institution (as issued by a decision of the minister of trade as opposed to being instituted by the ministry) to become a link between the industry and the ministry of trade. Under the council's umbrella garment producers discuss their problems in order to introduce them as recommendations to the minister of trade. Thus, the recommendations may reflect personal interests more than the interest of the approximately 1500 garment firms of Egypt.

In brief, financial inability is a hurdle to vertical integration both directly and indirectly. Whereas firms who have started out large; and/or have family and social networks financial backup; and/or utilize connections and bribes are more likely to face less severe financial constraints and so are more likely to break the vicious circle of small size the other firms cannot. This is not to diminish the role of internal finance (i.e. profits) in achieving the same result. But once internal finance is controlled for institutional substitutes are likely to have a large role in overcoming financial constraints and in turn in a firm's vertical integration status. Finally, it is important to note that in the same financial obstacles are ignored in vertical integration theory, institutional substitutes are as well.

3.4 Conclusion

This paper utilizes five different case studies to explore the motivations for vertical integration in the garment industry in Egypt. It contrasts them with hypotheses in the existing literature derived from analysis of firms operating in developed countries.

Three factors – quality, timeliness and payment problems – all encourage garment firms in Egypt to become vertically integrated. As opposed to garment exporters domestic producers cannot import fabrics either because of outright bans or prohibitive tariffs. Thus, for them concerns regarding quality and on time delivery are larger the more distinctive and sophisticated the segment of the market they represent. Consequently, it is more likely that firms serving the higher end of the domestic market will be vertically integrated.

Quality and on time delivery concerns for high quality and fashion producers are exacerbated in Egypt due to the absence of an efficient supporting upstream industry. This lack is created by the government's trade and custom intervention throughout the history of the textiles industry in Egypt. It is precisely this that drives the desire toward vertical integration even more so than in other countries at similar levels of development and contract enforceability. The strength of these forces for vertical integration is shown by the apparent inefficiency – in terms of idle capacity – of the integrated production.

But not all firms become integrated. This is partly because the strength of the motivation varies by market segment. But also because there are countervailing tendencies from risk aversion (e.g. demand variability and uncertainty), moderate production capacities, monitoring costs and financial constraints which limit the extent of vertical integration. These constraints operate most forcibly on small firms lacking of

(proxies for) institutional substitutes such as family and social networks. Thus, they become locked in a vicious circle unable to expand their operations.

Unlike theories of vertical integration describing firms' choices in a developed country setting, this chapter attempts to illuminate the role of financial obstacles and institutional substitutes. Equity, stock and insurance markets in Egypt-as in other developing countries- are not well developed, therefore most firms are liquidity constrained unless they have access to institutional substitutes which enable them to break out the vicious circle of small size. These institutional factors are thus an important reason for the lack of integration.

Chapter 4

Determinants of Vertical Integration: Theory in the Egyptian Context

As discussed in Chapter 2, theory suggests a range of explanations for vertical integration, to be tested in Chapter 6. However, since the institutional context in developing countries is different to that in developed ones, additional factors may encourage or discourage vertical integration. Therefore, drawing on the discussion of the case studies in Chapter 3, this chapter identifies institutional factors relevant to vertical integration in the Egyptian context. I also contextualize the theories of Chapter 2 to the Egyptian garment sector. Acting as a brief summary and link to Chapters 2 and 3, this chapter first considers those factors which encourage firms to integrate, and then those which act as a constraint upon the ability to do so. Hence, it will highlight all variables that will be tested in the empirical chapter (Chapter 6). It is important to stress that this chapter highlights the variables but not their measurement. Measurement will be dealt with later in section 6.2.

4.1 Motivations for Vertical Integration

Both standard theoretical, and context-specific, factors may provide the motivation for Egyptian garment firms to integrate backwards into fabrics production. These factors are (1) quality assurance; and (2) lock in and potential hold up.

4.1.1 Quality Assurance

As discussed in Chapter 3, the textile and garment industry in Egypt has been protected by trade barriers since the 1930s. There are two implications of this policy for my analysis. First, the mass domestic garment market makes limited demands, i.e. neither

fashion nor quality are that important. Second, an inefficient garment and upstream (textile) industry relative to that of a competitive market has been created for that segment of the market. However, there are exceptions to the limited demand. The export market is more demanding in terms of both quality and sensitivity to changing fashion. This was less so for Egypt's traditional markets in Eastern Europe, but has become a factor since firms began exporting to western markets. The same is true for the demand originating from the higher end of the domestic market where consumers are directly exposed to foreign products via travel, or indirectly via exposure to western media.

Thus, given Egyptian market conditions, quality is not a critical issue except for (1) exporting firms who are subject to importers' stringent quality control systems, and (2) firms serving the high-end of the domestic market. Consequently, producers for these two market segments may opt to integrate backwards into fabric production to ensure the desired input quality, which may not be available domestically.

4.1.2 Lock In and Potential Hold Up

Transaction Cost Theory (TCT) and Beyond

As discussed in sections 2.1 and 3.2.2, TCT has emphasized "lock in" and the associated "hold up" threat as the main determinant for vertical integration (e.g. Williamson: 1979, 1985). "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 (e.g. demanding a higher price than originally agreed on in the contract). In the context of backward integration, the latter is relevant. Once there is lock in there is potential for hold up; one way for a

firm to free itself from the threat of hold up is to vertically integrate backwards into input production.

To the extent that the garment firm considers the quality level of its repeated fabric suppliers adequate, Egyptian garment producers are subject to "lock in" and potential "hold up" by their fabric suppliers via three channels identified in Chapter 3: (1) search and switch costs, (2) temporal specificity, and (3) social and moral costs.

The first is search and switch costs. Search and switch costs render it difficult to change repeated suppliers simply because of the existence of transaction specific know-how and skills.[32] The fact that skill transfer is difficult means that it will be costly for the garment producer to search for and switch to alternative suppliers, thus creating lock in and potential hold up. Hence, higher search and switch costs increase the likelihood for backward integration into fabric production.[33]

The second channel is temporal specificity (section 3.2.2). Two types of firms are subject to this form of hold up by their fabric suppliers. The first are firms that serve the high end of the domestic market, whose production is strictly geared to the beginning of the season. The second are garment exporters, for whom timeliness is vital. Late delivery fines are sometimes specified per day in contracts between garment exporters and importers, or alternatively transport is transferred to the exporter in the form of air freight

32 A repeated supplier knows the exact specifications of the fabrics provided to the garment firm. The garment producer doesn't need to explain to its supplier every time how s/he wants the product.

33 Search and switch costs are present at any level of quality. For example, the lowest quality garment producers in Egypt want their garments to weigh more as retailers pay them by weight. So the garment producer would want the fabric supplier to give him heavier fabrics. The idea is that any specific demand the garment producer makes of his fabric supplier, regardless of whether it is fancy or plain, may give rise to search and switch costs.

causing additional costs representing at least 10% of the total production cost of the exported merchandise. Accordingly, temporal specificity increases the likelihood for backward integration to avoid hold up.

The third channel for potential hold up is more likely to be a factor in developing countries. This is the social and moral cost involved in replacing fabric suppliers. This cost would render it difficult for a garment producer to replace repeated suppliers. The cost of losing a friend or family rejection for cutting dealings with a relative is an example of social costs. To avoid the lock in arising from social costs firms may vertically integrate.

This last source of hold up hasn't been recognized by the vertical integration literature. In general, despite the additions introduced by the New Institutional Economics to Neoclassical Theory, social relations are still regarded as peripheral to economic performance (Uzzi, 1996). Social costs, a sign for the existence of personalized exchange, may alternatively have no impact on vertical integration indicating the persistence of personalized exchange in the face of these costs.[34]

Modern Property Rights Theory: Asset Specificity à la Grossman, Hart and Moore

As described in section 2.2, modern PRT revolves around the relative specificity of buyer and seller investments within an integrated firm with the possibility of the separate sub-units retaining management control (i.e. residual control rights) over their assets. Testing this theory requires information on sub-unit level governance, investments, incentives and decision-making processes. However, most firm-level surveys, including

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34 Social costs are discussed in greater detail in section 6.2.4

my own, deal with a single respondent, implicitly treating that respondent as the sole decision maker for the whole enterprise. Modern PRT cannot be formally tested with such a survey design. To test modern PRT would require a different questionnaire and survey design, applied only to a sub-sample of vertically integrated firms (which is too small in the sector under study to apply econometric analysis). However, in my analysis I use variables used in other papers to test a variant of the modern PRT.

Drawing on the analysis of both Woodruff (2002) and Hanson (1995), the argument adapted to the Egyptian context is that the less standardized a firm's products the larger the non-contractible investments in workmanship quality, design and distribution the garment producer undertakes to enhance his/her ability to obtain orders in the future. In contrast, based on interviews with producers, the fabric supplier appears to undertake a lower degree of non-contractible investment, such as human capital investments, in its monitoring activity or know-how and skill accumulation. Hence, both the garment and the fabric manufacturers' investments are to some extent specific to the characteristics of the end product and, hence, in turn to the relationship. The fabric supplier can behave opportunistically, exploiting the vulnerabilities of the garment producer (who has already undertaken the larger specific investment). As above, potential hold up increases the likelihood of vertical integration. [35]

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35 Note that in this setting, TCT makes the same prediction as PRT. Had the non-contractible investment of the fabric producer been larger than that of the garment producer then predictions would have differed. TCT would have predicted vertical integration, on account of the mere presence of specific investment, whilst PRT would have predicted non-integration on account of balancing the benefits and costs to integration as discussed in section 2.2.

4.2 Constraints on Vertical Integration

The previous section showed that various transactions costs make firms want to integrate. However, several constraints or disincentives limit their ability to do so. There are five main obstacles to integration likely to be present in the Egyptian garment industry: (1) monitoring costs; (2) the desire to avoid risk (demand variability and sales uncertainty); (3) firm size; (4) financial constraints and credit market imperfections; and (5) the lack or presence of institutional substitutes.

4.2.1 Monitoring Costs: Agency Theory

As indicated in sections 2.5 and 3.3.1 monitoring costs as a determinant of the "boundaries of the firm" is consistent with agency theory, team agency (Alchian and Demsetz, 1972) and measurement costs (Holmstrom and Milgrom, 1994 and Holmstrom, 1999).

Fabric production involves a higher level of team production than garment production. Garment production involves a 1:1 sewing machine to worker ratio. Weaving and knitting on the other hand entail team production and joint use of equipment.[36]

Monitoring costs refer to the costs associated with the effort to single out workers' productivity and to measure accurately their contribution to output. Thus, these costs contain the learning costs of the new production process, the administrative and managerial costs associated with coordinating the different stages of production and distribution whilst ensuring that quality is adequate, that technical specifications are met

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36 Interview material shows that a large factory of 1,500 workers has 500 sewing machines but only 4 knitting machines.

and that production is on time. The larger these costs, the less likely are firms to vertically 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 if add another stage.

4.2.2 Desire to Avoid Risk: Demand Variability and Risk Adjusted Property Rights Theory

Demand Variability Theories

Both theory and case study evidence stress the importance of demand variability as a discouraging force to vertical integration (sections 2.3.2 and 3.3.2). Why integrate and put all the eggs in one basket when variability in your sales is evident? Firms are less likely to integrate backwards when they face large fluctuations in downstream demand. When the industry setting is volatile, vertical strategies should entail insignificant degrees of internal transfer, lesser ownership stakes and fewer integrated activities (Harrigan, 1983). Using the input market in this context increases its risk-pooling benefits as opposed to integrating (Lieberman, 1991).

Risk Adjusted Property Rights Theory

Hanson (1995) has argued that integrating backwards, as much as it alleviates hold up problems and opportunistic behavior by the input supplier (the fabric supplier in this case), will expose the buyer (the garment firm in this case) to a higher degree of "natural risk" (section 2.3). In an environment where risk spreading channels are imperfect or absent (e.g. equity markets, stock markets, and insurance markets), as is the case in

nearly all developing countries including Egypt, the presence of demand or sales uncertainty[37] pushes garment producers (i.e. buyers) to desire spreading this risk (section 3.3.2). For many firms in Egypt, such uncertainty is prevalent. Asset ownership spreading (i.e. not integrating) as opposed to vertically integrating is the means through which garment producers spread this source of natural risk. Both demand variability and sales uncertainty make firms prefer to rely on the market, rather than integrate, because of its risk spreading abilities.

4.2.3 Financial Constraints and Credit Market Imperfections

Theories of vertical integration have rather neglected financial constraints as a determinant. These constraints are exacerbated by credit market imperfections. Financial constraints are a lack of own funds combined with no access to credit. It is expected that this limitation be more severe for developing country businesses because of the relatively underdeveloped financial system (section 3.3.3). However, the role of informal credit,[38] including funds from family and friends, should not be underestimated, and may adequately substitute for formal credit. Limited access to finance restricts the possibilities for firms to undertake the investment required to integrate.

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37 Sales uncertainty here refers to a situation where the realized value of sales is unexpected.

38 For example, the role of informal credit in developing countries has been stressed in McMillan and Woodruff (1999).

4.2.4 Firm Size: Economies of Scale

A second factor not accentuated in the vertical integration literature, which was stressed in the case study evidence (section 3.3.2), is horizontal firm size. The higher the fixed investment cost involved in any additional vertical stage of production the more important is the scale of operations prior to integration. The larger the scale of operations preceding integration the more cost effective is vertical integration. This is a standard economies of scale argument which will apply if there are increasing returns to scale. In Chapter 6, the empirical evidence will show that firm size prior to integration is highly correlated with retained profits. Accordingly, firms with larger garment output prior to integration are more likely to produce their own fabrics, because of both better access to finance, including retained profits, and to exploit economies of scale. Size however, may proxy other factors than returns to scale and access to finance. For instance, Maksimovic and Phillips (2002) have shown using firm level data that growth of single-segment firms is related to individual segment level productivity. Therefore, size may be a proxy for firm productivity as well.

4.2.5 Institutional Substitutes

Since many essential institutions, such as well functioning legal systems; equity, stock and insurance markets, are usually missing or malfunctioning in developing countries (section 3.2.3), individuals rely upon institutional substitutes to overcome this deficiency. Possession of power and foreign institutions represent such substitutes. Social networks, family ties and influential connections (e.g. with important government officials) could,

for example, proxy for power and in turn for institutional substitutes. If a particular institutional substitute mitigates, for instance, the limited access to finance then one would expect a greater likelihood of vertical integration for firms that can utilize that substitute. If however, it mitigates an inferior legal system (e.g. Macaulay 1963; Haley 1997; Greif 1997; McMillan 1997; McMillan and Woodruff 1999) and so moderates supplier hold up threat, for example, then it would decrease the likelihood of vertical integration. Accordingly, institutional substitutes can be placed either with the motivations for or with the constraints on vertical integration.

Finally, whilst the property rights theory isn't tested comprehensively for the reasons specified above, vertical foreclosures are not tested due to sample size restrictions. The theory of vertical foreclosures and small numbers bargaining generates the hypothesis that concentrated upstream markets increase the likelihood of backward integration. In the Egyptian fabrics market, levels of concentration are higher for woven fabrics compared to knitted fabrics. Integrated public sector companies account for 70% of woven fabrics but only 40% of knitted fabrics in the market (SEAM, 1999) implying that a firm is more likely to integrate in woven rather than knitted fabrics. This hypothesis should be tested by splitting the sample between firms that are vertically integrated in woven fabrics and those integrated in knitted ones. However, since only 30 percent of all vertically integrated firms in the sample produce woven fabrics (i.e. 13 firms only after accounting for those who stopped internal production) the sample size with respect to the vertical integration group is too small to allow for systematic econometric analysis.[39]

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39 The only data available in this regard is whether the firm is vertically integrated in woven fabrics or not. Percentage of integration in fabrics is aggregated across woven and knitted fabrics. Therefore, detailed statistics on integration in woven versus knitted fabrics are not available.

4.3 Concluding Note

This chapter has linked Chapters 2 and 3 re-emphasizing the relevant theories as well as additional determinants of vertical integration identified in the case studies. It has highlighted the main concepts (not their measurement) that will be tested later in the empirical chapter (Chapter 6). These fall under product quality, search and switch cost, social cost, temporal specificity, asset specificity, monitoring cost, demand variability, natural risk, financial constraints, firm size and finally institutional substitutes. The next chapter (Chapter 5) will introduce the survey instrument discussing important survey design and sampling issues.

Chapter 5

The Survey

This research is concerned with garment producers' decisions to integrate backward into fabric production. While the theoretical question can be clearly stated in this manner, empirical research faces many practical difficulties in translating theory into practice, meaning identifying clearly defined measures corresponding to the theoretical constructs. Even declaring a firm to be vertically integrated or not involves questions about using a dichotomous or continuous variable and, if the former, what cut-off to use, and issues relating to the treatment of branches and sister companies. Indeed, before even embarking on empirical analysis it was necessary to know whether the prevalence of backward integration in the garment industry was sufficiently high to allow systematic econometric techniques to pick up the determinants of integration.

This chapter describes the process of survey design and implementation, and how the sort of issues mentioned in the previous paragraph have been dealt with. Section 5.1 discusses survey design, presenting in turn the sample frame, the data it yielded on the prevalence and order of integration presented, and the implications for survey and sample design discussed. It also briefly describes all questionnaire questions (from questionnaire no. 3). Decisions regarding coverage of the survey and sample design are reported in section 5.2 along with a summary of my own role in the survey. Finally, section 5.3 presents general sample information.

5.1 Survey Design

5.1.1 The Sample Frame and Pre-Survey

The sample frame was based on a list of 2,500 private textile firms compiled by the Federation of Egyptian Industries (FEI) in 2003. The frame contained the name address and phone number of each company, plus their basic activities (i.e. the products they produce). The data in the sample frame showed that 25 percent of all garment producers were vertically integrated into fabric production. However, there was no information on the order of integration.

A firm may have backwardly integrated from garments into fabrics, or forwards from fabrics into garments; or simultaneously begun production of both garments and fabrics. This information was necessary in drawing the sample for two reasons: (1) I wanted to exclude firms which had integrated forwards into garments as this research investigates backward integration,[40] and (2) if the proportion of backward or simultaneously vertically integrated firms proved to be low, then purposive sampling of these firms might prove necessary. I was ambivalent about including companies which had integrated 'simultaneously', and the decision to include them was based mainly on the low prevalence of straightforward backward integration.

Given the necessity of information on the order of integration I decided to conduct a pre-survey. Specifically, a phone interview was carried out on all firms in the sample frame. This pre-survey had three main purposes. The first was to determine the prevalence and the order of integration for every firm. The second was to verify contact

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40 Four such cases were maintained which were treated as if vertically integrated at the onset and hypothetical questions were asked in order to obtain the variables of interest.

details, since these frequently proved to be inaccurate, and/or including firms which were no longer in operation. In fact, of the 2,500 firms in the frame, only 421 could be contacted by phone. Finally, I had also planned to investigate integration into either other aspects of production such as dyeing and retail, and so needed data on the prevalence of these two types of integration as well. The pre-survey is given as Appendix A.

5.1.2 Prevalence and Order of Integration: Questionnaire Types

Initial results from the pre-survey showed that overall 19 percent of garment producers were integrated into fabrics production, but only a quarter of these (24%) had integrated backwards, with close to half (47%) having started both garment and fabric production simultaneously at establishment (see Table 5.1). As only 5 percent of all producers were integrated backward I decided to include both these firms and those which had simultaneously integrated in my analysis. Furthermore, I decided to purposively sample all vertically integrated firms, taking a random sample of un-integrated producers. Further details of sample design are discussed in Section 5.3 below.

Table 5.1 Order of Integration into Fabrics

	Integrated into fabrics				No fabrics	Total
	Forward	Simultaneous		Backward		
		At establishment	After establishment			
Total	23	39	1	20	338	421
% of Total Firms	5.5	9.2	0.2	4.8	80.3	100%
% of VI Firms	27.7	47.0	1.2	24.1	n.a.	100%

Note: n.a. not applicable

The pre-survey showed that less than 5 percent of firms were integrated in dyeing,[41] so that it was decided not to examine integration into this aspect. Over a quarter of firms (28%) were integrated into retail, so data were collected on forward integration from garment production to retail (although these data are not examined in this paper).

Different sets of questions were applicable to firms depending on whether they were integrated into fabric production or retail, or both, and the order in which they had done so. The questionnaire design implied by these different permutations was unduly complex, so a decision was made to compile four separate questionnaires. Questionnaire (1) was for firms that vertically integrated into fabrics at the onset[42] (or into retail at the onset but were not vertically integrated in fabrics). Questionnaires (2) and (3) were designed for firms that have different orders or status of integration for fabrics and retail (e.g. firms who have integrated into fabrics subsequent to garment production but are not integrated in retail).

Finally, questionnaire (4) was intended for firms who are not integrated. By using four questionnaires, most enumerators could use the simplest form for non-integrated firms, allowing the most able enumerators to focus on the more complex cases. Appendix B presents Questionnaire (3). Table 5.2 below shows the prevalence and order of integration into both retail and fabrics.

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41 The questionnaire used for the pre-survey initially included questions on other aspects of production such as printing, but these were dropped as prevalence was extremely low.

42 Any firm who integrated into fabrics within one year of the start of garment production was considered to be vertically integrated from the beginning.

Table 5.2 Order of Integration into Retail and Fabrics

		Integrated in fabrics				No integration in fabrics	Total	% of all firms
		Forward	Garments started simultaneously with fabrics:		Backward			
			At establishment.	Later				
Integrated in Retail	Garments started after retail	1	0	0	0	2	3	0.7
	Garments started simultaneously with retail : At establishment After establish.	0 2	4 0	0 0	2 0	14 0	20 2	4.8 0.48
	Garments started before retail	9	11	1	6	65	92	21.9
No integration in retail		11	24	0	12	257	304	72.2
Total		23	39	1	20	338	421	100%
% of all firms		5.5	9.2	0.2	4.8	80.3	100%	
% of VI firms		27.7	47.0	1.2	24.1	n.a.	100%	

Note: n.a. not applicable

5.1.3 Screening Section and Flap Table

It was very important to apply the right questionnaire to each firm, and the data provided by the pre-survey could not be relied on for this purpose. First, they were not all completed before the start of the main survey. Second, the information may have not been accurate as the respondent was often not a senior manager. Indeed, the identity of the respondent could not always be accurately determined over the phone. Accordingly, a screening section in the main questionnaire was included to enable the enumerator to select the correct questionnaire type to be applied. The screening section identified the years of commencing various activities, and so the order of integration for both fabric production and retail; thus determining the appropriate questionnaire type.

Because of the degree of complexity of the questionnaire, it was important for enumerators to keep a record of certain information about the firm to correctly apply the skip pattern of the questionnaire. Since remembering may be a very difficult task for an enumerator, who may administer up to three interviews per day a "flap table" was used.

The flap table was a form attached to the front of the questionnaire containing the information required by the enumerators throughout the interview. This information was gathered from the first three sections of the questionnaire, covering: (1) the screening section, (2) the general questions section; and (3) the vertical integration and export status section.

The flap table contained the following information: whether the interviewed company had sister companies or branches, whether they ever provided it with fabrics or distributed its products, the establishment year, the years and chronological order of the various production/integration decisions, whether the company currently deals with any retailers, whether the company dealt or is currently dealing with fabric suppliers, their type (i.e. domestic versus foreign) and the period to which the information pertains (i.e. currently versus prior to integration); and finally the kinds of markets the firm serves(ed) for the different periods (i.e. the domestic garment market versus the export market). The screening section and the first two sections of each questionnaire included all questions whose answers entered into the flap table. Appendix B that presents Questionnaire (3) also includes the screening questions and the flap table.

5.1.5 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 (reported in a previous chapter, section 3.2.1) 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.[43] 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

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43 Semi-separate management means that only some members of the management board are the same.

certain interviewed company will pertain only to that specific physical[44] and administrative 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 (in section 2 of Questionnaire 3).

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

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44 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.

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 (as will be shown in section 6.1.1).

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 modeled 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 as shown in appendix B, section (2), questions 2.5 and 2.6.[45]

However, for firms that integrated at the onset I was able to collect this information for two points in time: for the LCFY and at establishment (which corresponds to the first year of vertical integration) as shown in Appendix B (after questionnaire 3 has been presented).

Firms that are not vertically integrated are not integrated given their current characteristics and 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 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 but same questions as backwardly integrated firms with respect to perceived costs and benefits. For example, with respect to disputes with fabric suppliers firms that subsequently integrated into fabric production 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.

5.1.6 Questionnaire Modules

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45 As prior to integration the vertical integration status is zero by definition.

The vertical integration status of a firm is hypothesised to be dependent on economic and institutional factors. The questionnaires were designed to be comprehensive, capturing the full range of these factors as well as the general environment in which the firm operates. Each questionnaire consists of nine modules in addition to the screening section described above (section 5.1.3):

Module 1: General questions on firm characteristics.

Module 2: Vertical integration and export status.

Module 3: Product quality (investment and temporal specificity issues).

Module 4: Demand variability/uncertainty, adjustment and monitoring costs

Module 5: Firm size (e.g. sales, number of workers…etc.)

Module 6: Institutions and institutional substitutes

Module 7: Lock in, switching costs and temporal specificity

Module 8: Contracts

Module 9: Dispute resolution

Module 3 mainly dealt with identifying the firm's products and their quality. Questions varied from inquiring about the types of garments the firm produced (q. 3.1) and questions that infer product quality. Specific questions referred to: the percentage of garments sold to women, men and children (q. 3.2); the consumer income class the firm mostly served (q.3), fashion turnover rate (q 3.4)[46]; questions inquiring about the quality of dying of their major products (q. 3.7; 3.8; 3.15; 3.16); whether company had designed or ever intended to design its own fashion line (q. 3.9; 3.10); the type of yarn used for

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46 The question didn't give the rate precisely, it was calculated based on the answer to that question.

their major products (q 3.11; 3.12); percentage imported of total trim and labels requirements (q 3.13); and finally the seasons the company prepares for (3.14). Most questions were asked for the LCFY[47] as well as for the last completed financial year/s prior to integration. They were disaggregated by market served (i.e. with respect to the firm's export market and with respect to the firm's domestic market) wherein necessary.

Module 4 contained questions about monitoring cost, demand variability and uncertainty. It included the following questions: the level of variability and uncertainty of firm's downstream demand (q 4.1-4.4); the number of models produced (q 4.5; 4.6); input price variability and its major source (q 4.7; 4.8) and the type of remuneration of the company's various unit managers (q 4.9; 4.10). The next questions concerned monitoring cost (q 4.11.1; 4.11.2; 4.12.1; 4.12.2) ; fabric/retail unit investment cost (4.13.1; 4.13.2; 4.14.1; 4.14.2); level of difficulty of finding required fabric inputs on the domestic market (4.15.1; 4.15.2); the perceived reason for such difficulty (4.16-4.18); and finally the type of knitting machines utilized (if vertically integrated) (q 4.19).

Module 5 contained sensitive questions, and so, after the pilot it was decided to move it to become the last module, though it still appears as module 5 in the questionnaire. The logic was to pose those questions after the respondent has gained some trust and confidence in the enumerator that encourages him/her to answer those questions. Appendix B has the modules in the same order they were asked. I follow that order in describing the modules.

Module 6 was on institutions, institutional substitutes and rudimentary measures of firm profits. Questions 6.1-6.3 inquired about the availability of the various sources of

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47 Or last few completed years depending on the question.

credit to the company; questions 6.4-6.6 were on profit levels; questions 6.7.1-6.8.1 inquired about the perceived effect of vertical integration on taxes; question 6.9 inquired about a variety of institutional obstacles to firm development; questions 6.10 and 6.11 inquire about the company's affiliation to certain influential bodies and finally questions 6.12 and 6.13 ask about the availability of a company lawyer.

Module 7 dealt with lock in, switching costs and temporal specificity. Section 7.a concentrated on fabric suppliers both foreign and domestic. It contained questions on whether the firm is free to choose its suppliers or whether its clients impose a certain supplier (q 7.1; 7.2); questions related to the number of (repeated) suppliers (q 7.3-7.6); whether any of the repeated supplier(s) provides unique inputs to the company (i.e. specific to that company, q 7.7; 7.8); how many of the repeated suppliers represent branches or sister companies (q 7.9-7.12); how often a new supplier is introduced (q 7.13; 7.14); whether the new supplier substitutes or complements existing repeated suppliers (q 7.15-7.18) and, if the former, which type of supplier is substituted (q 7.17-7.18). Questions 7.19 and 7.20 ask about the limits search and switch costs put on the firm with respect to changing its repeated suppliers, questions 7.21 and 7.22 inquire about the same but with respect to social costs. Questions 7.23 and 7.24 ask about the time it would take to acquire replacement supplies in case a repeated supplier failed to deliver the fabric inputs. Finally, questions 7.25 and 7.26 inquire about the loyalty to repeated suppliers in the face of an attractive price offer from a competitive supplier. Section 7b replicates sections 7a's questions with respect to clients (wholesalers and retailers) instead of suppliers.

Module 9 [48] mainly handles issues related to disputes with both suppliers and clients. In section 9a, questions 9.11 and 9.14 request information on the frequency of disputes with suppliers (domestic/foreign) and question 9.3 inquires about the frequency and effectiveness of the wide range of dispute resolution mechanisms available to garment producers. Section 9b contains very similar questions to those included in 9a but for clients (domestic/foreign).[49] Question 9.9 illuminates the main factors underlying the company's price strategy, question 9.10 inquires about the most important characteristics of a fabric supplier from the company's point of view and finally question 9.11 asks about the possibility for reputation effects.

Module 8 is on contracts. Section 8a covers contracts with clients (both domestic and foreign) and section 8b contracts with fabric suppliers, again both domestic and foreign. Section 8b includes the following questions[50]: Whether procurement of inputs is made via an order or alternatively via the spot market or a combination (q 8.15), whether agreements with suppliers are written, oral or depend on the relation with the supplier (q 8.16). Questions 8.17 through 8.20 seek information on terms and clauses of the agreement (be it written or oral) in terms of quality specifications, delivery times as well as quality and late delivery sanctions. Whether enforcement of these penalties depends on the company's relationship with the supplier (q 8.21), if it does or if penalties are not enforced then question 8.22 inquires about the relative importance of the various reasons

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48 Module 9 was moved in front of module 8 in response to enumerator requests to me.

49 Disputes related to poor quality of inputs can differ with respect to disputes resolution mechanisms compared to disputes related to payment issues (which are the most prevalent disputes with clients)

50 Section 8a is similar to 8b. I present the latter as it is the most relevant to the type of integration investigated in this research.

explaining that behavior. Finally, questions 8.23-8.25 ask about clauses in the contract that are in the supplier's interest, such as whether they stipulate a specific payment schedule in the agreement or sanctions related to late payments and lastly whether their enforcing of these penalties depend on their relation with the garment producer or not.

Finally, module 5 treats firm size and ownership issues. Information on year of establishment, the year prior to integration and the last completed financial year are included in this module. Questions 5.1 and 5.2 inquire about the number of workers, questions 5.3 and 5.5 sales value (garment sales and total sales), and question 5.4 the degree of uncertainty pertaining to the given level of sales. Net assets, issued capital, number of sewing machines and productive capacity are captured in questions 5.6, 5.9, 5.12 and 5.13 respectively. The legal status of the company, the relationship of owners to one another, the percentage of foreign ownership and the company's status in the stock market are given by the answer to questions 5.7, 5.8, 5.10 and 5.11 respectively.

5.2 Sampling

The 257 sample firms were drawn from the sample frame of 2,500 firms described above, after screening to verify information (that they did produce garments and location) through the telephone pre-survey. Since the research focuses on why garment firms produce their own fabric inputs, non-garment producing textile firms were excluded, leaving 1,418 firms. According to these data, nearly 95 percent of garment firms are concentrated in nine of the country's 27 governorates: Greater Cairo (Cairo, Giza, Kaliubiya), Gharbia, Alexandria, Sharkeya and El-Beheira. The sample covered all nine of these governorates.

The telephone pre-survey identified 421 firms as being operative and confirmed their contact details. Data from both the full sample frame of 1,418 firms and the one including the 421 firms showed the incidence of vertical integration to be limited (25%, 19% of all firms respectively). Hence, disproportionate sampling was applied. Disproportionate sampling implies sampling the two groups at different sampling rates to ensure having enough observations in the group of interest (i.e. the VI group) (Maddala, 1992). Specifically, 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 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).

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 estimates of the population means. However, this problem is simply corrected for by the use of sampling weights. In all chapter 6 regressions population weights (or sampling weights) are used. Population weights should be used as they give each observation the weight it deserves relative to the population.[51] 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 the sampling

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51 These weights answer the question of whether this specific firm represents one firm of the population or instead, for instance, 10 firms of population firms.

design[52] (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:

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

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

The second issue regarding representativeness is one of sample selection bias, which arises if firms who refused to respond have different characteristics to 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, about 12%, which means that such bias will not be considerable. 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[53] was due to refusals (the "hard core" non-response), or

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52 That is, Weighting each observation by the inverse of its probability of selection.

53 The frame that resulted in the 421 firms identified as operative.

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).[54] 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 from 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 would have limited their response rate as well. However, 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 somewhat representative of the larger frame. Ideally, the comparison would be made on more firm characteristics,[55] but apart from the degree and order of integration given in

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

55 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

tables, 5.1 and 5.2 above no other variables are available for the firms of the smaller sample frame.

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 three months from March-May, 2004. 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.

Implementation of the survey took three months, which was longer than originally anticipated. There were delays for several reasons: (1) high rate of initial refusal by respondents, or desire by respondents to schedule interview for some weeks later, (2) failure of respondents to be present at agreed interview time, (3) low rate of appointments arranged by the survey company in the initial weeks and finally (4) inaccurate address information. These and other factors meant that the enumerators recruited initially were not all able to remain in the survey team. During the course of the survey five sets of enumerators were recruited, some from each staying until the end of the work, but others not. As a result I trained five different groups of enumerators. The best enumerators were given the more complex cases for interview, although I administered 26 such interviews myself. The fieldwork was completed in June 2004 once the data cleaning had been largely completed.

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latter group 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.

5.3 General Sample Information

Forty percent of the sample are firms with sole proprietorship (i.e. owned by a single owner), 34 percent are general partnerships, 15 percent are limited partnerships, just under 10 percent are joint stock companies and 2 percent are either a foreign branch or a franchise (Table 5.3). The oldest firm of the sample was established in 1935 and the youngest in 2002. The median firm age is about 19 years old (as is the mean).

Table 5.3: Summary of Basic Survey Data

	All firms	VI	Non-VI
Number of firms	257	63	200
Establishment Year			
Mean	1983	1982	1984
Median	1985	1985	1986
Duration (# of years it took for a firm to vertically integrate)			
Mean	n.a.	9	n.a.
Median	n.a.	7	n.a.
% of backward integration	n.a.	40%	n.a.
Age			
1-20 years	56%	51%	58%
20-40	35%	38%	34%
>40	9%	11%	8%
Percentage of Firms Serving the Export Market	20%	50%	11%
Sole Proprietorship	39%	24%	44%
Note: n.a. not applicable			

Forty percent of all vertically integrated firms decided to integrate into fabrics having been producing garments for some time (i.e. backward integration) the rest made that decision at the same time of the start of their garment production. Twenty-four percent of the sample is vertically integrated in fabrics (63 firms). All of them produce knitted fabrics but only 30 percent produce woven fabrics as well (19 firms).[56] Eighteen

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56 Vertical integration was defined to have taken place at the time of the earliest integration, whether into knitting or weaving.

percent of all firms exported garments prior to integration, and 20 percent of all firms export garments currently. Five percent of the firms have some degree of foreign ownership.

Chapter 6

Empirical Analysis on Vertical Integration and Institutional Constraints on Firm Behavior: The Case of the Garment Industry in Egypt

In the simplest presentations of neo-classical economics, firms can buy their inputs from a competitive market through costless transactions. However, recent approaches to New Institutional Economics (NIE) and Industrial Organization (IO) suggest that there are transaction costs, and that these costs may be sufficiently high for firms to decide to make, rather than buy, their inputs. Such costs include the costs of writing, monitoring and enforcing contracts, and the costs of sequential bargaining over benefits linked to sunk investments. More generally, these are costs arising from settings with asymmetric information such as adverse selection and moral hazard; as well as bounded rationality. Vertical integration, that is combining two or more stages of a production process under one firm, has been recognized by those literatures as key organizational structure that moderates those costs (e.g. Arrow (1975); Alchian *et. al* (1978); Willamson (1979); Joskow (1985);Grossman and Hart (1986) and Hart and Moore (1990)).

The literature has focused on conditions that encourage vertical integration, giving less attention to conditions that may constrain vertical integration. Based on existing theory and an original survey of private firms in Egypt, this chapter empirically examines both motivations to, and constraints on, vertical integration. More precisely, the study looks into the determinants of backward vertical integration of garment producing firms in Egypt into fabrics production. These determinants are drawn from both theory,

and the particular institutional context facing firms in a developing country setting such as Egypt. Unlike the existing empirical literature, the model in this paper includes variables suggested by several alternative theories.

This chapter is organized as follows. Section 6.1 illustrates how the model specification utilized here, under certain conditions, tackles the problem of endogeneity. Section 6.2 presents the empirical measures and patterns in the data. The econometric technique is discussed in section 6.3 and section 6.4 gives the results. Section 6.5 deals with possible caveats to the analysis. The presence of omitted variable bias in less completely specified models is shown in section 6.6. Finally, section 6.7 concludes.

6.1 The Model

This section discusses the theory behind one aspect of the model used in this paper. The estimated model used in this paper is different to that in the existing literature, which estimate current vertical integration status as a function of current determinants. It is likely that many of these regressors are endogenous with respect to vertical integration. In section 6.1.1 I show that using pre-integration characteristics rather than current characteristics is both more intuitively appealing and avoids this source of endogeneity. But, as shown in Section 6.1.2, bias in the estimates may still be present for other reasons.

6.1.1 Simultaneous Equation Bias: The Endogeneity Problem

The existing literature has modeled current vertical integration status as a function of current firm characteristics (e.g. Montverde and Teece (1982), Birgerfelt (1997), and Woodruff, 2002). On account of the likely endogeneity of some of the regressors, some

authors admit that they are only showing a correlation between vertical integration and the set of current period regressors included in their models (e.g. Wernerfelt, 1997). It is indeed likely that not all explanatory variables in the vertical integration equation are truly exogenous. If they were there would be no problem of simultaneity bias. However, this assumption is likely to be false: it does not seem plausible that the only relationship between the variables in the vertical integration function is the one represented by the single equation usually estimated in the literature. The existence of other behavioral relationships between the variables of the vertical integration equation cannot be ruled out. These relationships should be explained by additional equations, giving rise to the possibility that the explanatory variables may themselves be endogenous in the vertical integration function.

Here I show why this problem arises when the vertical integration equation alone is estimated, ignoring other relationships that might exist. As an example, assume for simplicity that vertical integration is a function of monitoring costs only.[57] Assume that the complete system constitutes of a vertical integration equation (1) (which is the one usually estimated in the literature), and a monitoring cost equation (2):

$$VI_t = VI_t(M_t; \varepsilon_t) \tag{1}$$
$$M_t = M_t(VI_t, ED_t; u_t) \tag{2}$$

Where VI_t is the percentage of total fabric requirements that is produced in house in the completed financial year "t", M_t is monitoring cost for that year, and ε_t is the error term

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[57] One explanatory variable is used here for expositional reasons. Generalization by including more explanatory variables won't affect the logic of the argument.

of the population regression line of equation (1). In equation (2) ED_t is the education level of the manager of the firm in year "t", which is assumed to be exogenous.[58]

Expressing the endogenous variables as functions of the exogenous variables and the disturbances gives the reduced form of equations (1) and (2):

$$VI_t = VI_t(ED_t, u_t; \varepsilon_t) \tag{3}$$

$$M_t = M_t(ED_t, u_t; \varepsilon_t) \tag{4}$$

Equation (4) shows the problem clearly: M_t, assumed to be an exogenous variable in the VI function (1), is in fact correlated with the disturbance ε_t in that same equation, thus violating one of the assumptions of the classical model. Estimating the structural vertical integration equation (1) - as has been done in the literature - results in biased and inconsistent estimators of the vertical integration function parameters.[59] This is the problem of simultaneous equation bias. This problem arises because of the simultaneous nature of equations (1) and (2). The two equations involve relations between the two endogenous variables VI_t and M_t. Given the values of the exogenous variables, both VI_t and M_t jointly determine the value of vertical integration VI_t and monitoring cost M_t. Since estimation of (1) results in biased estimates, techniques have to be used that allow the extraction of unbiased and consistent estimates of the coefficients.[60]

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58 This variable could be easily replaced with any other exogenous variable (e.g. by years of experience). It is only a plausible choice, as monitoring costs for a particular firm maybe likely influenced by the education level of the manager.

59 The concept of endogeneity carries over to all regression techniques that assume no correlation between the right hand side variables and the error term.

60 The choice of the technique to be used depends basically on the identification status of the complete system (recall that system (1) and (2) is a simplified versions of the full system). In the example given here, the VI equation is just identified and the monitoring cost equation is not identified.

As is clear from the above exposition, the problem arises since VI is modeled to depend on current monitoring costs. However, it is argued here that the true specification for vertical integration should be (again assuming a greatly simplified model for purposes of exposition):

$$VI_t = VI_t(M_{t-x}; \varepsilon_t) \tag{5}$$
$$M_t = M_t(VI_t; u_t) \tag{6}$$

In equation (5), M_{t-x} is the level of monitoring costs for the year preceding the vertical integration. This variable is, by definition, exogenous since it is pre-determined; i.e. by time "t" M_{t-x} is already given and so cannot possibly be endogenous. In other words, M_{t-x} are the decision maker's perceived monitoring costs when the firm was not vertically integrated, i.e. when VI=0, and so x is the number of years since the firm integrated plus one. Equations (5) and (6) are the structural equations of the model. Section 5.1.5 under the heading "Which Periods?" briefly discussed the conceptual reasons behind treating the values in the year prior to the vertical integration decision for the independent variables as the explanatory variables of the vertical integration equation. Section 6.5 will discuss further the justification for using the year prior to the vertical integration decision rather than any other year. As for equation (6), in that case it is reasonable to assume that monitoring costs in a specific period depend on the level of vertical integration in that very same period. It could be argued that the larger the magnitude of the vertical production process the harder it is to monitor the workers and so the larger are monitoring costs. Alternatively, it could be argued that the larger the magnitude is the easier it is to monitor the workers due to economies of scale that enable

the use of sophisticated techniques for monitoring. Either way the answer is an empirical

matter that is outside the scope of this paper.

The reduced form of system (5) and (6) is as follows:

$$VI_t = VI_t(M_{t-x}; \varepsilon_t) \tag{7}$$

$$M_t = M_t(M_{t-x}; \varepsilon_t, u_t) \tag{8}$$

Equation (7) is identical to equation (5), i.e. the structural vertical integration

equation is the same as the reduced form equation, which implies that VI_t is the only

endogenous variable in that equation. As to the complete system in general, the structure

of the structural model given by equations (5) and (6) means that the values of the

endogenous variables are determined recursively rather than simultaneously. And so, M_t

is determined recursively once VI_t is determined. It also implies that VI_t is independent of

u_t, and indeed, if there exist no contemporaneous correlation between ε_t and u_t (i.e. cov (ε_t

,u_t) =0), it could be argued that the structural system is not simultaneous at all; it is in fact

what is known as a recursive system. [61]

Estimating the entire system is outside the scope of this paper and is not necessary

to look into the determinants of vertical integration. Therefore, the approach used in this

paper is to estimate the structural equation (5), which the discussion above suggests

eliminates the problem of endogeneity. However, whilst the source of endogeneity from

using current regressors as is done in existing literature is removed, the problem may still

be present for other reasons.

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[61] Note, however, that the assumption of no contemporaneous correlation between ε_t and u_t is not
necessary for equation (5) to be free of endogeneity as u_t is not a right hand side variable in that equation.

6.1.2 Conditions for No-Endogeneity: Are They Really Met?

The main condition that ensures the absence of the endogeneity problem in the vertical integration equation is the independence between all regressors of the equation and the disturbance. However, in the regression analysis presented in section 6.4 there maybe at least three cases in which this assumption breaks down.

The first of these is that if the estimated model omitted a relevant variable that happens to be correlated with any or all of the included regressors. For expositional purposes only assume that the true vertical integration equation is given by equation (9) which includes a variable representing the education level of the decision maker in the year preceding the integration decision.

$$VI_t = VI_t(M_{t-x}, ED_{t-x}; \varepsilon_t) \tag{9}$$

Suppose that instead of estimating (9) we estimate equation (10) below.

$$VI_t = VI_t(M_{t-x}; u_t) \tag{10}$$

Hence, we omit a relevant explanatory variable, ED_{t-x}, from the estimated equation. The disturbance in a regression equation represents all influences on the dependent variable apart from those of the explanatory variables present in the equation. This implies that if we estimate (10) we are forcing the disturbance u_t in that equation to represent the omitted variable ED_t as well as any random factors, i.e. $u_t = u_t(ED_{t-x}, \varepsilon_t)$ where ε_t is the true disturbance of equation (9). If ED_{t-x} happens to be correlated with M_{t-x} (which is very likely as higher education levels maybe expected to reduce worker monitoring costs) then this would imply that the disturbance u_t is correlated with M_{t-x}, thus, violating the independence assumption. This contemporaneous correlation will generally result in biased and inconsistent estimators. Even though the regressions

presented in section 6.4 do indeed have a much larger explanatory variable set than most in the existing literature, other omitted variables such as the decision maker's level of education, may induce biased estimators in case it is correlated with any of the included regressors.

The second case where the independence assumption breaks down is the case of measurement errors. In case of wrongly measuring any of the explanatory variables - which is common with survey data- contemporaneous correlation between the disturbance and the wrongly measured regressor is present. Suppose that instead of measuring the true values of M_{t-x} and VI_t we observe for each firm M^*_{t-x} and VI^*_t, where

$$M^*_{t-x} = M_{t-x} + \mu_{t-x}; \qquad VI^*_t = VI_t + \gamma_t \tag{11}$$

The errors made in the measurement of M_{t-x} and VI_t are represented by μ_{t-x} and γ_t. Now suppose that we are forced to estimate equation (5) using M^*_{t-x} and VI^*_t instead of the true values M_{t-x} and VI_t. Regression equation (5) becomes:

$$VI^*_t = VI^*_t (M^*_{t-x}; (\varepsilon_t + \gamma_t - \mu_{t-x})) \tag{12}$$

Because we lack data on M_{t-x} and VI_t, we estimate (12) which includes the composite disturbances $\varepsilon^*_t = (\varepsilon_t + \gamma_t - \mu_{t-x})$. The problem with estimating (12) is that both M^*_{t-x} and the composite disturbance ε^*_t depend on μ_{t-x} which will again result in violation of the independence assumption between the regressors and the disturbance.

The third case appears in the use of one of the control variables utilized in all specifications of this study: the percentage of fabrics provided currently by a branch or a sister company. The logic for including this control is that firms that obtain their fabrics from sister companies, branches or both are likely to have lower levels of integration. Therefore, it is really a control variable rather than a determinant of vertical integration.

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. As presented in section 6.1.1 of the literature that models current vertical integration status as a function of current characteristics the inclusion of this variable may render this control variable endogenous, thus the independence assumption breaks down. [62]

In summary, this approach removes one source of bias in existing models and reduces another. Endogeneity of regressors is removed by using pre-determined values of these regressors. However, the estimates will still be biased if explanatory variables are omitted. Whilst such a possibility cannot be ruled out, the problem is less here than in other papers which typically use a more restricted variable set (indeed I show below this bias). However, two sources of bias remain, those stemming from possible measurement error (a problem common to all studies), and the use of the percentage of inputs provided by a sister company as a control variable, which may well be endogenous with respect to the vertical integration decision.

6. 2 Empirical Measures and Trends

This section presents the variables used in the models to be presented: first, choice of dependent variable (section 6.2.1) and then the regressors (section 6.2.2).

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62 This is so as it is also true that if a firm produces some of its total input requirements in house it reduces the amount it obtains of this input from its branch or sister company.

6.2.1 Vertical Integration: The Dependent Variable

Much of the empirical literature measures vertical integration as a dichotomous variable (0/1): taking a value of 1 if the share of inputs produced rather than purchased exceeds a certain threshold[63] (e.g. Montverde and Teece, 1982; Lieberman, 1991; Woodruff, 2002).[64, 65] Treating the dependent variable as dichotomous has meant that estimation has been by probit or logit.

Sixteen years ago in his review of the empirical literature Joskow (1988) stated: "it is not clear why a continuous variable [measuring the degree of vertical integration] was not used, perhaps in conjunction with a switching regression technique."

Accordingly, the dependent variable utilized here is a fractional response variable: the fraction of fabrics produced internally to the value of the firm's total fabrics' requirements (for its garment production) during the last completed financial year.[66] Close to half of all vertically integrated firms are fully vertically integrated, so that the dependent variable takes the value of 1 (i.e. they produce all their fabric inputs internally and so do not deal with the upstream market any longer). With respect to the other half (i.e. for whom 0<VI<1) the fraction varies between .05 (5%) and .97 (97%). The median,

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63 This is of course the case of backward integration, which is what being analyzed here. An analogous formulation applies for forward integration.

64 An exception to this statement is Wernerfelt, (1997) who treated the dependent variable as continuous. Also, Hubbard, 2000 used a categorical dependent variable and so applied an ordered logit model.

65 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 % of units franchised (as opposed to company-owned) as its dependent variable.

66 The question was asked for garments serving the domestic market, then for garments serving the export market. The dependent variable is the aggregated fraction weighted by the percentage of garments a firm sells on the domestic market and that sold to the export market respectively.

which is also approximately the mean, is 0.54. With 16% of non-fully integrated firms integrated at exactly 0.5, that distribution is approximately normal.[67] Table 6.1 summarizes these findings.

Table 6.1: Vertical Integration Variable Statistics

	VI=0	0<VI<1	VI=1	Total
Vertical Integration (VI)				
# of observations	202	31	32	265[68]
% of all firms	76.23	11.69	12.08	100%
% of VI firms	0	49.21	50.79	100%
mean	0	0.53	1	0.18
median	0	0.54	1	0
mode	0	0.50	1	0
standard deviation	0	0.30	0	0.36
skewness	n.a.	-0.27	n.a.	1.62
kurtosis	n.a.	1.67	n.a.	3.79
min	0	0.05	1	0
max	0	0.97	1	1
n.a.= not applicable				

6.2.2 Independent Variables

Firm characteristics and decision makers' perceptions prior to integration are the direct cause for firms to embark on vertical integration. Section 5.1.5 ("Which Periods") briefly emphasized the conceptual reasons behind this assumption. In addition, section 6.1.1 has shown how this approach does not suffer from the endogeneity problem which is present in most of the empirical literature. A following section (6.5.1) will discuss this argument further.

The table below (Table 6.2) shows the questions as they appeared in questionnaire number 3, which is the questionnaire for garment firms that have integrated backwards into fabric production. Firms that integrated at establishment (who were given

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67 There is a slight gap with no firm with vertical integration levels in the range .3-.5, giving the distribution a slightly bi-modal appearance. Skew ness is moderate (-.27) as is kurtosis (1.67)

68 Note that the number of observation here is 267, however, only 257 forms have complete data sets.

questionnaire 1) were asked the same questions regarding perceived costs and benefits of vertical integration. For example, the monitoring cost question was: *Give the level of 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. the time, money and hassle involved in monitoring the workers)". However, questions that entailed facts or characteristics relating to the firm were asked hypothetically to firms that integrated at the time of establishment. For example, disputes over quality were asked in the following manner "Had you not vertically integrated at the onset, how frequent would you imagine disputes over quality with your fabric suppliers would have been?"

Firms that are not vertically integrated (who were given questionnaire 4) are not integrated given their current characteristics and current perceptions of their decision makers.[69] Therefore, for this type of firm information was collected for the current period, more precisely for the last completed financial year (2002) or the last few completed financial years (see section 5.1.5), as these are the variables which can be used to model the integration decision

Chapter 4 presented all the concepts and measures that will be used in this research. It also showed their relevance to both theory and the Egyptian context. The following presents the actual measure/s used for each of these concepts and some descriptive statistics. Table 6.2 gives the exact wording for the questions corresponding to each of these measures for questionnaire number 3. The measures are represented in

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69 Further discussion of this assumption will appear in section 6.5.2.

the exact order the concepts were presented in chapter 4, with the relevant section in chapter 4 written after each of the variable names.

Quality (4.1.1): I asked about several measures of quality, each representing a different aspect of quality-related concepts. Disputes over quality mainly asked about the frequency with which the firm has had disputes over quality with its repeated (domestic/foreign) fabric suppliers prior to integration. The answer was given on a 5 point semantic scale from "absolutely no disputes" to "very frequent". While 32% (70%) of vertically integrated firms asserted that they very frequently (frequently and very frequently) had encountered disputes over quality with their repeated suppliers, this figure was only 7% (30%) for non-vertically integrated firms. Another quality measure is a categorical measure of whether the desired fabric quality was available on the market prior to vertically integrating. Thirty two per cent (67%) of vertically integrated firms strongly agreed (agreed and strongly agreed) that it was difficult to find the desired fabric quality (on the market prior to integration) but only 17% (33%) of non-vertically integrated firms expressed this view. Another quality measure is the percentage of garments exported to total sales. Whilst 42 per cent of vertically integrated firms were exporters prior to integration, only 10 per cent of non-vertically integrated firms are exporters.

Table 6.2: BASIC SURVEY QUESTIONS*

Variable	Corresponding Survey Question
Vertical Integration	▪ 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)? *The Domestic Market* <table><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)? *The Export Market* <table><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>
Quality Disputes	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.
Non-available desired fabric quality	*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.
Supplier Search & Switch Costs	*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.

Variable	Corresponding Survey Question
Fabric Supplier Social Cost	*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).
Fashion turnover rate	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.
% sold to women	% of garment sales to women in the last completed financial year prior to vertical integration.
Monitoring Cost	*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)
Demand Variability	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".
Uncertainty	Was this sales value (remind the respondent of his sales answer)….? 1) Absolutely expected 4) Somewhat unexpected 2) Expected 5) Unexpected 3) Somewhat expected 6) Absolutely unexpected
Size Variables	In the given years, how much was the value of the company's issued capital (garment sales; net assets)? 1=£E 2=$
Fabric Unit Investment Cost	*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).

Variable	Corresponding Survey Question	
Access to finance	Prior to producing your own fabrics internally describe on a scale from 0 to 10 your belief as to the degree of difficulty in obtaining the necessary funds, from each of the indicated sources, to add another stage of production to the basic stages of production of the company. Such as: 0……………………………………………………………………………………. 10	
	Describes your prior belief that it was impossible to obtain the necessary funds from this source of finance	Describes your prior belief that it was extremely easy to obtain the necessary funds from this source of finance
	1) Financial Markets & Intermediaries (Banks and Financial Institutions) 2) Personal Savings and loans from family members or friends and relatives 3) Company Retained Profits 4) Mother Company Retained Profits 5) Sister Company or Branch Retained Profits	
Average Profits	Compared to garment firms that were in the market at the time, what estimate would you give your profits, on average, since establishment until the year the firm integrated (i.e. from yyyy to yyyy)? 1. Very weak 4.Somewhat high 2. Weak 5. High 3.Somewhat weak 6. Very High	
% 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	

* Wording shown here corresponds to questionnaire No.3, which was designed for firms which vertically integrated after having produced garments for some time.

Lock in and hold up (4.1.2): The second set of variables pertains to the severity of the various sources of lock in and potential hold up. 39% (69%) of vertically integrated firms strongly agreed (agreed and strongly agreed) that the search and switch cost involved in

changing repeated fabric suppliers had rendered it difficult for them to replace any of their repeated suppliers in contrast to only 11% (33%) of the non-integrated firms. Similarly, 21% (39%) of vertically integrated firms reported that the social and moral cost involved in changing repeated fabric suppliers had the same effect whereas only 9% (20%) of non-vertically integrated firms expressed the same view. Two alternative measures of asset specificity are the fashion turnover rate and the percentage of garments sold to women.[70] Section 2.2 has discussed the reasoning behind the use of these variables in the literature as a proxy for asset specificity. Fashion turnover rate is given by the expected duration of market demand for a new style introduced by the firm. This amounted to 49 weeks for the average non-vertically integrated firm to a surprisingly high 107 weeks for the average vertically integrated one. A similar pattern appears for the other measure, with non-vertically integrated firms selling nearly half of their garment sales to women compared to a lower percentage of only 30% for the average vertically integrated firm.

Agency theory (4.2.1): Agency theory was represented by a question that asked if before producing their own fabrics the decision makers thought that monitoring workers undertaking fabrics production was a very difficult task (i.e. time, money and hassle involved in monitoring the workers). While 33% (63%) of non-vertically integrated firms strongly agreed (agreed and strongly agreed) to it being a difficult task a very small percentage - 3% (26%) - of vertically integrated firms felt this way .

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70 Very similar measures have been used by Woodruff (2002) and Hanson (1995) to test the modern PRT.

Desire to Avoid Risk (4.2.2): These types of variables investigated the extent of the variability, as well as the uncertainty, of garment demand a firm faced in the years just preceding vertical integration. While only 5% (9%) of vertically integrated firms reported that garment demand was strongly variable (variable and strongly variable) prior to integration a large percentage of 39% (68%) of non-vertically integrated firms face such variability. Likewise, only 2% (35%) of non-vertically integrated firms assert that the value of sales of the last completed financial year was totally expected (expected and totally expected) while a bulk of 11% (70%) of vertically integrated firms stated that they totally expected (expected and totally expected) the value of sales of the year just prior to integration.

Financial constraints (4.2.3): Financial constraints are proxied by two alternative ways. The first inquires about the degree of agreement as to whether opening a fabrics production unit in the firm was perceived to be a very expensive undertaking prior to integration. While only 10% (30%) of vertically integrated firms strongly agreed (agreed and strongly agreed) to the proposition, a massive 78% (93%) of non-vertically integrated stressed that it is indeed a very expensive undertaking. The second measure was concerned with the extent of ease/difficulty with which a firm has access to finance, in case it wanted to add another stage of production, from each of 5 different channels.[71] The answer was given on a 11 point scale with 0 corresponding to the prior belief that it was impossible to obtain such funds from a particular channel and 10 representing that it

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71 The channels are: (1) Financial Markets & Intermediaries (Banks and Financial Markets), (2) Personal Savings and loans from family members or friends and relatives, (3) Company Retained Profits, (4) Mother Company Retained Profits, and (5) Sister Company or Branch Retained Profits

was extremely easy. 77% of vertically integrated firms stated that they believed it was extremely easy (10) to receive such finance from at least one channel against only 53% of non-vertically integrated firms.

Firm size (4.2.4): Financial firm size measures included issued capital, net assets and garment sales for the completed financial year just prior to integration. Vertically integrated firms' issued capital, net assets and garment sales average (median) prior to integration amounted to £E5,247,975 (£E432,053) , £E23,300,000 (£E3,531,323), £E268,000,000 (£E9,374,389) respectively compared to only £E1,409,473 (£E10,956), £E3,204,227 (£E91,297) , £E5,721,079 (£E182,593) respectively for non-vertically integrated firms. Firms could give these figures in either U.S. dollar ($) or Egyptian pound (£E). Since the year for which this value is given varies from one firm to another depending on each firm's year of vertical integration, consumer price indices and exchange rates were used to normalize these figures (constant prices, 2000).

Institutional substitutes (4.2.5): Possession of or access to power; and foreign institutions both could be regarded as institutional substitutes. They could be substitutes to inferior financial intermediaries and/or to an inferior legal system. Institutional substitutes were proxied by three variables: (1) membership to the Egyptian garment commodity council, (2) percentage of foreign ownership, and (3) having a company lawyer. The first and third are proxies for access to power. 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. Under the council's umbrella garment producers discuss their problems in order to introduce recommendations to the minister of trade. Thus, members of the council are influential textile businessmen. Hence, membership to the council reflects on the possession of power. None of the vertically integrated firms were members prior to integration while 3% of non-vertically integrated firms are currently members. However, 19% of vertically integrated firms are currently members of the council against 3% of the non-integrated firms. This might be since several firms vertically integrated before the council was even established. Before integrating 19% of the vertically integrated firms had a lawyer compared to 34% of the non-vertically integrated ones. However, the current situation is the reverse: 56% of vertically integrated firms have a company lawyer compared to 36% of non-integrated firms. Finally, the variable "percentage of foreign ownership" proxies access to foreign institutions (e.g. foreign financial intermediaries, foreign dispute resolution mechanisms). Only 2% of non integrated firms have some foreign ownership element in contrast to 11% for vertically integrated firms.

Other variables: Other control variables included in the model are whether the company was listed on the stock market before integration, the extent to which it was believed that integrating may reduce a firm's tax burden, the firm's age, whether it is a family business and finally the percentage of fabrics provided by a sister company or a branch. Listing on the stock market is a measure of the level of sophistication of the management of a company (as well as access to finance and firm size, but these variables are already controlled for). Vertically integrating as opposed to purchasing through the input market, may be a way to reduce transaction cost through sidestepping additional taxes on inputs -

so the believe that this is so may induce integration. Older firms maybe expected to be vertically integrated on account of industry experience, for instance. The same applies for family businesses, i.e. business owned by members of the same family for more than one generation.

Table 6.3 shows relevant statistics of dependent and independent variables as well as the predicted sign of the independent variables on vertical integration.

Table 6.3: Variable Statistics

	Mean			Standard Deviation			Minimum			Maximum			Expected sign
	VI	Non-VI	All	VI	Non-VI	All	VI	Non-VI	All	VI	Non-VI	All	
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													
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	-
Access to finance	9.36	8.06	8.37	1.41	2.83	2.62	5	0	0	10	10	10	+
Institutional substitutes													

	Mean			Standard Deviation			Minimum			Maximum			Expected sign
	VI	Non-VI	All	VI	Non-VI	All	VI	Non-VI	All	VI	Non-VI	All	
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	+/-

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

6.3 Quasi Maximum Likelihood Estimation

The question under examination is the extent of vertical integration in the Egyptian textile industry, and the factors underlying the decision to integrate. As discussed earlier, much of the literature analyzes this decision using a dichotomous dependent variable; giving a value of one if the share of inputs produced rather than purchased exceeds a certain threshold. For example, Woodruff (2002) gives the value of 1 for the variable measuring integration if the manufacturer sells any portion of production through owned stores (in the case of forward integration) and Montverde and Teece (1982) give the value 1 if the firm produced 80 percent or more of a component internally.

In my data set some of the firms who integrate are not fully integrated, but buy some and make some of their inputs. Although of course firms who are not vertically integrated do have zero values, many which are vertically integrated have a share less than one: about half of all vertically integrated firms are not fully integrated. Hence, firms are deciding not just whether to vertically integrate or not, but on the degree of vertical integration (VI) according to their characteristics.

Thus, use of a dichotomous response econometric model, such as probit (e.g. Montverde *et al.*, 1982 and Woodruff, 2002), which is common in the literature, does not take full advantage of the continuous nature of the vertical integration dependent variable. Preferably, the dependent variable ought to be modeled as a fractional response

variable conditional upon a vector of determinants, X. Accordingly, the population regression model takes the following form:[72][73]

$$E(VI \,/\, X) = \beta_1 + \beta_2 X_1 + \ldots\ldots + \beta_k X_k = X\beta \qquad (5)$$

Where,

VI = fraction of fabrics produced in house to total fabric requirements

X = a vector of independent variables

According to Papke and Wooldridge (1996), the problem of estimating (1) is that VI is bounded between 0 and 1, and so the effect of any particular X_j cannot be constant throughout the range of X. This problem may be overcome by augmenting a linear model with non-linear functions of X. But predicted values from the OLS regression can never be guaranteed to lie between 0 and 1.

The alternative used to be to model the log-odds ratio:

$$E(\log[VI \,/(1 - VI)] \,|\, X) = X\beta \qquad (6)$$

According to the authors the problems with this are:

1) The equation cannot be true if VI takes on the values 0 and 1 with positive probability (rather than the assumed 0 probability).This implies that if the log

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72 One might think that a tobit specification would be appropriate since there are many zero observations. However, tobit is appropriate only when the data are censored, meaning that the variable can in principle take the unobserved values (Madalla, 1983). But VI cannot be negative and so tobit should not be used, rather the fractional response model given here is the appropriate specification.

73 The following discussion draws closely on Papke and Wooldridge (1996).

odds ratio is used then observations of VI equaling to 0 and 1 require an adjustment.

2) Adjustment to extreme values may be not a good idea especially if a large proportion of the data are at the extremes (in my case, 76% of observations are at the 0 value). Thus, it is best to treat such situations in a regression framework.

3) Even if (6) is well defined, E(VI|X) cannot be recovered (as no functional form of VI is assumed)

It is always possible to estimate E(VI|X) by assuming a particular distribution for VI given X and estimating the conditional distribution by maximum likelihood. The authors show that for a regression model:

$$E(VI_i \mid X_j) = G(X_j \beta) \tag{7}$$

Where,

(X_j, VI_i): i   =1, 2, 3…., N is an independent (not necessarily identically distributed) sequence of observations

G (.)   = is a known function satisfying 0 <G(z)<1 for all z € R. This implies that predicted values of VI will lie in the interval (0, 1)

Equation (7) is well defined even if VI_i takes on 0 or 1 with positive probability. Typically, G (.) is chosen to be a cumulative distribution function (cdf), typically the logistic function. The authors show that G (.) does not even need be a cdf.

The estimation procedure they propose is a quasi likelihood method. Their Bernoulli log-likelihood function given by:

$$l_i(b) = VI_i \log[G(X_i b)] + (1 - VI_i) \log[1 - G(X_j b)] \tag{8}$$

is defined for 0<G(.)<1 and matches the case at hand for several reasons. The authors

explain that because equation (8) is a member of the linear exponential family (LEF), the

quasi-maximum likelihood estimator (QMLE), b, is consistent for β provided equation

(7) holds. In other words, the Bernoulli quasi-maximum likelihood estimator is consistent

and asymptotically normal regardless of the distribution of VI_i conditional on X_j; the

dependent variable could be a continuous variable, a discrete variable, or have both

discrete and continuous characteristics (exactly like this case's VI_i variable).

Accordingly, the conditional distribution of VI on X is assumed to be the logistic

distribution: G (.)= $(e^{Xb}/1+ e^{Xb})$. The conditional distribution is then estimated by

maximum likelihood (MLE).[74]

6.4 Results

This section presents the results from a basic regression, containing variables pertaining

to the different theories and factors discussed above. These results are then tested for

robustness using different model specifications, such as different measures of the

different variables. Finally, three hypotheses are explored: (1) whether the fact that firms

exporting their garment outputs has an effect on vertical integration (on account of

quality concerns); (2) whether institutional substitutes mitigate the effects of transaction

costs; and (3) how the effect of search and switch costs may vary according to whether

the fabric supplier is domestic or foreign.

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74 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)) = xβ. 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.

6.4.1 Regression Results: Basic Model

Results are presented first for the basic regression model, shown as regression (1) in Table 6.4, which includes all the main determinants discussed above along with a note on interpretation of the coefficients. Where possible, the results are compared with those in the existing empirical literature, although some of the variables used here are innovations. Following this discussion, robustness and more nuanced hypotheses are examined through variations in sample and model specification.

Table 6.4 Maximum Likelihood Estimation Results

	Basic Regression	Size Measures		Asset Specificity	Quality Measures	Parsimonious		Other Controls
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Quality disputes	0.502	0.722	0.641	0.582		0.539	0.535	0.500
	(0.059)*	(0.083)*	(0.082)*	(0.012)**		(0.031)**	(0.035)**	(0.060)*
Search & switch cost	0.259	0.383	0.578	0.267	0.249	0.255	0.252	0.258
	(0.115)	(0.147)	(0.022)**	(0.103)	(0.127)	(0.122)	(0.122)	(0.113)
Social & moral cost	0.366	0.461	0.343	0.380	0.373	0.377	0.378	0.366
	(0.031)**	(0.085)*	(0.129)	(0.019)**	(0.022)**	(0.024)**	(0.021)**	(0.030)**
Temporal specificity (D)	1.758	2.006	2.272	1.678	1.532	1.761	1.756	1.758
	(0.001)***	(0.016)**	(0.010)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Fashion turnover rate	0.002	0.002	0.000		0.003			0.002
	(0.499)	(0.562)	(0.898)		(0.26)			(0.499)
Monitoring Cost	-0.284	-0.494	-0.333	-0.286	-0.270	-0.299	-0.296	-0.285
	(0.086)*	(0.030)**	(0.105)	(0.081)*	(0.088)*	(0.077)*	(0.092)*	(0.093)*
Demand variability	-1.036	-1.377	-1.049	-1.050	-0.990	-1.043	-1.041	-1.035
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Demand uncertainty	-0.483	-0.665	0.749	-0.479	-0.463	-0.468	-0.466	-0.484
	(0.025)**	(0.030)**	(0.005)***	(0.031)**	(0.025)**	(0.040)**	(0.036)**	(0.026)**
Log issued capital	0.583			0.552	0.510	0.572	0.568	0.584
	(0.000)***			(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Fabrics unit investment cost	-1.170	-1.651	-1.551	-1.072	-1.119	-1.164	-1.165	-1.173
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
% Foreign ownership	0.000	0.017	0.013	0.000	0.002	0.004	0.004	0.000
	(0.953)	(0.235)	(0.327)	(0.981)	(0.857)	(0.749)	(0.715)	(0.956)
Listed on stock market (D)	-0.893	-0.768	-1.041	-0.801	-0.821	-0.881	-0.888	-0.898
	(0.276)	(0.472)	(0.212)	(0.252)	(0.212)	(0.218)	(0.196)	(0.275)
Tax incentive	-0.046	0.104	0.050	0.010	0.038	-0.031		0.048
	(0.823)	(0.712)	(0.83)	(0.963)	(0.844)	(0.882)		(0.813)
% Fabrics provided by sister company or branch	-0.122	-0.139	-0.110	-0.118	-0.113	-0.113	-0.111	-0.122
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Net assets		0.573						
		(0.000)***						
Garment sales			0.682					
			(0.002)***					
Age								0.000
								(0.98)
Family inherited business (D)								-0.042
								(0.956)
Non-available desired fabric quality					0.232			
					(0.189)			
% sold to women				0.009				
				(0.309)				
Number of Observations	243	242	237	242	244	244	245	243
Log Likelihood	-44.815	-47.533	-47.376	-44.641	-45.602	-45.045	-45.066	-44.814

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. $G(.)= (e^{Xb}/1+ e^{Xb})$.
2) Coefficients are marginal effects (percentages); p-values in parentheses, variables followed by (D) are dummy variables.
3) p-weights are used in all regressions.
4) Robust standard errors are specified in all regressions.
5) * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

A Note on Interpretation

Figure 6.1 shows the actual (the points) and fitted values (the solid line) from the basic regression model. 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 laying along the x-axis). For about half the sample, the fitted value is also indistinguishable from zero.[75] At the other end of the spectrum, the majority of fully integrated firms have fitted values of close to one.[76] Finally, virtually all partially integrated firms have fitted values in the mid-range.

Figure 6.1: Actual versus Fitted Values

Note: Data sorted by fitted values

———Fitted values   ● Actual values

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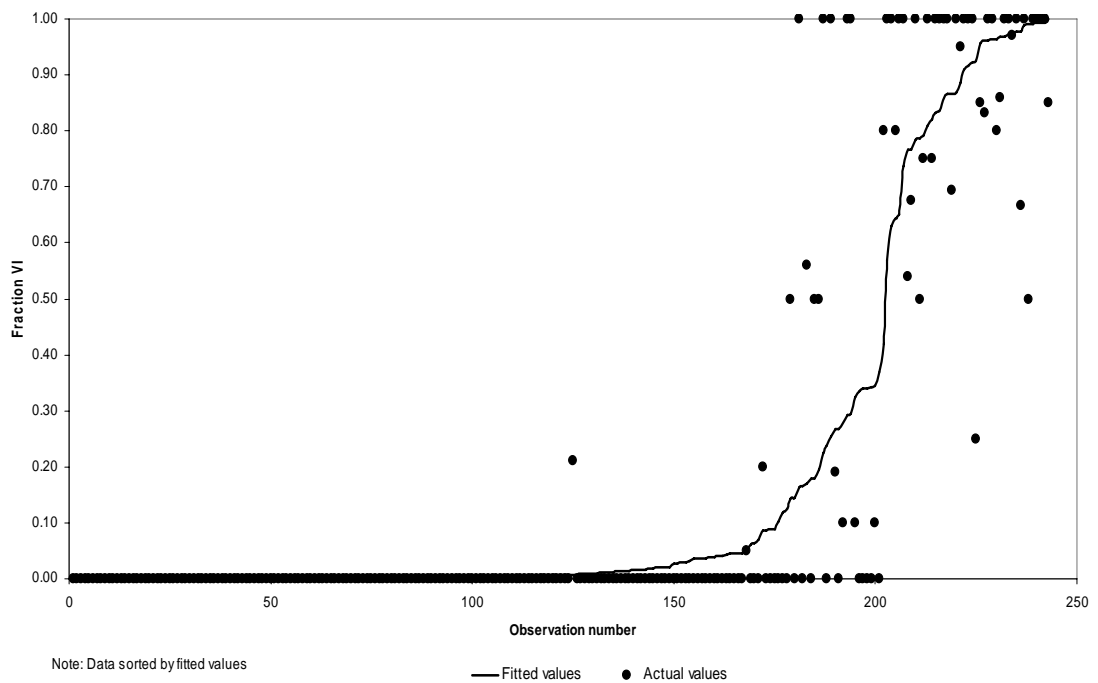
75 112 of the fitted values are 0 to two decimal places, and 164 have a fitted value of less than 0.05 (compared to 185 firms for which VI is actually 0 in the sample used for the basic regression).

76 18 of the 29 fully integrated firms have a fitted value of more than 0.95.

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 (0.01). Varying any one of the regressors by a marginal increment (i.e. to calculate the marginal effects), will leave the estimated fraction 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, in the discussion below, marginal effects are calculated 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 56 percent. Table 6.5 shows the marginal effects for these two sets of values of the regressors using the coefficients from the basic regression. It shows marginal effects for a one standard deviation increase around the specified values of the regressors (either the mean[77] or the value selected to yield a fitted VI of 0.56).

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77 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 6.5.

Table 6.5: Marginal Effects in % for Basic Regression at Different Points

	Marginal effect of 1 SD change (x100)	
	At the means	At VI fit=.56
Quality disputes	0.58	11.87
Search & switch cost	0.45	9.15
Social & moral cost	0.60	12.30
Temporal specificity (D)	0.63	17.84
Fashion turnover rate	0.23	4.33
Monitoring Cost	-0.46	-9.45
Demand variability	-1.67	-34.15
Demand uncertainty	-0.71	-14.52
Log issued capital	1.56	31.99
Fabrics unit investment cost	-1.51	-30.92
% Foreign ownership	0.00	0.28
Listed on stock market (D)	-0.15	-4.27
Tax incentive	-0.00	-1.37
% Fabrics provided by sister company or branch	-1.22	-25.04

1) All marginal effects are shown for a one standard deviation increase from the mean and from the used regressor values respectively.
2) Variables followed by (D) are dummy variables

Discussion of Results

The results show that a history of quality disputes does, as predicted, increase the likelihood of vertical integration: a one standard deviation increase in disputes over quality results in a 12 percent increase in the degree of integration (calculated at expected VI=0.5; it is just 0.58 calculated at the means, which is small for the reasons discussed above).[78]

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[78] Ordered categorical response variables (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.

There are no directly comparable results in the existing literature. The literature has considered product idiosyncrasy and complexity, as opposed to the quality disputes variable presented here, these have been associated with relationship specific investments (i.e. lock in and hold up considerations), to which I now turn.

In my model, lock in and potential hold up are measured by variables capturing social costs and temporal specificity,[79] the first of which has not been considered in the literature before.[80] Both these variables are significant with the expected signs, with one standard deviation increase resulting in increase in the share of inputs produced internally of 12 and 18% respectively (calculated at fitted VI=0.56, these figures are 0.60 and 0.63 calculated at the means. For future results, these values are not given in the text, but can be seen in Tables 6.5 and 6.6). This finding is in line with that of other studies examining the impact of temporal specificity on vertical integration; e.g. Masten, (1984); Hubbard, (1999).

Four sets of variables act as constraints on vertical integration: monitoring costs, financial constraints, the desire to avoid risk and if a company has a sister company or branch. All of these variables have the expected effect. A one standard deviation increase in monitoring costs reduces integration by 9%. Financial constraints are measured by two variables: perceived investment cost of opening up a fabrics production unit, which cuts vertical integration by 31%, and, as a proxy for access to own-finance, issued capital

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79 A third measure of lock in, related to search and switch costs, was insignificant in the basic model, but becomes significant when variations by market-orientation are allowed (see below).

80 Work in sociology focuses on social relations. For instance, Uzzi's work has put a very large weight on the effect of social relations on economic actions and outcomes in general (but not in the context of vertical integration) (eg. Uzzi (1996; 1999)

(logged), which increases in house production by 32%. The interpretation of the size variable is however complicated by the fact that it is also (1) a control variable, (2) may also pick up the effect of economies of scale as discussed in the theory section and (3) that it can be a proxy for other variables as discussed in section 4.2.4. The large correlation between all measures of financial size (issued capital, net assets and garment sales) and the average profits variable (0.50, 0.48 and 0.54 respectively) made me reasonably comfortable in considering size as another proxy for access to finance, hence, to financial constraints. However, given the three points above and since the correlation is not perfect one should treat the results of the size variable with caution.

The desire to avoid risk was measured by demand variability and sales uncertainty, which reduce integration by 34% and 15% respectively. Finally, firms that obtain their fabrics from sister companies, branches or both are less likely to be integrated: a one standard deviation increase in the percentage of fabric inputs provided by a branch or a sister company reduces the share procured internally by 25%.[81]

Existing literature has found similar results to those reported in the previous paragraph in most cases, but not all. Several studies 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) find higher monitoring costs to provide a

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81 The branch/sister company factor is a control variable rather than a determinant of vertical integration. 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.

disincentive for integration. However, Wernerfelt (1997) found such costs to be insignificant.

Financial constraints to vertical integration have been neglected by both the theoretical and empirical vertical integration literature. However, 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).

Contrary to my findings, Lieberman (1991) found no evidence to support the proposition that firms in the chemicals manufacturing industry are less likely to integrate backward when they face large fluctuations in downstream demand (i.e. demand variability). Other studies (e.g. Hanson, (1995), Anderson and Schmittlein, (1984)) find, as do I, that exposure to natural risk proxied by sales uncertainty discourages vertical integration, which is contrary to Williamson's predictions. [82]

Not all variables in the basic regression model are significant. This is true of asset specificity, measured by the fashion turnover rate (p-value=0.50), listing on the stock market, lock in caused by search and switch costs (p-value=0.12), tax incentives (p-value=0.82), and institutional substitutes proxied by foreign ownership (p-value=0.95), all of which are insignificant at the 10% level. The insignificance of these variables is not consistent with all existing literature, although the literature has not considered the tax

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[82] Though it is important to emphasize that Williamson stressed that uncertainty when coupled with asset specificity would encourage vertical integration (Williamson; 1979, 1983). When Anderson and Schmittlein interacted the two variables still there was no support for Williamson's prediction.

incentive and institutional substitutes[83] variables. This inconsistency may be in part since virtually all existing literature contains only the variables of interest in the estimated models rather than all relevant determinants, and thus suffer from omitted variable bias, which may render genuinely insignificant variables significant. Nevertheless, there may also be other explanations. The insignificance of the tax incentives variable may indicate two things. The first is that tax incentives to vertical integration are not present in the garment industry. The second is that people do not respond to such incentives. From the open ended interviews it seems that the former is more likely. Listing on the stock market is insignificant as there were only 7 firms that were listed on the stock market, 3 of which are integrated. On the other hand, as explored below, some variables may become significant once a more elaborate specification is employed.

The existing empirical literature has widespread support for the importance of asset specificity. For example, Montverde and Teece (1982) examined "human asset specificity" in the automobile industry. They concluded that the larger the engineering effort required in designing a specific automobile part (their measure of human asset specificity) the more likely is this part to be internally produced rather than contracted out for. Masten (1984) measures "relationship specific investment" for an aeorospace firm by both the degree of design specificity and site specificity of each component it uses in production. He found that the larger the degree of specificity the more likely is the component to be produced internally.

Woodruff (2002) uses fashion turnover rate as a measure for investment

83 Which will be dealt with in great detail in section 6.4.5.

specificity in the Mexican footwear industry 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 these assumptions, while transaction cost theory predicts vertical integration,[84] modern property rights theory would predict a reduced likelihood of forward integration.[85] In contrast to my findings[86], Woodruff's results support the property rights theory.

6.4.2 Discussion

Table 6.6 sorts the basic regression's variables in Table 6.5 ranked according to importance as given by the marginal impact of a one standard deviation change. It is shown that some variables rarely considered in the vertical integration literature prove to be not only significant but among the most important determinants of vertical integration.[87]

These variables are market volatility (measured by demand variability), firm size (proxying for scale economies but also for access to finance and possibly other factors such as firm productivity) and financial constraints. The strong influence of these

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84 On account of the mere existence of specific investments.

85 On account of the retailer's investment being the most important to the relation. See Chapter 2 for discussion of these differences.

86 Note that my results didn't support either theory as fashion turnover rate is insignificant. Recall that, in contrast to Woodruff's (2002) study, the garment industry setting in Egypt didn't allow for a distinction between the TCT's and PRT's predictions. See section 4.1.2 Lock In and Potential Hold Up (Modern Property Rights Theory: Asset Specificity à la Grossman, Hart and Moore) for details.

87 ,some more so than others. Demand variability and uncertainty have been dealt with in the literature to some extent but nothing comparable on the effect of size or financial constraints on vertical integration.

variables is to be expected in an environment such as that in Egypt where risk-spreading

channels are imperfect or absent and where financial intermediaries function poorly.

Table 6.6: Marginal Effects- of a One Standard Deviation Change in the X Variable - in % for Basic Regression Ordered by Importance

	Marginal effect of 1 SD change (x100)	
	At the means	At VI fit=.56
Demand variability	-0.67[***]	-34.15[***]
Log issued capital	1.56[***]	31.99[***]
Fabrics unit investment cost	-0.51[***]	-30.92[***]
% Fabrics provided by sister company or branch	-0.22[***]	-25.04[***]
Demand uncertainty	-0.71[**]	-14.52[**]
Temporal specificity (D)	0.63[***]	17.84[***]
Social & moral cost	0.60[**]	12.30[**]
Quality disputes	0.58[*]	11.87[*]
Monitoring Cost	-0.46[*]	-9.45[*]
Search & switch cost	0.45	9.15
Fashion turnover rate	0.23	4.33
Listed on stock market (D)	-0.15	-4.27
% Foreign ownership	0.00	0.28
Tax incentive	0.00	1.37

1) All marginal effects are shown for a one standard deviation increase from the mean and for the used regressor values respectively.
2) Variables followed by (D) are dummy variables
3) * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

In social network settings social and moral costs involved in replacing suppliers

with whom one has personal or family ties with can be so high so as to restrain economic

agents from attaining efficiency. By restricting their ability to switch to alternative

suppliers, these costs operate via limiting economic agents' choice set. This reasoning is

consistent with Uzzi's argument that embeddedness (the process by which social

relations shape economic actions) yield positive returns only up to a threshold point, after

which they become negative (Uzzi, 1996). Had there been no effect of social and moral

costs on vertical integration this result would have implied the persistence of personalized

exchange. One would have not been able to infer, however, whether the persistence of

this type of exchange is efficient.[88] The results indicate that garment firms in Egypt react to these types of costs by vertically integrating which can be interpreted as a move toward efficiency.[89]

Temporal specificity is an important regressor (5th place): if delivery on time matters to the producer then they are likely to produce a greater proportion of their inputs internally. In the vertical integration literature, the problem of temporal specificity is generally seen as a hold up problem, whereby the supplier may exploit the producer's need to get the materials on time to improve the conditions of the contract (i.e. opportunistic behavior) (see sections 3.2.2 and 4.1.2). However, the questionnaire question only revealed the importance of timely delivery and did not distinguish between whether the importance of timely delivery to the garment producer is associated with opportunistic behavior or with the inability of the fabric supplier to deliver on time on account of circumstances beyond their control.

During one of the interviews I conducted, the electricity went off 4 times throughout the 3 hour appointment (for a total period of 1 hour). The respondent explained that he cannot be harsh on his suppliers when it comes to timely delivery: "see how often we lose electricity, if this happens to him frequently even if he is serious and honors his word he cannot fulfill on time. It is simply out of his control." If so, then this case, and similar ones-though not all- would be in line with Fafchamps's (1996)

88 Kranton (1996) shows that personalized exchange can persist even when it is inefficient .

89 Kranton has also shown that the market (or generally any organizational structure) can persist even when it is inefficient (Kranton, 1996). But it is reasonable to assume that the transformation from complete personal exchange to either complete or partial integration is at the onset and so the dynamics of reaching the other extreme of vertical integration being inefficient are, at this point, still far reaching.

argument that: "In all cases, delivery problems are blamed on shocks affecting suppliers and are treated by respondents as cases of excusable default." The inability to deliver on time is, as is poor quality (to be discussed in the next paragraph), divorced from opportunistic behavior (i.e. lock in and hold up issues) but associated with the problems of production in a developing country. Not all firms are so concerned about timely delivery, nor do all firms face these production difficulties and therefore may excuse their suppliers. In addition, some firms may face a problem of moral hazard whereby they cannot distinguish between whether untimely delivery is due to excusable difficulties or supplier's failure to comply with the terms of the contract for no good reason. Hence, vertical integration is seen as a solution to delivery problems only for some of the firms.

The implication of the importance of the quality disputes variable is twofold. First, it reveals the importance of the segment of the market to which the garment firm belongs. If the firm serves the high end of the market, especially given the inefficiencies of the supporting industry caused by government intervention in trade policy, product quality considerations are essential. Second, a wide range of dispute resolution mechanisms in Egypt may be flawed.[90] It is more likely though that both considerations - market segment as well as disputes - jointly motivate vertical integration; this is what the results show. Similar to the quality disputes variable, temporal specificity also reflects the importance of market segment. Firms serving segments for which timely delivery is essential are more likely to integrate.

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90 For a wide range of dispute resolution mechanisms refer to Hendley et al. , (2000); and Hendley and Murrell, (2003).

Based on the case study evidence, firms of differing degrees of vertical integration, ranging from none to fully integrated, stressed the absence of relationship specific investment-at least of physical asset specificity.[91] The regression estimates confirm that asset specificity is irrelevant in the Egyptian garment industry (marginal $\beta=0.0$, p-value=0.499). As indicated in the previous section asset specificity has gained widespread empirical support.[92] This result confirms that in developing countries other factors come to play shaping the incentives for and against vertical integration. Economic theory, developed to fit developed country settings, does not provide sufficient insight into developing country environments. Finally, the insignificance of both search and switch costs and institutional substitutes, the former only moderately so (as significant at the 11% level) was somewhat expected. The search and switch cost variable aggregates across foreign and domestic suppliers. Therefore, as will be argued in section 6.4.6, disaggregation is necessary. The institutional substitute's effect, as earlier mentioned, is more likely to operate interactively with other factors affecting integration which will be handled in section 6.4.5.

6.4.3 Robustness Checks

This section examines whether the results are robust to a variety of specifications and robustness checks.

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91 Relationship specific investments are investments that are specific to a particular relation in the sense that their value outside the relationship is greatly reduced.

92 For reviews of the literature see Joskow, 1988; Shelanski et al. 1995; and Klein 2004.

Changing size variables to any other financial size variable such as net assets or garment sales prior to vertically integrating virtually leaves the basic result unaltered; regressions (2) and (3) in previous table 6.4 (section 6.4.1).

The percentage of garments sold to women prior to integration is used as an alternative measure for product standardization, hence to asset specificity. As described above the less the standardization the larger the specific investment and in turn the larger the hold up threat. Resembling the fashion turnover rate variable this measure is insignificant, and does not alter the basic regression result; regression (4).

Replacing disputes over quality with a variable measuring the extent to which desired fabric quality was available on the market prior to making the decision to integrate also maintains the basic result; regression (5). Dropping some insignificant variables such as fashion turnover rate and tax incentives, hardly alters the results; regressions (6) and (7).[93] And finally, including other controls such as age and a variable indicating whether the firm is an inherited family business does not alter the results; regression (8). [94],[95]

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93 Only 243 firms reported the size variable. I included a missing dummy for those observations missing this variable. Since (1) most of the missing observations belong to small, non-integrated firms of whom I have many already; (2) it hardly changed the results but (3) adds unnecessary co-linearity on the regression and reduces the degrees of freedom I decided to drop the dummy (regression results not shown).

94 The access to finance variable which may be better to use as a proxy for financial constraints compared to the fabrics unit investment cost variable, does not perform well. This is due to two reasons. The first is that it is highly correlated with both the size variable (0.24) as well as the demand uncertainty variable (0.19). The second reason has to do with the question itself. The question asked how difficult it would be to get finance from various sources if the firm wanted to expand vertically in any additional stage of production. The problem with this question is that firms that are already vertically integrated in fabrics would answer this question thinking about the finance necessary to vertically integrate in dying, for instance, a far larger capital investment undertaking compared to opening up a fabrics production unit, whereas a non-vertically integrated firm may think of integrating in fabrics or retail. Consequently, the answers are not comparable in terms of the amount of required funds each type of firm bases its answer on.

The last regression shows both the age of the firm as well as the family business variable to be insignificant. The prediction was that both would increase the degree of vertical integration on account of industry experience. As for the latter variable, it could also induce integration because it could also be a reasonable proxy for access to finance from family members. This insignificance maybe due to the fact that industry experience is expected to boost horizontal integration as much as it boosts vertical integration; the data available do not allow for this possibility to be investigated. In addition, maybe this is so as access to finance is already controlled for by both the investment cost and the size variables. Or it may simply be that these variables are not important in determining vertical integration in Egypt.

6.4.4 Exports and Vertical Integration

Exports (percentage of garments a firm exported before it integrated) are a quality measure since the quality required for export markets is mostly greater than that in the domestic market (see table 3.1). But should exports substitute the quality disputes variable or complement it? The correlation coefficient between the two variables is 0.088

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95 The average profits variable also didn't perform well (is insignificant) in several model specifications. The average profits variable indicates average profits throughout the establishment of the firm until the year it vertically integrated. It is a categorical variable ranging from very weak to very high. There are two reasons for this poor performance. The first is the high correlation between average profits and both the size variable (0.50) and the demand uncertainty variable (-.20). When substituting average profits for the size variable, profits become significant at the 13% level and when substituting it for both size and uncertainty, profits become significant at the 8% level. And so the size variable, in a way, proxies for both size and profits. The second is the tendency of most respondents, especially smaller firms, to not give an honest answer to this question. Profits are a very sensitive area and many respondents are concerned about tax authorities haunting them if they revealed their profits are high; regressions A1-A3, Table A1 of Appendix C.

which suggests that exports include other aspects of quality "disputes over quality" did not capture.

Accordingly, I added exports to the basic regression (Table 6.7 Regression (9)). However, it is insignificant (p-value=0.31), which seems surprising. But the case study evidence provided insights as to how the export variable operates (section 3.2.1). For both the export market and the local high quality market, low quality fabric inputs can cause problems. There is, however, a crucial difference between the two groups. Exporters have the option of importing their fabrics. But those serving the domestic market are legally prohibited from this choice – they have to either buy locally or produce the fabric themselves. Hence, it is reasonable to expect that on the one hand exporters who imported their fabric requirements are less likely to integrate. This is so because they have already fulfilled the desired quality requirement. On the other hand, however, exporters who do not import their requirements are more likely to vertically integrate to ensure the desired quality (given all the upstream market inefficiencies associated with government intervention.)

Based on the above, I interacted the export variable with an import dummy that indicates whether a firm imported part or all of her fabric requirements.[96] The results are shown in regression 10: as expected (1) the export variable becomes significant on its own right; and (2) the sign of the interactive term's coefficient is negative indicating that

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96 The Import Dummy $\quad$ =1 if fabric imports>0

$\qquad\qquad\qquad$ =0 otherwise

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).

There are no comparable results in the literature for this variable, it is a case specific variable and so should be utilized on a case by case basis depending on the institutional environment of the case under study.

Table 6.7: Exports, Interactive Institutional Substitutes & Disaggregated Search & Switch Cost

	Basic Regression (1)	Including % Exported (9)	Including % Exported & Imports Interaction (10)	Foreign Ownership Interaction (11)	Garment C. Council Interaction (12)	Disaggregated Search and Switch Cost (13)
Quality disputes	0.502	0.491	0.478	0.456	0.319	0.010
	(0.059)*	(0.084)*	(0.084)*	(0.11)	(0.194)	(0.959)
Search & switch cost	0.259	0.192	0.207	0.235	0.219	
	(0.115)	(0.271)	(0.236)	(0.128)	(0.13)	
Social & moral cost	0.366	0.417	0.388	0.360	0.287	0.282
	(0.031)**	(0.025)**	(0.040)**	(0.036)**	(0.071)*	(0.045)**
Temporal specificity (D)	1.758	1.742	1.687	1.799	0.017	1.659
	(0.001)***	(0.002)***	(0.003)***	(0.001)***	(0.000)***	(0.000)***
Fashion turnover rate	0.002	0.002	0.002	0.002	0.002	0.000
	(0.499)	(0.511)	(0.504)	(0.464)	(0.319)	(0.576)
Monitoring Cost	-0.284	-0.320	-0.321	-0.298	-0.265	-0.119
	(0.086)*	(0.061)*	(0.072)*	(0.090)*	(0.107)	(0.335)
Demand variability	-1.036	-1.028	-1.010	-1.024	-0.948	-0.669
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Demand uncertainty	-0.483	-0.458	-0.488	-0.548	-0.520	-0.459
	(0.025)**	(0.032)**	(0.022)**	(0.013)**	(0.009)***	(0.010)***
Log issued capital	0.583	0.532	0.560	0.586	0.512	0.439
	(0.000)***	(0.001)***	(0.001)***	(0.000)***	(0.000)***	(0.000)***
Fabrics unit investment cost	-1.170	-1.178	-1.176	-1.277	-1.235	-1.005
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
% Foreign ownership	0.000	0.001	0.002			-0.007
	(0.953)	(0.934)	(0.859)			(0.454)
Listed on stock market (D)	-0.893	-.948	-0.835	-0.916	-0.830	-0.961
	(0.276)	(0.255)	(0.335)	(0.296)	(0.303)	(0.016)**
Tax incentive	0.046	-0.041	-0.088	-0.075	-0.024	0.089
	(0.823)	(0.835)	(0.669)	(0.723)	(0.905)	(0.63)
% of fabrics provided by sister	-0.122	-0.116	-0.119	-0.126	-0.120	-0.076
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
% Exported		0.009	0.018			
		(0.313)	(0.078)*			
% Exported*Import Dummy			-0.016			
			(0.186)			
Foreign ownership DM*finance				0.037		
				(0.015)**		
Foreign ownership DM*disputes				-0.398		
				(0.446)		
Foreign ownership dummy (D)				-1.072		
				(0.236)		
Membership to council*disputes					0.078	
					(0.891)	
Search & switch cost w.r.t. domestic suppliers						0.349
						(0.032)**
Search & switch cost w.r.t. foreign suppliers						-0.406
						(0.137)
Missing dummy (domestic)						-0.773
						(0.193)
Missing dummy (foreign)						-13.227
						(0.006)***
Membership to council*finance					19.151	
					(0.112)	
Current membership to Garment Commodity Council(D)					-1.230	
					(0.080)*	
Observations	243	243	243	243	243	243
Log Likelihood	-44.815	-44.384	-43.861	-44.057	-43.262	-39.314

1) MLE as specified above, coefficients are marginal effects (percentages), p values in parentheses, variables followed by (D) are dummy variables.
2) p-weights are used in all regressions.
3) Robust standard errors are specified in all regressions.
4) significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

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6.4.5 Institutional Substitutes Interactive Terms

As described in section 4.2.5 institutional substitutes mitigate institutional deficiencies. And so if, for instance, a particular institutional substitute mitigates the limited access to or cost of finance then one would 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 for integration via reducing the positive effect of, for instance, disputes over quality on vertical integration. Accordingly, I interact the foreign ownership variable - proxying for foreign institutions[97]- with both the fabric unit investment cost and quality disputes variables; regression (11).

Indeed, foreign ownership moderates the negative effect that high investment costs have on vertical integration. The marginal coefficient on the interactive term is significant at the 1.5% level and is positive (β=.037, p-value=0.015, z=2.43) compared to the negative coefficient of the investment cost variable (β=-1.277, p-value=0.000, z=-4.85). Clearly then foreign ownership eases financial constraints to vertical integration even if this effect is quite modest. But the effect of foreign ownership on disputes is not significant, although it has the expected sign (β=-.398, p-value=0.446, z=-0.76).

With respect to membership to the garment commodity council there is a problem with the reliability of this variable. The council was not established before many of the firms were established or before they integrated. This manifests itself in a mean value of only .026 (7 firms) for this variable prior to integration compared to

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97 As discussed before foreign institutions are considered an institutional substitute since they substitute for domestic institutions such as the domestic legal system or domestic financial intermediaries.

.071 (19 firms) currently.[98] I, therefore, interact the current (as opposed to before integration) membership status with both fabric unit investment cost and the quality disputes variables; regression (12) of table 6.7.

Membership to the council definitely moderates the discouraging effect high fabric unit investment cost (proxying for financial constraints) has on vertical integration. The marginal coefficient on the interactive term is significant at the 11.2% level and is positive (β=19.151, p-value=0.112, z=1.59) compared to the negative coefficient of the investment cost variable (β=-1.235, p-value=0.000, z=-4.36). The effect of membership to the council on financial constraints is relatively large and indicates that influential members of the council have a less severe financial constraint. Precisely, the coefficient on the investment cost variable increases from -1.23 to 17.916 (-.012345+.1915076) indicating that an increase in the investment cost variable actually increases vertical integration, and does not decrease it. As for its effect on quality disputes, membership to the council has an insignificant effect (p-value=0.891, z=0.14). Using current membership as opposed to membership prior to vertical integration, however, gives rise to an endogeneity problem.[99] Therefore, results involving membership to the council should be taken with caution. Table 6.7 shows these results.

Once again, no comparable results are to be found in the empirical literature either because these factors are not important in developed country settings, or they

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98 This is a dummy variable, taking the value of 1 if a firm is a member and 0 otherwise.

99 One cannot distinguish whether members of the council are integrated because they had a less severe financial constraint or whether they have a less severe financial constraint because they are integrated.

are simply believed not to be important and/or the existence of a general trend in the literature to limit the variables employed in econometric analysis.

6.4.6 Different Market Segments: Disaggregated Supplier Search and Switch Costs

The prediction for supplier search and switch costs is that high search and switch costs - a sign for lock in - stimulate a potential hold up threat which garment producers would respond to by vertically integrating. It was clear from the interviews that, regarding vertical integration, garment producers behave differently depending on whether they are dealing with a domestic or a foreign fabric supplier. The data were collected in a disaggregated manner, providing search and switch costs with respect to both domestic suppliers and foreign suppliers separately. Instead of using the aggregated, weighted[100]search and switch cost variable appearing in regression (1), I use two variables (1) search and switch costs with respect to domestic fabric suppliers; and (2) search and switch costs with respect to foreign suppliers. Prior to integration, some firms dealt solely with domestic suppliers others with foreign ones and the rest dealt with both types of suppliers. Accordingly, each firm will have at least one non-missing disaggregated search and switch cost variable.[101] So as not to lose those observations for which one of these variables is missing, I included two missing dummy variables.[102] One dummy is a search and switch costs dummy for foreign suppliers and another is for domestic suppliers.

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

101 Either search and switch costs with respect to foreign suppliers or search and switch costs with respect to domestic suppliers.

102 A missing dummy, DUMX for variable X takes the value of 1 if X=missing and 0 otherwise, i.e.

DUMX =1   for X=missing

     =0   otherwise

The results (Table 6.7, regression (13)) show that the presence of high search and switch costs increases the likelihood for vertical integration only if the garment firm was dealing with repeated "domestic" fabric suppliers. Whilst if the repeated suppliers were foreign (i.e. the fabric was imported prior to integration) then, contrary to theoretical expectations, the presence of search and switch costs does not increase the likelihood for vertical integration (p-value=0.137, z=-1.49).

There are two plausible explanations to this phenomenon. The first is that when foreign institutions ensure contract enforcement with respect to quality and delivery for a contracted price, suppliers' opportunistic behavior is deterred, reducing the necessity of garment firms to integrate. Hence, the presence of search and switch costs with respect to foreign suppliers does not imply that they actually behave opportunistically rather it merely indicates that there exist trust and security in the relationship between the garment firm and its repeated foreign fabric supplier.[103] In other words, there is lock in not followed by hold up. This may not be the case with respect to domestic suppliers when domestic institutions do not guarantee the same level of enforcement.[104]

The second explanation relates to market segment. If search and switch costs are high with respect to domestic suppliers the garment firm is able to ensure the

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X itself is replaced with any constant number if X is missing. Hence, a new variably Z is generated such as: Z   = constant   for X=missing

        = X   otherwise

Both Z and DUMX are added to the right hand side variables of the regression.

103 In fact, several of the interviewees stated that they hope that Egyptian suppliers respect their on time delivery and quality commitments as much as foreign suppliers do.

104 Or alternatively, when work ethics are different. But one cannot distinguish whether economic agents are responding to the incentive structure or because they genuinely rather behave non-opportunistically.

desired quality of fabrics if it vertically integrates. However, if there exist search and switch costs with respect to foreign suppliers, giving rise to hold up, internal production of fabric inputs may not be a sensible response as the firm cannot match the desired quality level. It is likely that the two aforementioned justifications jointly explain the difference in significance of the search and switch cost variable depending on the nationality of the supplier.

Two variables loose their significance in regression (11), which may be explained by the multicollinearity introduced by the missing dummies for foreign and domestic suppliers. 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 also meant to have a systematic relation with vertical integration. This co-linearity undermines the significance of monitoring costs and quality disputes. [105] 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.

6.5 Caveats: Solutions and Explanations

This section anticipates potential problems that might be argued to exist in the analysis, presenting various regression results to show that such problems are apparent rather than real. I begin with 'cognitive concerns', meaning issues related to respondent recall, and then deal with 'time problems', i.e. the appropriate choice of time period for dependent and independent variables.

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105 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 table shows a large correlation coefficient of (-.30) between the dummy and quality disputes. It also shows a large correlation with monitoring costs (0.20).

6.5.1 Cognitive Concerns

The estimates presented above use firm characteristics and decision makers' perceptions immediately prior to taking the decision to vertically integrate as the determinants for that decision. The logic is simple. On the one hand, perceptions preceding vertical integration are a good proxy for the entire history that shaped these specific perceptions. One the other hand, firm characteristics in the immediate year and/or years preceding integration are precisely the characteristics which – combined with perceptions – provided the impetus for decision makers to finally vertically integrate.

Given this approach, firms differ with respect to the years for which their characteristics and perceptions were collected: being the current year and either the year preceding vertical integration or establishment, where these last two vary from firm-to-firm. This fact gives rise to two cognitive issues. The first problem is that the decision maker may no longer be available for interview, which most usually arose when s/he had passed away and the interviewee was then usually his/her offspring. It is plausible to expect some resemblance of the answers to those that the father would have given were he alive. However, one would not expect them to be identical. Therefore, a question was included on the "awareness year" of the respondent, who was asked: "In what year did you become aware of the reasons behind the basic and strategic decisions undertaken in this firm?" To examine whether the inclusion of cases in which the respondent was not the decision maker at the time of integration affects the results, I re-estimated the basic model excluding all observations for which the respondent's awareness year is later than the vertical integration year. Regression 14 in Table 6.8 shows the results, significance levels are hardly different, though the probability value for the search and switch cost variable increases by a substantial

amount. This result is most likely because of the difference in significance between the foreign and domestic versions for this variable as discussed in section 6.4.6, or possibly due to the smaller number of observations and so the loss in the degrees of freedom. There is a decline in magnitude of the marginal coefficients for reasons which will be explained below.

The second cognitive issue may take place even if the respondent was the actual decision maker. If the firm integrated many years ago, excessive recall periods may contaminate the answers. Respondents may have forgotten their real perceptions back then or confuse current perceptions with old ones. Against this point of view, it might be argued that decision makers will not forget reasons which prompted them to make a strategic decision such as vertical integration. Vertical integration involves buying specialized machines, providing space for the production operations, learning about the production process and many other issues that are of too great a magnitude to be forgotten, especially for a businessman/woman to whom his/her firm is like a child.[106]

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106 In fact, several of my interviewees used those exact words when referring to their firms.

Table: 6.8 Cognitive Concerns: Basic Regression for Different Sub-Samples

	Basic Regression (1)	Awareness Year Regression (14)	Firms Integrating after 1989 (median year) (15)	Backwardly Integrated Firms only (16)
Quality disputes	0.502	0.173	0.056	0.007
	(0.059)*	(0.001)***	(0.001)***	(0.006)***
Search & switch cost	0.259	-0.005	0.041	0.005
	(0.115)	(0.867)	(0.008)***	(0.030)**
Social & moral cost	0.366	0.057	0.008	0.002
	(0.031)**	(0.035)**	(0.356)	(0.143)
Temporal specificity (D)	1.758	0.207	0.093	0.087
	(0.001)***	(0.003)***	(0.000)***	(0.000)***
Fashion turnover rate	0.002	0.000	-0.000	-0.000
	(0.499)	(0.723)	(0.682)	(0.437)
Monitoring Cost	-0.284	-0.029	-0.022	-0.003
	(0.086)*	(0.179)	(0.035)**	(0.073)*
Demand variability	-1.036	-0.203	-0.032	-0.004
	(0.000)***	(0.000)***	(0.010)***	(0.014)**
Demand uncertainty	-0.483	-0.087	-0.024	-0.003
	(0.025)**	(0.011)**	(0.127)	(0.168)
Log issued capital	0.583	0.070	0.034	0.004
	(0.000)***	(0.001)***	(0.000)***	(0.002)***
Fabrics unit investment cost	-1.170	-0.132	-0.109	-0.013
	(0.000)***	(0.000)***	(0.000)***	(0.001)***
% Foreign ownership	0.000	0.003	-0.000	-0.000
	(0.953)	(0.136)	(0.963)	(0.802)
Listed on stock market (D)	-0.893	-0.070	-0.071	-0.007
	(0.276)	(0.479)	(0.000)***	(0.031)**
Tax incentive	0.046	-0.012	0.016	0.002
	(0.823)	(0.626)	(0.189)	(0.400)
% Fabrics provided by sister company or branch	-0.122	-0.001	-0.005	-0.000
	(0.000)***	(0.000)***	(0.000)***	(0.001)***
Number of Observations	243	227	215	204
Log Likelihood	-44.815	-28.865	-18.633	-15.307
% Not vertically integrated (VI=0)	76%	82%	86%	91%
Estimated fraction of VI calculated at the mean of the X's	0.01214399	0.00144004	0.00053241	0.00006863

1) MLE as specified above, coefficients are marginal effects (percentages), p values in parentheses, variables followed by (D) are dummy variables.
2) p-weights are used in all regressions.
3) Robust standard errors are specified in all regressions.
4) * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

As for decision makers equating current and past perceptions, this is not the case. For all variables, with no exception, the substantial majority of vertically integrated firms' respondents report different perceptions and characteristics for the last completed financial year/past few years compared to those reported for the last

completed financial year/past few years prior to integration. For example, 68% of all respondents in vertically integrated firms have changed their perceptions regarding monitoring costs. For quality disputes, fabrics unit investment cost, demand variability and sales uncertainty this figure is 78%, 74%, 87%, and 71% respectively. The change was mostly in a direction unfavorable for the vertical integration decision. For example, 44% perceive monitoring costs to be higher than they previously thought it would be[107] (remember that perceptions that this cost would be low drove people toward integration) and 66% perceive fabrics unit investment cost to be currently higher than their belief prior to integration.

Of course, currently stated views of past perceptions may be influenced by current perceptions without the two being the same. To take a more rigorous look at whether the past influences the present I estimated the following one variable simple model:

$$CP = \beta\ PP + \varepsilon$$

Where CP=Current Perceptions, PP=Past Perceptions and ε=error term. There are two groups of variables. The first are characteristics variables such as the size of the firm, whether it is listed on the stock market, firm's percentage exported and the fashion turnover rate for the firm's products. The second are pure decision maker's perceptions variables, such as how high s/he expected monitoring costs to be upon integration or whether s/he believed that integration is a hefty financial undertaking. The respondents usually checked the former type of variables in company books or referred enumerators to the relevant department personnel and even if not then the likelihood for bias is much reduced for what could be labeled "objective variables"

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107 In other words, higher than before they actually started producing their fabric inputs internally.

(as opposed to subjective perceptions and feelings about something). The concern is more acute for the latter type of variables, where the answer is subjective and depends on one's own opinions and feelings. Accordingly, the OLS regression results shown in Table 6.9 below are divided between the two groups.

Table 6.9 Cognitive Concerns: OLS Regressions of Current on Past Variables

	Intercept	Coefficient	R^2	No of Observations
Perception Variables				
Tax incentive	5.7	0.62	0.29	62
	(0.000)***	(0.000)***		
Financial constraints	3.71	0.009	0.00	62
	(0.000)***	(0.961)		
Monitoring cost	3.97	0.23	0.08	62
	(0.000)*	(0.023)**		
Characteristics Variables				
Quality disputes	3.75	-0.07	0.01	62
	(0.000)*	(0.49)		
Fashion turnover	34.21	0.92	0.51	63
	(0.052)*	(0.000)***		
Demand variability	2.81	0.09	0.01	63
	(0.000)***	(0.472)		
Demand uncertainty	3.30	0.23	0.09	63
	(0.000)***	(0.020)**		
Size	4.07	0.72	0.67	59
	(0.000)***	(0.000)***		
Exports	5.41	0.77	0.59	64
	(0.185)	(0.000)***		
Stock market	0.00	0.33	0.30	63
	(1.000)	(0.000)***		

* significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

Of the three perceptions variables (i.e. monitoring cost, financial constraints and tax incentive) only one (tax incentives) has a relatively high R^2=0.29 and a very significant coefficient (p-value=0.000). However, the relatively high R^2 is to be expected in this case. The tax incentive variable inquired on the degree the respondent believed that vertical integration would reduce his/her firm's tax burden. S/he was asked the question twice, for his/her belief before s/he integrated and on his/her current belief. Obviously if vertical integration does not in fact reduce a firm's tax burden then respondent's past and current beliefs are more likely to coincide than

differ. I have learned from the case study evidence in which I asked open questions on the benefits of integration that a reduction in a firm's tax burden is by no means one of these benefits and indeed should have not kept the question in the questionnaire, for the tax incentive variable turned insignificant in all regressions.

As for the financial constraints variable it is evident that there is absolutely no connection between past and current responses. The monitoring cost variable has a significant coefficient (however small, $\beta=0.23$) but a very low $R^2=0.08$ indicating that the error dominates the regression.

With respect to characteristics variables, four variables have relatively high R^2. In addition to the logic presented above as to the irrelevance of the concern when it comes to firm characteristics some more clarification is presented here. Whether a company is listed or not on the stock market is straight forward, once a company is listed it usually continues to be so. As to the export variable, firms who exported have as shown earlier in section 6.4.4 vertically integrated because they exported some or all of their output. If this were the reason for their integration logically then they would still export after integration. The same logic applies to the fashion variable (fashion turnover rate). Finally, the size variable was the main variable for which respondents referred the enumerator to the financial department or had to check their financial records, thus reducing the error rate for that particular group of variables. The high correlation between past and current size variables (issued capital) tends to confirm the statement that smaller firms are trapped into a vicious circle of small size, or more generally, that size perpetuates itself.

Nonetheless, to investigate whether there is a potential problem here, I dropped those firms who vertically integrated before the median year - that is before 1989. The results, shown in regression (15), still look reasonable, especially

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considering that over half of vertically integrated firms (32 firms) have been dropped from the sample. Instead of being significant at the 1% level; the sales uncertainty variable becomes significant at only 12.7% and social costs become insignificant (p=0.356). All other significance levels are very similar.

A third cognitive issue may arise due to the questionnaire design. Firms that integrated at establishment have no history to be asked about. Hence, they were asked hypothetical questions regarding perceived costs and benefits. For example, a backward integrated firm is asked "In the years prior to producing your own fabrics, on average, how variable was the demand on your products?"[108] But a firm that has embarked on both garments as well as fabric production simultaneously at establishment was asked: "Before establishing your company, how variable did you expect the demand on your garments to be during the first few years of operation?"

To see whether the use of counterfactual data made a difference to the results the basic model was re-estimated excluding all firms that integrated at establishment (regression 16 in table 6.8 above). Social and moral costs become significant at the 14% level only and uncertainty at the 16.8%. Apart from these two, significance levels are virtually unaltered. Nevertheless, marginal coefficients have dropped significantly. The same logic explained in section 6.4 ("A Note on Interpretation") carries over to here. Using a subset of the sample that includes the same number of non-vertically integrated firms but only a few of the vertically integrated ones meant that 91%[109] of the observations are not vertically integrated. This much higher proportion (than the one for the full sample) caused the estimated fraction integrated

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108 Which the answer to was given on a six point scale from "absolutely invariable" to "very variable".

109 82% and 86% for regressions 14 and 15 respectively.

calculated at the means of the regressors to decline sharply from (0.01) to (0.00007)[110]. Hence, varying any one of the regressors by a marginal increment (i.e. to calculate the marginal effects), will leave the estimated fraction integrated extremely close to zero (to an even greater extent than in the case of the full sample, since most fitted values are indeed even closer to zero). The marginal effects calculated at the means thus appear much smaller than those for the full sample. The row before last of table 6.8 gives the percentage of non-vertically integrated firms and the last row gives the estimated fraction of vertical integration calculated at the means of the regressors for each of the presented regressions.

To reinforce this logic, and prove that the basic regression results do not entirely depend on firms vertically integrating at the outset, I ran the same basic regression but instead of excluding firms integrating at the onset, I excluded firms that integrated backward. The same effect is evident, significance levels are nearly identical to the basic regression, however, marginal effects plummet sharply. The estimated fraction of vertical integration calculated at the means of the regressors is (0.0008)[111] which-following the same logic- induces the marginal coefficients' sharp decline.[112]

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110 From (0.01) to (0.00144) and (0.00053) for regressions 14 and 15 respectively.

111 A bit larger than the estimated fraction for the previous regression. This is due to the fact that for this relatively larger sample only 82% of the observations are not vertically integrated (compared to the 91% for the previous sample).

112 Regression results not shown. Available upon request from the author.

6.5.2 Time Problems

Modeling vertical integration suffers from a number of time-related 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. However, 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 a dichotomous independent variable is used and a probit or logit regression is performed. Nevertheless, this will 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 (most the remainder have decreased the degree of integration, with just one firm increasing it).

Once deciding on the percentage it is the norm to maintain it at the same level. This result provides confidence in 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. Which justifies using the independent variables at the time of (actually prior to) the first integration decision rather than independent variables of the current time.

Despite this, it is of course on interest to know how different the results would be if one uses dichotomous response models instead (i.e. probit and logit). Regressions 17 and 18 in Table 6.10 show these results.

Following Woodruff (2002), the dependent variable in these two regressions is a dichotomous variable taking a value of 1 if VI>0 and 0 otherwise. The results show that two variables (social and moral cost; and demand uncertainty) that were significant in the basic regression become insignificant (the latter for logit only, it is significant at 10% using probit). The coefficients are incomparable 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, provides reassurance in 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, as have been shown, renders two variables that would be insignificant using the conventional approach significant.[113]

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113 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..

Table 6.10 Dichotomous Response Models

	Basic Regression (1)	Probit (17)	Logit (18)
Quality disputes	0.418	0.756	1.451
	(0.059)*	(0.000)***	(0.000)***
Search & switch cost	0.216	0.129	0.272
	(0.115)	(0.256)	(0.259)
Social & moral cost	0.305	0.188	0.468
	(0.031)**	(0.177)	(0.119)
Temporal specificity (D)	2.949	2.234	4.341
	(0.001)***	(0.001)***	(0.006)***
Fashion turnover rate	0.002	0	-0.001
	(0.499)	(0.904)	(0.852)
Monitoring Cost	-0.237	-0.269	-0.564
	(0.086)*	(0.024)**	(0.026)**
Demand variability	-0.864	-0.54	-1.098
	(0.000)***	(0.001)***	(0.004)***
Demand uncertainty	-0.402	-0.236	-0.351
	(0.025)**	(0.056)*	(0.168)
Log issued capital	0.486	0.392	0.789
	(0.000)***	(0.001)***	(0.004)***
Fabrics unit investment cost	-0.975	-0.814	-1.599
	(0.000)***	(0.000)***	(0.000)***
% Foreign ownership	0.001	0.006	0.013
	(0.953)	(0.381)	(0.388)
Listed on stock market (D)	-1.253	-0.958	-2.058
	(0.276)	(0.253)	(0.211)
Tax incentive	-0.038	0.036	0.048
	(0.823)	(0.743)	(0.833)
% Fabrics provided by sister company or branch	-0.102	-0.028	-0.053
	(0.000)***	(0.032)**	(0.025)**
Constant	-3.535	-3.268	-6.890
	(0.096)*	(0.104)	(0.113)
Number of Observations	243	243	243
Log Likelihood	-44.815	-24.584	-23.678

1) Coefficients are regression coefficients, p-values in parentheses, variables followed by (D) are dummy variables.
2) p-weights are used in all regressions.
3) Robust standard errors are specified in all regressions.
4) * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

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 LCFY values are valid determinants to use for the decision not to integrate. However, it might be pointed out, 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. But these would be

onerous to collect and probably unreliable. It might instead be said that in practice owners or managers will only seriously consider such an investment on a very occasional basis, such as at establishment and maybe every ten years or so thereafter. In these circumstances one ideally would use the values for the year preceding the decision not to integrate was made - in principle possibly generating several observations for each firm. It is clearly not practical to identify these "decision years" in practice. Therefore, in summary, using LCFY data for non-integrated firms seems the most satisfactory way to proceed.

6.6 Omitted Variable Bias

Most empirical studies consider only the theory of interest. This focus means that they exclude from their analysis other variables which have also been argued to be determinants of vertical integration by other authors. Hence, if these latter authors are also correct, then the estimated models have omitted variable bias, which means that neither the coefficient estimates nor any of the tests of statistical significance are valid.

Paul Joskow (1988) has made this point in his literature review on asset specificity and vertical integration in which he stresses that alternative theories are not allowed for in empirical work. The usual approach is to state a hypothesis pertaining to a single model which is tested against the data. If the hypothesis is supported by the data it is accepted until new hypotheses or data can be examined (Joskow, 1988). This is the methodology empirical work on vertical integration has been following and hence the problem of omitted variable bias. This section illustrates the omitted variable bias problem that is present in much of the empirical literature on vertical

integration, and shows how joint testing of the various theories and models is key to overcoming this deficiency.

This bias arises since omiting a relevant variable in multiple regression leads to "omitted variable bias". An estimator, b is said to be an unbiased estimator of β if and only if E(b) = β, i.e. b is unbiased if the mean of its sampling distribution is equal to β, the parameter being estimated (Thomas, 1985). The omitted variable bias for the slope coefficient of an included variable, X_j, is a function of (1) the coefficient on the excluded variables (had they been included in the regression), and (2) the correlation between X_j and each of the excluded variables. Omitted variable bias is present whenever relevant variables are omitted, unless those variables are orthogonal to all variables included in the model.

Before embarking on showing the bias that emerges when including only a limited number of variables, usually those representing one particular theory of interest, I first divide the variables I have used in this analysis into general variables and context specific variables. General variables are those that should apply in any context, i.e. not just the Egyptian context - be it a different industry, a different level of economic development, or a different country. I classify lock in, asset specificity, considerations of avoiding risk, agency issues, size and financial constraints under this type of variables. Context specific variables are applicable according to the context. For instance, the interactive variable for exports with the imports dummy introduced in section 6.4.4 is context specific. In many countries, all groups of producers have the option to import their inputs if desired. The same applies to splitting the search and switch cost variable into search and switch costs with respect to both foreign and domestic suppliers (section 6.4.6). Proxies for institutional substitutes such as the garment commodity council (section 6.4.5) may not exist in

exactly the same way in other countries; but other institutions that perform similar roles such as lobbies and unions may be present, which may make that variable part of the general variable group. Only the general variables included in the basic regression are utilized here to demonstrate the extent of bias caused by omitting relevant variables in a regression.[114]

Regression (19) of table 6.11 includes only variables corresponding to Transaction Cost Theory and the Modern Property Rights Theory,[115] excluding all other likely relevant theories. These variables – which were insignificant in the basic regression – now appear to be significant (aggregated search and switch cost variable and the fashion turnover rate). The fashion turnover rate was insignificant in all specifications of this study (nearly 20 specifications). This significance appears to support the validity of the Modern Property Rights Theory[116] and suggests that disaggregating the search and switch cost variable by foreign versus domestic suppliers is unnecessary. However, both are false implications driven only by omitting relevant variables in the vertical integration model. This "false significance" remains even after adding further control variables: regression (20) adds two more controls, the variables remained significant and on top of that the controls, which are insignificant in basic regression (1) as well as all other specifications, are also significant.

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114 Empirical studies do in general include some context specific variables - e.g. Hanson (1995) used a measure for enforcement of labor standards for it is specific to the Mexican context.

115 As in Woodruff, 2002 and Hanson, 1995. Earlier literature has sometimes considered Transaction Cost Theory solely (e.g. Montverde and Teece, 1982).

116 As in Woodruff, 2002.

Table 6.11 Omitted Variable Bias

	Basic Regression (1)	TCT & MPRT (19)	TCT & MPRT with controls (20)	Uncertaint, Agency T., Size & other controls (21)	Demand Variability, TCT, Uncertainty & controls (22)
Quality disputes	0.418	0.552	0.633		
	(0.059)*	(0.010)**	(0.003)***		
Search & switch cost	0.216	0.362	0.343		0.494
	(0.115)	(0.001)***	(0.001)***		(0.000)***
Social & moral cost	0.305				
	(0.031)**				
Temporal specificity (D)	2.949	1.336	1.483		
	(0.001)***	(0.031)**	(0.028)**		
Fashion turnover rate	0.002	0.002	0.002		
	(0.499)	(0.067)*	(0.081)*		
Monitoring Cost	-0.237			-0.396	
	(0.086)*			(0.000)***	
Demand variability	-0.864				-1.105
	(0.000)***				(0.000)***
Demand uncertainty	-0.402			-0.455	-0.383
	(0.025)**			(0.025)**	(0.064)*
Log issued capital	0.486			0.326	
	(0.000)***			(0.000)***	
Fabrics unit investment cost	-0.975				
	(0.000)***				
% Foreign ownership	0.001		0.020	0.002	0.014
	(0.953)		(0.030)**	-0.766	(0.056)*
Listed on stock market (D)	-1.253				
	(0.276)				
Tax incentive	-0.038		0.209	0.049	0.122
	(0.823)		(0.067)*	(0.693)	(0.329)
% Fabrics provided by sister company or branch	-0.102				
	(0.000)***				
Constant	-3.535	-6.432	-7.435	-2.69	0.847
	(0.096)*	(0.000)***	(0.000)***	(0.012)**	(0.407)
Number of Observations	243	243	243	243	243
Log Likelihood	-44.815	-129.548	-124.618	-112.534	-84.288

1) Coefficients are regression coefficients, p-values in parentheses, variables followed by (D) are dummy variables.
2) p-weights are used in all regressions.
3) Robust standard errors are specified in all regressions.
4) * significant the 10% level ; ** significant at the 5% level; *** significant at the 1% level

Following Anderson and Schmittlein (1984) and Wernerfelt[117] (1997) regression (21) includes variables corresponding to uncertainty, monitoring, size along with other controls. Significance levels are similar to basic regression (1). However, as we know from regression (1) these determinants are not sufficient in determining the fraction of vertical integration, there are other crucial determinants that this model is missing, such as financial constraints, which are missing from this model.

Following Lieberman (1991) regression (22) includes demand variability, demand uncertainty, search and switch cost as a proxy for Transaction Cost Theory and two controls. In this case, two variables that are repeatedly insignificant in this research appear to be significant here in this much simpler model (quite highly so for the search and switch cost variable).

This section has shown that omitted variable bias can render genuinely insignificant variables significant. This is precisely the risk the empirical literature on vertical integration is running into. In mitigation, it might be argued that sample size means that not too many variables can be included. Hence, it is an issue of balance between omitted variable bias and degrees of freedom. But in practice few studies are constrained by their degrees of freedom. Rather the problem is one of data availability: the data required to define the full range of variables are not available. This conclusion thus supports one of the major motivations of this research, that is survey instruments should gather data on all possible determinants in order to arrive at valid conclusions.

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117 Though Wernerfelt included additional variables to test his adjustment cost theory (Wernerfelt, 1997).

6.7 Conclusion

This chapter has examined the determinants of vertical integration in the Egyptian garment sector. This conclusion summarizes the major arguments that have been made. First, it is argued that the institutional setting matters. This section first reviews key features of the institutional context facing Egyptian garment producers, and how these features affect vertical integration. The following section discusses specific theories in more detail, and the extent to which they are supported by my results. Finally, I review the methodological innovations this thesis has adopted in modeling vertical integration.

Importance of the Institutional Setting

Since the 1930s, the textile and garment industry in Egypt was both protected by trade barriers and largely controlled by the public sector. Until the 1980s, these policies resulted in the large domestic market being served by largely uncompetitive industries with little regard for quality. However, the 1990s brought about several changes. Economic liberalization paved the way for expansion of a privately owned garment sector, though not fabrics, which largely remains in government hands. Liberalization and increased media access exposed middle class Egyptian consumers to rapidly changing Western fashions, increasing the quality demands they made on Egyptian producers. At the same time the collapse of Egypt's traditional export destinations in the Eastern European Block caused exporters to look elsewhere, that is to more demanding Western markets. These changes created a quality gap. The quality of fabric input required by the higher segment of the garment industry could not be satisfied by the domestic fabrics industry; not only quality, but 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 a year.

This institutional setting induced the desire for vertical integration in the garment industry in order to ensure the desired input quality. This is especially so, as firms serving the domestic market were legally banned from importing their fabric inputs. The above argument is picked up through the following five variables: disputes over quality, importance of timely delivery, percentage exported (interacted with a dummy for fabric imports), and search and switch costs with respect to domestic suppliers. The results revealed that, with no exception, all these factors provide the impetus for firms to desire integration; in other words, given this particular institutional setting, it is these aspects, which render vertical integration efficient.

While some firms manage to integrate others do not. Two forces operate in different directions – in one direction constraining the ability to integrate and in the other facilitating it – which on balance determine to which group a firm belongs, i.e. integrated or not.[118] First are forces that hinder the ability to integrate.[119] Some of these forces are consistent with existing economic theory on vertical integration and others - despite potentially applicable in other settings - have not been considered by economic theory on vertical integration. These constraints may well be more acute in a developing country such as Egypt where certain market imperfections are present (e.g. credit market imperfections). Second are forces that can mitigate these constraints notably the presence of institutional substitutes. The next subsection will

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118 And if integrated then to what extent.

119 Or alternatively limit the desire for integration (e.g. demand variability and sales uncertaintly).

discuss in more detail the results of the study relating the results to economic theory on vertical integration.

The Relevance of Theory

This study has found that some variables commonly held to be important determinants of vertical integration were not so in the case of the Egyptian garment industry, whereas other variables, which are not normally considered, do matter.

While evidence was found in support of demand variability theories and risk adjusted property rights theory, agency theory, financial constraints, economies of scale, moral costs towards repeated suppliers and aspects of quality concerns, no evidence was found to support asset specificity; i.e. the modern property rights theory or (this aspect of) transaction cost theory.[120] In other studies, asset specificity[121] (the core of TCT and MPRT on vertical integration) is usually at the top of the list for determinants of vertical integration. However, the results presented here show it to be insignificant.

Features of the Egyptian business environment are the most significant determinant of vertical integration. Importance analysis confirms that - in order of importance - demand variability, firm size, financial constraints, sales uncertainty, social and moral costs and market segment (proxied by disputes over quality and the importance of timely delivery to the garment producer) are the most important

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120 As opposed to human asset specificity for instance.

121 The reader may think that the social and moral cost variable is a proxy for asset specificity on account of its introduction to lock in with a specific supplier. However, there is a crucial difference, the presence of moral costs associated with changing repeated suppliers merely implies the limitation of the garment producer's choice to switch to alternative suppliers due to these types of costs. Rather than limitation due to the 1) opportunistic behavior on the supplier's part to exploit the lock in position the garment producer is in 2) or due to the incurring of relationship specific investments of any type, whose return will be reduced outside this particular relationship.

determinants of vertical integration in the Egyptian garment industry. On the one hand, limited access to finance prevents many firms from undertaking the investment required to integrate. Firms with larger issued capital (or garment output or net assets) prior to integration are more likely to produce their own fabrics, both on account of better access to finance, including retained profits, but also to exploit economies of scale. On the other hand, volatile and uncertain market conditions - such as demand variability and sales uncertainty – make firms more likely to rely on the market, hence, discouraging vertical integration. However, social and moral costs do not constrain firms from choosing to integrate if it is efficient to do so. In addition, contrary to quality concerns, monitoring costs hamper the ability for vertical integration.

As argued in the previous subsection, higher quality (in terms of both product quality and timely delivery) garment producers possess higher degrees of vertical integration in order to ensure the required quality level. This finding arises out of the Egyptian setting described above. The research has also introduced other context specific determinants. First, there are some nuances related to market segment. Producers of higher quality garments rely on imported textiles since the required fabric quality is not available domestically. Contrary to theoretical predictions, these producers do not integrate even if search and switch costs are high. But the opposite is true of producers relying on domestic suppliers. An interpretation of this result is that foreign institutions ensure contract enforcement with respect to quality and on time delivery so that suppliers' opportunistic behavior is deterred, reducing in turn the necessity of garment firms to integrate. This may not be the case with respect to domestic suppliers when domestic institutions do not guarantee the same level of

enforcement. This result shows support for human asset specificity and is consistent with Transaction Cost Theory.

Second, garment producers in Egypt serving the domestic market are legally not allowed to import their inputs. This has brought about an additional measure that introduces another aspect of quality: exporters that do not rely on the import market for their inputs. Those hold higher degrees of vertical integration.

Institutional substitutes, whether regarded as context specific or general determinants, mitigate some of the aforementioned institutional deficiencies. In Egypt, both foreign ownership and membership to the garment commodity council play an important role through moderating the negative effect limited access to and high cost of finance have on vertical integration.

In conclusion, other factors than traditional factors considered in the vertical integration literature are just as important. This has two implications. The first relates to theory. Theories actually are more likely to complement each other than to compete against one another. The second, however, is empirical. Existing and future empirical work focusing on only one explanation for vertical integration suffers from omitted variable bias.

Model Specification and Choice of Technique

Unlike many other empirical studies to date, rather than focus on a particular theory of interest, the model used here includes variables suggested by the full range of different theories. Hence, observing how they all perform when placed jointly in the same analysis. In addition, other variables are added which reflect the institutional setting facing firms operating in a developing country such as Egypt. These latter variables capture - among other things - the presence of financial constraints, social

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costs and scale economies (firm size). The chapter demonstrates the omitted variable bias problem in existing studies as a result of focusing on one or at most two theories of interest. This limited focus jeopardizes the validity of study findings as omitted variable bias can result in "false significance". Indeed, even though financial constraints, social costs and institutional substitutes may have a stronger impact in a developing country such as Egypt, these determinants are by no means confined to developing countries and accordingly should be included in developed country models for their validity in these settings to be tested.

The modeling approach adopts two innovations: (1) use of fractional response models, and (2) partially avoiding endogeneity. The dependent variable is measured as the degree of vertical integration (i.e. fraction of fabric inputs which are produced in house rather than bought) rather than as a dichotomous variable as has previously been mostly the case. The results show that this change makes a difference to the results, even though in my case only half of the firms which are integrated (12 percent of the whole sample) have non-integer levels of integration (i.e. $0 < VI < 1$). The endogeneity problem which has plagued the literature is partially avoided as data were collected on decision-maker perceptions and firm characteristics in the year(s) preceding integration so that nearly all regressors are pre-determined.

The findings from this study thus have a clear implication for future research: studies of the determinants of vertical integration need to incorporate the full range of determinants suggested by theory in addition to factors which are specific to the institutional context being studied. Failure to do this, both invalidates the empirical results and limits progress in identifying the full story as to why firms integrate. There is thus considerable scope, especially in developing countries, for further research on the underlying causes of vertical integration.

Finally, it is important to note a number of things. First, is that the findings of this study pertain to a certain type of integration, to one country and to one industry, so that care should be taken in generalization. Second, results pertaining to the garment commodity council and to the percentage of fabrics provided by a firm's sister company or branch should be treated with caution for possible endogeneity associated with regressing current vertical integration status on current firm characteristics. Lastly, the results of the size variable should also be treated with proper caution for the possibility of this variable proxying several concepts. Finally, whilst the approach used has reduced problems of endogeneity and omitted variable bias, the continued presence of such problems cannot be ruled out.

APPENDIX A: Phone Screening Interview

Respondent Name		Tel #: office1								
Respondent Title		office2								
FIRM ID#:		Cell #:								

Company Name:……………………………..Commercial Name………………..……………

1. Does this company produce garments?
   [1] Yes   [2] No…thank you for your time➔ **Don't proceed to the rest of the questions.**

2. Are either gloves or socks among your main products?
   [1] Yes   [2] No…thank you for your time➔ **Don't proceed to the rest of the questions.**

3. What is the year of establishment of this company?
   [ ][ ][ ][ ]

4. Does your company or any of its branches produce knitted fabrics?
   [1] Yes   [2] No

5. Does your company or any of its branches produce woven fabrics?
   [1] Yes   [2] No

6. Does your company distribute some or all of its sales in company owned retail stores?
   [1] Yes   [2] No

7. Does your company or any of its branches perform dying services? Or own a dye house or a dye unit?
   (Do you dye in house?)
   [1] Yes   [2] No>>9

8. For your dying process: do you use sinks or jets or hasbels? Check all that applies.

Jet	1
Hasbel	2
Sink	3

9. What is the capacity of your jet, hasbel or sink?

Jet					kg
Hasbel					kg
Sink					kg

Don't ask the following question if <u>all</u> answers to Q. 4, 5, 6 and 7 are No=2.

10. Please list the order of the start of production of each of the following production stages if applicable.

Garments production	
Woven fabrics production	
Knitted fabrics production	
Dying	
Owning own retail store(s)	

11. We would appreciate your providing us with the names of the following personnel for a possible survey.

Company Owner(s)	
Factory Manager	
Sales Manager	

12. How many workers are employed in this company?

13. Please provide us with opening hours.

APPENDIX B: Questionnaire (3)
Screening Questions

S.1 What is your position in this company? If not the CEO, Chairman, President, Director or General Manager of this company>> obtain an interview with a more appropriate company official.	S.2 In what year did production start in this company? ☻ **1) put the year in *1C*** **2) in the time line below** **3) any other place in which production start year is mentioned**

S.3 Please list the company's name and all names of its branches including the mother company (if any). ☻ **A branch is defined as a company that is registered in the Commercial Registration Office under the same name as this firm (i.e. under the same mother company).** **Put *1* in *0A* if company has branches and *0* if not.**	Skip if 0A=0 S.4 What are the productive activities of these branches?	Skip if 0A=0 S.5 Are any of the owners of these branches a relative of yours? (either by blood or by marriage? 1. Yes 2. No
This Company: Tel:		
Mother Company: Tel:		
Branch 1: Tel:		
Branch 2: Tel:		
Branch 3: Tel:		
Branch 4: Tel:		
Branch 5: Tel:		

S.6 Please list names of all sister companies, if any. ☻ Sister Companies **A sister company is a company that is owned by some or all of the same owners of the interviewed company but is not registered under the same name.** **Put *1* in *0B* if company has sister companies and *0* if not.**	Skip if 0B=0 S.4 What are the productive activities of these sister companies?	Skip if 0B=0 S.5 Are any of the owners of these sister companies a relative of yours? (either by blood or by marriage? 1. Yes 2. No
Sister Company 1: Tel:		
Sister Company 2: Tel:		
Sister Company 3: Tel:		
Sister Company 4: Tel:		
Sister Company 5: Tel:		

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Firm ID:	
Questionnaire:	Q.

S.9 Please specify the start year of each of the following production processes in this company, if it is now performing or has ever performed any of them. ☻	S.10 If the company has **stopped** any of these processes, please give the **year** in which it **ceased production**. ☻ **Note: In question S.11, scratch over the cell corresponding to any activity the company has stopped.**	S.11 Utilize the time line below this table then write down the order of each stage of production. ☻ While doing that confirm the order again with the respondent. For instance, if start of production year is the same as knitting commencement year, followed by garment production say: "So the company started out producing knitted fabrics then later it started producing garments". **Note: do NOT include any activity the company has stopped into that order.** **The Order:**
Garments=g	Garments=g		
Knitted fabrics=f	Knitted fabrics=f		
Woven fabrics=f	Woven fabrics=f		
Distribution of garments in company owned or rented retail stores=r	Distribution of garments in company owned or rented retail stores=r		

How to fill the time line: 1) Enter start of production year first
2) Start of production year takes the order "1"
3) Any production process commenced within one year of start of production also takes the order "1".
4) After that, the order for the remainder of stages should ascend starting with "2".
5) Do not include the year of any ceased process in the time line and do not give its order in question S.11.

Activity	**Start of prd. Yr.**								
Year									
Order	**1**								

1. **Enter start of production year (from S.2) and the order of the start of the given production process (from S.11) in the 2nd flap table.**
2. Use the following table to identify this company's CASE.
3. Utilize the proper questionnaire type as indicated by the intersection of the rows and columns of the table.

	g after f: g>f	g=f =1 (at estab.)	g=f>1 (later)	g before f: g<f	f=0 (no f)
g after retail: g>r	drop				drop
g=r =1 (at estab.)		Q.1		drop	Q.1
g=r>1 (later)	drop				
g before retail: g<r	Q.2	Q.1	Q.3	Q.3	Q.2
r=0 (no r)	Q.4	Q.1		Q.3	Q.4

Firm ID:						
Questionnaire:	Q.					

The flap table should be visible to you <u>at all times during the course of the interview</u>

0. Branches & Sister Companies

Branches				Sister Companies			2.7	2.9	2.11	
A				B						

1. Establishment & Awareness Years

Start of Production Year	C				
Awareness Year	D				

2. Chronological Production & Integration Decisions

	Start of Production					Order of Integration		
Knitted Fabrics	E					H		
Woven Fabrics	F					I		
Retail	G					J		

3. Retail Services: Domestic Suppliers

		Domestic Retailers	
Last Completed Financial Year (LCFY)	K	If **2.5.e ≠100%** *0*insert *1* here, otherwise insert *0*	

4. Fabric Suppliers

	Domestic Suppliers provide fabrics		Foreign suppliers provide fabrics	
LCFY	M	If either one of **2.5.h** , **2.6.p>0%** insert *1* here, otherwise insert *0*	O	If either one of **2.5.j** , **2.6.s>0%** insert *1* here, otherwise insert *0*
Prior to fabric production	N	If either one of **2.5.g** , **2.6.o>0%** insert *1* here, otherwise insert *0*	P	If either one of **2.5.i** , **2.6.q>0%** insert *1* here, otherwise insert *0*

5. Market Orientation

	Export Mrkt.		Domestic Mrkt.	
The last few years	Q		S	
Before in house distribution of garments	R		T	
Before in house production of fabrics	V		U	

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Firm ID:					
Questionnaire:	Q. 3				

1. General Questions

1.1 What percentage of this company do you own?	1.2 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 **2.** No	1.3 Did this company exist under any other name? **1.** Yes **2.** No>>1.5	1.4 Does this imply that someone else owned this company and you bought it from them, or is it the same company only its name has changed? **1.** Someone else owned and I bought it. **2.** The company's name has changed	1.5 In what year did you become aware of the reasons behind the basic and strategic decisions undertaken in this company? ☻ **1) Insert the answer in cell *1D*** **2) In any other location where the awareness year is mentioned.**
%				

2. Vertical Integration and Export Status

2.1 During the last few years, on average, **what percentage of your total garment sales** have you **exported**? ☻ *Fill the **5th falp table** as follows: **1) If answer=X, X=0% ➜ insert *0* in 5Q and *1* in 5S** **2) If answer=X, X>0% ➜ insert *1* in both 5Q and 5S** **3) If answer=X, X=100% ➜ insert *1* in 5Q and *0* in 5S**	%
Skip if 2J=2G=empty **2.2 Before in house distribution of garments**, on average, **what percentage of your total garment sales** have you **exported**? ☻ *Fill the **5th falp table** as follows: **1) If answer=X, X=0% ➜ insert *0* in 5R and *1* in 5T** **2) If answer=X, X>0% ➜ insert *1* in both 5R and 5T** **3) If answer=X, X=100% ➜ insert *1* in 5R and *0* in 5T**	%
2.3 Before in house fabrics production, on average, **what percentage of your total garment sales** have you **exported**? ☻ *Fill the **5th falp table** as follows: **1) If answer=X, X=0% ➜ insert *0* in 5V and *1* in 5U** **2) If answer=X, X>0% ➜ insert *1* in both 5V and 5U** **3) If answer=X, X=100% ➜ insert *1* in 5V and *0* in 5U**	%

2.4 Have you <u>now</u> or <u>anytime in the past</u> **dyed fabrics or garments in any of <u>the company's factories</u>**? **1.** Yes>> insert *1* in the cell of question 2.17 corresponding to the dyeing row. **2.** No>> scratch out all dyeing rows and columns from all tables of section #2.	

Firm ID:					
Questionnaire:	Q. 3				

1) If 2J=2G=empty: a) insert 0% in 2.5e   b) insert *1* in 3K   c) Skip retail questions   2) Skip column (1) if 5S=0   3) Skip column 2) Remind the respondent that internal production of fabrics implies production in the company's factories NOT in the factories of its branches/sis.

		Domestic Market					
		LCFY (1)			Prior ot Fabric Production (2)		
		Fabrics	Retail	Dyeing	Fabrics	Retail	Dyeing
Internal Production/Distribution		f	<u>e</u>	d	c 0%	b	a
Domestic Suppliers		h ■			g ♥		
Foreign Suppliers		j ♫			i ●		
Total		**100 %**			**100 %**		

2.5 With Respect to the Domestic Market: ☻

With respect to the fabrics used for garments you sell on the domestic market ask:
(During the last completed financial year/prior to internal production of fabrics), what **percentage of the total value of these fabrics requirements** did you produce internally, **what percentage** did you **purchase** from domestic producers and **what percentage** did you **purchase** from foreign producers (i.e. imported)?

With respect to retail ask:
(Prior to fabric production/during the LCFY) what **percentage of the value of your total sales on the domestic market was distributed in company retail stores** (i.e. either owned by or rented to the company)?
After obtaining the answer to this question fill 3rd flap table

With respect to dyeing ask:
(During the last completed financial year/prior to internal production of fabrics), what **percentage of your total dyeing requirements for clothes sold on the domestic market did you perform <u>internally</u>** (i.e. in company's factories)?

---

1) If 5Q=5V=0   a) skip 2.6   b) Fill out 4th flap table   2) Skip column (1) if 5Q=0   3) Skip column (2) if 5V=0

	Export Market			
	LCFY (1)		Prior ot Fabric Production (2)	
	Fabrics	Dyeing	Fabrics	Dyeing
Internal Production/Distribution	n	m	l 0%	k
Domestic Suppliers	p ■		o ♥	
Foreign Suppliers	s ♫		q ●	
Total	**100 %**		**100 %**	

2.6 With Respect to the Export Market ☻

With respect to the fabrics used for garments you sell on the export market ask:
(During the last completed financial year/prior to internal production of fabrics), what **percentage of the total value of these fabrics requirements** did you produce internally, **what percentage** did you **purchase** from domestic producers and **what percentage** did you **purchase** from foreign producers (i.e. imported)?
After obtaining the answer to this question fill 4th flap table

With respect to dyeing ask:
(During the last completed financial year/prior to internal production of fabrics), what **percentage of your total dyeing requirements for the clothes you export did you perform <u>internally</u>** (i.e. in company's factories)?

Firm ID:					
Questionnaire:	Q. 3				

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In the following table: 1) skip branches row if 0A=0   2) skip sister comp. row if 0B=0   3) fill table by row   4) fill out 0ᵗʰ flap after table

	skip if 3K=0 ☺		skip if 4M=0 ☺	skip if 4N=0 ☺	skip if 4O=0 ☺	skip if 4P=0
	2.7 During LCFY, what percentage of the total value of domestic market garment sales was distributed in branch/sister company retail stores?	**2.8** Prior to internal production of fabrics, what percentage of the total value of domestic market garment sales was distributed in branch/sister company retail stores?	**2.9** During LCFY, what percentage of the total value of domestically purchased fabrics was purchased from a branch/sister company?	**2.10** Prior to internal production of fabrics, what percentage of the total value of domestically purchased fabrics was purchased from a branch/sister company?	**2.11** During LCFY, what percentage of the total value of imported fabrics was purchased from a branch/sister company?	**2.12** Prior to internal production of fabrics, what percentage of the total value of imported fabrics was purchased from a branch/sister company?
Branches	%	%	%	%	%	%
Sister C.	%	%	%	%	%	%

2.13 **During LCFY** what percentage of the total value of internally produced fabrics have you **sold** on the market (i.e. in the form of fabrics not garments)	skip if 2J=2G=empty 2.14 **During LCFY** what percentage of the total value of your garments distribution have you distributed for other firms?
%	%

Fill this table by row

	2.17 Has this company either now or at any point in time performed any of the following production processes? **1.** Yes **2.** No>>move to the following row	2.18 In what year did the company start this production process?	2.19 Is the company still performing this process? **1.** Yes **2.** No>>move to the following row	2.20 In what year have you stopped this production process?
Printing			If 1>>following row	
Embroidery			If 1>>following row	
Dyeing			If 1>>following row	
Design			If 1>>following section	

Firm ID:	
Questionnaire:	Q. 3

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3. Investment Intensity (Products)

3.1 Tick all types of garments the company has produced for the specified groups in the specified periods of the table.

	3.1.1 Last completed financial year (LCFY)				3.1.2 Year preceding year of vertical integration into fabrics i.e. year:		
	Women	**Men**	**Children**		**Women**	**Men**	**Children**
1. Scarves				1. Scarves			
2. Body Suit & Camisoles				2. Body Suit & Camisoles			
3. Coat				3. Coat			
4. Suits				4. Suits			
5. Blouse				5. Blouse			
6. Pullover				6. Pullover			
7. Pants				7. Pants			
8. T-shirt				8. T-shirt			
9. Tailort				9. Tailort			
10. Training Suit				10. Training Suit			
11. Jacket				11. Jacket			
12. Galabia جلابية				12. Galabia جلابية			
13. Gloves				13. Gloves			
14. Skirt				14. Skirt			
15. Robe				15. Robe			
16. Bath Robe				16. Bath Robe			
17. Tights				17. Tights			
18. Sweatshirt				18. Sweatshirt			
19. Shall				19. Shall			
20. Socks				20. Socks			
21. Shorts				21. Shorts			
22. Abaia عباية				22. Abaia عباية			
23. Dress				23. Dress			
24. Ball Dress				24. Ball Dress			
25. Shirt				25. Shirt			
26. Sports clothes				26. Shorts clothes			
27. Swim Suits				27. Swim Suits			
28. Underwear, non-cotton				28. Underwear, non-cotton			
29. Cotton Underwear				29. Cotton Underwear			
30. Sleep outfits				30. Sleep outfits			
31. Uniform				31. Uniform			
32. Other				32. Other			
33. Other				33. Other			
34. Other				34. Other			
35. Other				35. Other			
36. Other				36. Other			
37. Other				37. Other			
38. Other				38. Other			

3.2 In the indicated periods, what is the percentage sold to women, men and children of your total sales in the indicated markets (R). **Fill table by row.**

	3.2.1 LCFY				3.2.2 Year preceding year of vertical integration into fabrics i.e. year:			
	Women	**Men**	**Children**		**Women**	**Men**	**Children**	
% of total domestic market sales (R)				100%				100%
% of total export market sales(R)				100%				100%

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Explain to respondent that some of this section's questions inquire about the company's plans <u>before it vertically integrated</u> for the <u>first few years subsequent</u> to its internal production of fabrics. Fill next table by main column: i.e. after inquiring about domestic and export market (C) in a specified period (R), move to next row and ask about the two markets for the next indicated period. After filling in all cell of Q 3.3 move to Q 3.4 and fill in the same manner.

	3.3 *<u>With respect to the past few years ask:</u> In the last few years on average, what income class have you targeted for the largest portion of your sales to the (C) market? * <u>**With respect to the period prior to internal fabric production ask:**</u> During the period that immediately preceeded the company's internal fabric production, which income class have you planned to target for the largest portion of your sales to the (C) market? **Code:** **a** domestic **b** foreign		**1.** High income class **2.** Upper middle income **3.** Middle income **4.** Lower middle income **5.** Low income class (Shabia)	3.4 *<u>With respect to the fast few years ask:</u> In the last few yeas, on average, how long did the demand on a new style the company has introduced to the (C) market persist? * <u>**With respect to the period prior to internal fabric production ask:**</u> 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			
	3.3.1 Domestic (C)		**3.3.2 Export (C)**		**3.4.1 Domestic (C)**		**3.4.2 Export (C)**	
	Unit	Code	Unit	Code	Unit	Code	Unit	Code
Few past years (R)	Skip if:5S=0		Skip if: 5Q=0		Skip if: 5S=0		Skip if: 5Q=0	
Prior to internal production of fabrics (R)	Skip if: 5U=0		Skip if: 5V=0		Skip if: 5U=0		Skip if: 5V=0	

3.7 Last year, how much did it cost to dye 1 kg of fabrics used for the garments that constitute your highest proportion of sales? Codes: £E=1; $=2 	Unit	Code	**3.8 Compared to the dye quality of last year,** what quality of dying have you planned prior to integration to achieve, for the products you expected are going to create the largest proportion of sales to the company during the first few years of integration? **Compared to the dye quality of last year:** 1. I intended to achieve dye quality for the products I expected are going to create the largest proportion of sales to the company during the first few years of integration that is **much higher** than that of last year's. 1. I intended to achieve dye quality for the products I expected are going to create the largest proportion of sales to the company during the first few years of integration that is **higher** than that of last year's. 1. I intended to achieve dye quality for the products I expected are going to create the largest proportion of sales to the company during the first few years of integration that is **equivalent** than that of last year's. 1. I intended to achieve dye quality for the products I expected are going to create the largest proportion of sales to the company during the first few years of integration that is **lower** than that of last year's. 1. I intended to achieve dye quality for the products I expected are going to create the largest proportion of sales to the company during the first few years of integration that is **much lower** than that of last year's.	**3.9** Did the company design its own fashion collection last year? 1. Yes 2. No	**3.10** Did you plan **immediately prior to integration** to design your own fashion collection **during the first few years of integration?** 1. Yes 2. No

Fill: 1) 3.11-3.12 by column   2) 3.13 by row   3) 3.15-3.16 by column

	Last completed financial year LCFY(C)	**Prior to internal production of fabrics (R)**
3.11 <u>With respect to the LCFY ask:</u> During last completed financial year, what types of yarns did you use for those garments that provided company with largest percentage of sales? <u>**With respect to prior to internal production of fabrics ask:**</u> Prior to internal production of fabrics what yarn types have you planned to utilize for the garments you expected will provide largest percentage of sales for the company?	(1	(1
	(2	(2
	(3	(3
3.12 What is the number for those threads?	(1	(1
	(2	(2
	(3	(3

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Firm ID:				
Questionnaire:	Q.3			

	Last completed financial year LCFY(C)			Prior to internal production of fabrics (R)			
3.13 *With respect to LCFY ask: During LCFY, what percentage of your total requirements of trim and labels have you imported? *With respect to prior to internal production of fabrics ask: Prior to internal production of fabrics,** what percentage of your total requirements of trim and labels have you planned to import **during the first few years of integration?**		%			%		
3.14 In the indicated periods (C), which of the following fashion seasons has your company prepared for? (chose all that applies) 1.Spring 2. Summer 3. Fall 4. Winter 5. Feast 1 6. Feast 2 7. Mother's day 8. Christmas 9.Start of the school year 10. Other							
3.15 In the indicated periods (C), did you use direct dye (i.e. non-permanent) on any of your garments or fabrics? 1. Yes 2. No	if 2.No>>ask about next period			if 2.No>>section #4			
3.16 In the indicated periods (C), did you use direct dye (i.e. non-permanent) on the clothes that generate the highest sales percentage? 1. Yes 2. No							

Section 4: Demand Variability, adjustment and monitoring costs

4.1 How variable was the demand on your garments **during the last few years?** 1. Absolutely variable 2. Variable 3. Somewhat variable 4. Somewhat invariable 5. Invariable 6. Absolutely invariable	**4.2** How expected was the realized demand level? 1. Absolutely expected 2. Expected 3. Somewhat expected 4. Somewhat surprising 5. Surprising 6. Absolutely surprising (i.e. absolutely unexpected)	**4.3 How variable** was the demand on your garments **during the first few years of integration?** 1. Absolutely variable 2. Variable 3. Somewhat variable 4. Somewhat invariable 5. Invariable 6. Absolutely invariable	**4.4** How expected was the realized demand level? 1. Absolutely expected 2. Expected 3. Somewhat expected 4. Somewhat surprising 5. Surprising 6. Absolutely surprising (i.e. absolutely unexpected

Fill by Column: first , w.r.t Q. 4.5 ask about the domestic market then the export marketإملأ سؤال : إملأ بالعمود. After that move to Q 4.6.

4.5 In the LCFY, on average, how many models has the company produced per season on the (C) market?		**4.6** Prior to internal production of fabrics, how many models, on average, have you planned to produce per season for the (C) market during the first few year of integration?	
Skip if: 5S=0 **4.5.1 Domestic (C)**	Skip if :5Q=0 **4.5.2 Export (C)**	Skip if: 5U=0 **4.6.1 Domestic (C)**	Skip if: 5V=0 **4.6.2 Export (C)**

Fill table by column, i.e. fill in the past few years column then move to the next column.

	Last Few Years	Prior to the company's internal production of fabrics
4.7 * With respect to the past few years, ask: During the last few years how frequently have prices of basic production inputs increased? *With respect to prior to internal production of fabrics ask: Prior to the company's internal production of fabrics,** how frequently have prices of basic production inputs increased? 1. Very frequently 2. Frequently 3. Rare 4. They have never increased 4>>4.9	if 4>>4.9	if 4>>4.9
4.8 In the indicated periods, was this increase **mostly** coming from an increase in prices of inputs purchased on the market,or from an increase of your own cost in producing those inputs? 1. Market prices 2. My own cost increase		

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Firm ID:				
Questionnaire:	Q.3			

Skip asking about retail stores in this table if: 2J=2G=0 **The Code for the following two questions:** 1. Constant salary per month 2. Constant wage per hour 3. Proportion of sales 4. Proportion of profits 5. Incentives related to manager's production level 6. Stock options 7. Other 8.N.A.	Production (C)	Fabric Unit (C)	Retail Stores (C)	Sales (C)	CEO (C)
4.9 How do you pay the (C) manager? (Pick all that applies, for instance a combination of a constant salary per month and proportion of sales is a valid option)					
4.10 Prior to the company's internal production of fabrics, how did you pay the (C) manager?					

4.11-4.15 Give the level of dis/agreement with the following statements, use the following scale:
1. Strongly agree   2. Agree   3. Somewhat agree   4. Somewhat disagree   5. Disagree   6. Strongly disagree

4.11.1 Monitoring workers undertaking fabrics production is <u>a very difficult task.</u> (i.e. time, money (e.g. hiring a manager to monitor the workers), and hassle involved in monitoring the workers)	
4.11.2 Monitoring employees of company affiliated retail stores is <u>a very difficult task.</u> (i.e. money (e.g. hiring a manager to monitor the sales personnel), time and hassle involved in monitoring the store's employees and workers.	
4.13.1 Opening up a fabrics production unit in the company is <u>a very expensive undertaking.</u> (i.e. all investment costs of **b**uying the machines, the extra space required, preparing the space as well as any other costs involved in opening up the unit (e.g. costs involved in trying to convince non-convinced stockholders of the benefits of the investment).	
4.13.2 Opening up company-affiliated retail stores is <u>a very expensive undertaking.</u> (i.e. all investment costs necessary to purchase or rent the store, preparing the store, and any other costs related to opening up the store)	
4.12.1˘ <u>Prior to producing fabrics internally,</u> you thought that monitoring workers undertaking fabrics production is <u>a very difficult task.</u> (i.e. time, money (e.g. hiring a manager to monitor the workers), and hassle involved in monitoring the workers)	
Skip if: 2J=2G=empty **4.12.2 <u>Prior to distributing your garments in company-affiliated stores,</u> you thought that monitoring employees of company affiliated retail stores is <u>a very difficult task.</u>**	
4.14.1 <u>Prior to producing fabrics internally,</u> you thought that opening up a fabrics production unit in the company is <u>a very expensive undertaking</u>. (i.e. all investment costs of **b**uying the machines, the extra space required, preparing the space as well as any other costs involved in opening up the unit (e.g. costs involved in trying to convince non-convinced stockholders of the benefits of the investment).	
Skip if: 2J=2G=empty **4.14.2 <u>Prior to distributing your garments in company-affiliated stores,</u> you thought that opening up company-affiliated retail stores is <u>a very expensive undertaking</u>.** (i.e. all investment costs necessary to purchase or rent the store, preparing the store, and any other costs related to opening up the store)	

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\1. Strongly agree 2. Agree   3. Somewhat agree   4. Somewhat disagree   5. Disagree   6. Strongly disagree

4.15.1 On the domestic market, <u>it is difficult</u> to find fabrics with the specifications and quality level that suit your production.	
4.15.2 On the domestic market, it is difficult to find the appropriate quality level of distribution services.	

1) If 4.15.1=5, 6, cross out the fabrics column from the following table

2) If 4.15.2=5, 6, cross out the retail column from the following table

3) Remind respondent of his answer to the previous question (4.15) then start posing question 4.16

4.16 Indicate using the following scale, the importance level of the following factors as a reason for the difficulty of finding fabrics/distribution services with the specifications and quality level that suits your production

 1. Very important   2. Important   3. Somewhat important   4. Somewhat unimportant 5. Unimportant   6. Absolutely unimportant

	Fabrics	Retail (distribution services)
4.16.1 Unavailability of sufficient technical knowledge		
4.16.2 Insufficient hard work on the part of the fabric producer/retailer		
4.16.3 Fraudulent intentions on the part of the fabric producer/retailer		
4.16.4 Opportunistic behavior on the part of the fabric producer/retailer (i.e. behavior is legal but immoral)		

4.17-4.18: Give the level of dis/agreement with the following statements, use the following scale:

4.17 Prior to producing your own fabrics, <u>it was difficult</u> to find fabrics with the specifications and quality level that suit your production on the domestic market.	
Skip if: 2J=2G=empty **4.18 Prior to distributing your garments in company affiliated retail stores, <u>it was difficult</u> to find the appropriate quality level of distribution services on the domestic market.**	
<u>**Ask only if:**</u> **2.7=0% and either answers of 2J=2G=empty** **4.18 Before sister companies/branches started distributing some of your garments, <u>it was difficult</u> to find the appropriate quality level of distribution services on the domestic market.**	

	LCFY (C)				Prior to internal production of fabrics			
Skip if: 2H=2E=empty **4.19 Indicate all types of knitting machines utilized in the company in the indicated periods: check all that applies.** **1. Circular knitting machines** **2. Flat knitting machines** **3. Automatic Rectangular knitting machines** **4. Manual Rectangular knitting machines**								

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6. Institutions: Fill this table by column: give respondent the scale **after posing the question.**

	6.1 Describe on a scale from 1 to 10 your belief as to **the degree of difficulty in obtaining the necessary funds, from each of the indicated sources (R),** to add another stage of production to the basic stages of production of the company. Such as: 0……………………………………10		6.2 **Prior to producing your own fabrics internally,** describe on a scale from 0 to 10 your belief as **to the degree of difficulty in obtaining the necessary funds, from each of the indicated sources (R),** to add another stage of production to the basic stages of production of the company. Such a 0……………………………………10		6.3 What **percentage of the company's initial capital** did the following sources (R) contribute in the year of establishment of this firm? (If 1D<1C as about awareness year instead of establishment year)
	It is impossible to obtain the necessary funds from this source.	It is extremely easy to obtain the necessary funds from this source.	Describes your prior belief that it was impossible to obtain the necessary funds from this source of finance	Describes your prior belief that it was extremely easy to obtain the necessary funds from this source of finance	
1. Financial Markets and Intermediaries **(Banks and Financial Institutions)** (i.e. loans from banks, stocks and bonds issued on the financial market).					**%**
2. Personal savings, loans from family members and/or friends (R).					**%**
3. Company retained profits					
Skip 4 if: 0A=0 **4.** Mother company or branch retained profits					**%**
Skip 5 if: 0B=0 **5.** Sister company retained profits.					**%**

Code for following 3 questions: 1. Very Weak 2. Weak   3. Somewhat Weak   4. Somewhat high 5. High   6. Very High

6.4 Compared to other garment companies in the market, **what estimate would you give your profits for the LCFY**?	**6.5 Compared** to garment firms that were in the market at the time, **what estimate** would you give your profits, on average, **from the year the firm integrated until now? (i.e. from yyyy to 2004)?**	**6.6 Compared** to garment firms that were in the market at the time, **what estimate** would you give your profits, on average, **since establishment until the year the firm integrated (i.e. from yyyy to yyyy)?**

Give the level of dis/agreement with the following statements, use the following scale for questions 6.7-6.14 :
1. Strongly agree 2. Agree   3. Somewhat agree   4. Somewhat disagree   5. Disagree   6. Strongly disagree

6.7.1 Producing fabrics internally, instead of purchasing them from the market, **may reduce the company's tax burden.**	
6.7.2 Distributing the company's garment products in company affiliated retail stores, instead of distributing somewhere else, **may reduce the company's tax burden.**	
6.8.1 Prior to producing your own fabrics, you thought that producing fabrics internally, instead of purchasing them from the market, may reduce company's tax burden.	
Skip if 2J=2G=empty **6.8.2 Prior to distributing the company's garment products in company affiliated retail stores, you though** that **internal distribution** of the company's garment **products,** instead of distributing somewhere else, **may reduce the company's tax burden.**	

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1. Strongly agree 2. Agree 3. Somewhat agree 4. Somewhat disagree 5. Disagree 6. Strongly disagree	**6.9 The company's growth and development has been hindered…..**	
	6.9.1 prior to its internal production of fabrics due to (i.e. from yyyy to 2004):	**6.9.2 since its internal production of fabrics until now due to (i.e. from yyyy to 2004):**
1 Tax administration problems (e.g. haphazard estimation of taxes)		
2 Unavailability of skilled labor		
3 High cost of finance (e.g. high interest rate on loans from banks, excessive collaterals to render credit affordable.)		
4 Uncertainty of the persistence of different government policies (e.g. customs, exchange rate, exporting and importing…etc.)		
5 Insufficiency of domestic demand		
6 Variability in domestic demand levels		
7 Insufficiency of export demand		
8 Variability in export demand levels		
9 Bribes (Gifts and side payments)		
10 Disputes with suppliers		
11 Disputes with clients		
12 Bureaucratic and transactions costs when applying the "drawback" and "temporary relief" systems (e.g. time and money wasted on trying to get merchandise out of customs, retaining the letter of credit (LC) when re-exporting and all bureaucratic issues related to these 2 systems).		

Fill the following table by row

	6.10 Does the CEO or any of the company's board of directors belong to any of the following? 1. Yes 2. No	**6.11** Since what year has he been a member? *In case of multiple years get the oldest year*
1. Garment Commodity Council	If 2>>next row	
2. Egyptian Exporters Association (ExpoLink).	If 2>>next row	
3. Egyptian Ready Made Garment Exporters Association (EGEA)	If 2>>next row	
4. Union of Industrial Chambers	If 2>>next row	
5. The National Democratic Party	If 2>>6.12	

6.12 Did this company ever have a lawyer? 1. Yes 2. No>>section#7	**6.13** Since what year have you had a lawyer?

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7. Lock in, switching costs and temporal specificity 7a) Fabric Suppliers

Skip if 5S or if 4M=0			
7.1 Do your domestic clients always <u>**make you**</u> buy the used fabrics from <u>**certain domestic**</u> fabric suppliers? **1**. Yes **2**. No			

Skip if 5Q=0 or if 4O=0			
7.2 Do your foreign clients (i.e. garment importers) always <u>**make you**</u> buy the used fabrics from <u>**certain foreign**</u> fabric suppliers?**1**. Yes **2**. No			

With respect to <u>section 7a</u>:

1) Cross out column (1) if 4M=0. 2) Cross out column (2) if 4O=0. 3) Cross out column (3) if 4N=0. 4) Crosse out column (4) if 4P=0. 5) Ask by main column.

Currently	(1) Domestic (C)	(2) Foreign (C)	Prior to the Company's Internal Production of Fabrics	(3) Domestic (C)	(4) Foreign (C)
7.3 What is the number of (C) fabric producers you currently deal with?			**7.4** What is the number of (C) fabric producers you **dealt** with **prior to the company's internal production of fabrics**?		
7.5 How many (C) fabric producers do you deal with **repeatedly** If 0>> 7.13	If 0>> 7.13	If 0>> 7.13	**7.6** How many (C) fabric producers <u>**did you deal with repeatedly**</u> **prior to the company's internal production of fabrics?** If 0>> 7.14	If 0>> 7.14	If 0>> 7.14
7.7 What is the number of (C) repeated suppliers who **produce the exact same products** to other companies or factories**?**			**7.8** What is the number of (C) repeated suppliers you **dealt** with **prior to the company's internal production of fabrics,** who **produced the exact same products** to other companies or factories**?**		
Skip if 0A=0 **7.9 How many** of your repeated (C) fabric suppliers are branches of the company?			**Skip if 0A=0** **7.10 How many** of your repeated (C) fabric suppliers **prior to your internal production of fabrics were** branches of the company?		
Skip if 0B=0 **7.11 How many** of your repeated (C) fabric suppliers are sister companies?			**Skip if 0B=0** **7.12 How many** of your repeated (C) fabric suppliers **prior to your internal production of fabrics were** sister companies?		
7.13 How **frequently** do your try out new (C) fabric suppliers? **1.** Very frequently **2.** Frequently **3.** Rarely **4.** Very rarely **5.** I never try out new suppliers>> 7.19 **6.** They choose me, I don't choose them>>7.19	If 5, 6>>7.19	If 5, 6>>7.19	**7.14** How **frequently** did you try out new (C) fabric suppliers **prior to the company's internal production of fabrics?** **1.** Very frequently **2.** Frequently **3.** Rarely **4.** Very rarely **5.** I never tried out new suppliers>>7.20 **6.** They chose me, I don't choose them>>7.20	If 5, 6>>7.20	If 5, 6>>7.20
7.15 When you try out new (C) fabric suppliers is it usually at the expense of the fabrics you purchase from your current suppliers? **1.** Yes **2.** No>>7.19	If 2>>7.19	If 2>>7.19	**7.16 Prior to the company's internal production of fabrics, w**hen you tried out new (C) fabric suppliers was it usually at the expense of the fabrics you purchased from your current suppliers then? **1.** Yes **2.** No>>7.20	If 2>>7.20	If 2>>7.20
7.17 Which types of (C) suppliers do you reduce your purchases from? Choose all that applies. 1. Those suppliers who provide you with a small percentage of your total fabric requirements 2. Suppliers you deal with repeatedly 3. Suppliers you deal with every now and then (i.e. occasional) 4. Other (please clarify)			**7.18** Which types of (C) suppliers did you reduce your purchases from? Choose all that applies. 1. Those suppliers who provided you with a small percentage of your total fabric requirements 2. Suppliers you dealt with repeatedly 3. Suppliers you dealt with every now and then (i.e. occasional) 4. Other (please clarify)		

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Currently			Prior to the Company's Internal Production of Fabrics		
	(1) **Domestic** **(suppliers)** **(C)**	**(2)** **Foreign** **(suppliers)** **(C)**		**(3)** **Domestic** **(suppliers)** **(C)**	**(4)** **Foreign** **(suppliers)** **(C)**
Give the level of dis/agreement with the following statements, use the following scale for questions 7.19, 7.21: **1. Strongly agree**　　　**2. Agree**　　　**3. Somewhat agree** **4. Somewhat disagree**　　**5. Disagree**　　**6. Strongly disagree**			**Give the level of dis/agreement with the following statements, use the following scale for questions 7.20, 7.22:** **1. Strongly agree**　　**2. Agree**　　**3. Somewhat agree** **4. Somewhat disagree**　　**5. Disagree**　　**6. Strongly disagree**		
7.19 <u>Search and switch</u> costs involved in altering fabric suppliers, **rendered it difficult for you to switch from any of your repeated (C) fabric suppliers.** If company does not have repeated suppliers, just ask about suppliers.			**7.20 Prior to producing fabrics internally, <u>search and switch</u> costs involved in altering fabric suppliers, <u>rendered it difficult for you to switch from any of your repeated (C) fabric suppliers at the time.</u>** If company doesn't have repeated suppliers, just ask about suppliers.		
7.21 <u>Social and moral costs</u> involved in altering fabric suppliers, **rendered it difficult for you to switch from any of your repeated (C) fabric suppliers.** (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.) If company does not have repeated suppliers, just ask about suppliers.			**7.22 Prior to producing fabrics internally, <u>social and moral costs</u> involved in altering fabric suppliers, <u>rendered it difficult for you to switch from any of your repeated (C) fabric suppliers at the time.</u>** (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.) If company does not have repeated suppliers, just ask about suppliers.		
7.23 If a (C) repeated fabric supplier failed to deliver on time, how long would it take you to get replacement supplies? **1.** Day　**2.** Week　**3.** Month　**4.** Year　　**5.** I would never be able to find replacements for his/her products If company does not have repeated suppliers, just ask about suppliers.	**Unit** | Unit	**Unit** | Unit	**7.24 Prior to producing fabrics internally, had** a (C) repeated fabric supplier failed to deliver on time, how long would it have taken you to get replacement supplies? **1.** Day　**2.** Week　**3.** Month　　**4.** Year　**5.** I would have never been able to find replacements for his/her products. If company does not have repeated suppliers, just ask about suppliers.	**Unit** | Code	**Unit** | الكود
7.25 If a company or a supplier **you've never purchased from before offered** to sell you **same quality fabrics with a price** 10% **lower than your (C) repeated supplier. <u>Would you buy from the new supplier instead of the repeated one?</u>** **1.** Yes　**2.** No　　**3.** I'd buy from both of them If company does not have repeated suppliers, just ask about suppliers.			**7.25 Prior to producing fabrics internally, if** a company or a supplier **you'd never purchased from before** had **offered** to sell you **same quality fabrics with a price** 10% **lower than your (C) repeated supplier at the time. <u>Would you have bought from the new supplier instead of the repeated one?</u>** **1.** Yes　**2.** No　　**3.** I would have bought from both of them 　　If company does not have repeated suppliers, just ask about suppliers.		

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7b) Clients: <u>With respect to section 7b:</u>
1) Cross out column (1) if 3K=0.   2) Cross out column (2) if 5Q=0.   **3) Ask column (5) only if: 2G, 2J≠ إجابات من أياً لو أو** **empty OR any of 2.7 answers≠0%**

Currently			(5) If 2J,2G≠empty say: prior to the company's internal distribution of fabrics If 2J, 2G=empty and 2.7≠0 say: prior to branch/sister company's distribution to some of your products.		
	(1) Domestic clients (C)	**(2) Foreign clients (C)**		**(3) Domestic clients (C)**	**(4) Foreign clients (C)**
7.1b What is the number of (C) clients you currently deal with?			**7.2b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), **how many (C) clients did you deal with?** If 0>>cross out the rest of the column in this section	If 0>>cross out the of the column in this section	If 0>>cross out rest of the column in this section
7.3b How many (C) clients do you deal with repeatedly? If 0>>7.5bb	If 0>>7.5bb	If 0>>7.5bb	**7.4b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), **how many** (C) clients **did** you deal with **repeatedly?** If 0>>7.6bb	If 0>>**7.6bb**	If 0>>**7.6bb**
7. 5b How many of your repeated (C) clients sell your products exclusively?			**7.6b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), **how many of your repeated (C) clients** sold your products exclusively?		
7.5bb How frequently do you try out new (C) clients? **1.** Very frequently **2.** Frequently **3.** Rarely **4.** Very rarely **5.** I never try out new clients>>7.7b **6.** They choose me, I don't choose them>>7.7b	If 5, 6 >>7.7b	If 5, 6 >>7.7b	**7.6bb** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), **how frequently** did you try out new (C) clients? **1.** Very frequently **2.** Frequently **3.** Rarely **4.** Very rarely **5.** I never try out new clients>>7.8b **6.** They choose me, I don't choose them>>7.8b	If 5, 6 >>7.8b	If 5, 6 >>7.8b
7.13b When you try out new (C) clients, is this at the expense of reducing your sales to your current clients? **1.** Yes **2**. No>>7.7b	If 2, 3>>7.7b	If 2, 3>>7.7b	**7.14b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), when you tried out new (C) clients, <u>was this at the expense of reducing your sales to your clients at the time?</u> **1.** Yes **2**. No>>7.8b	If 2, 3>>7.8b	If 2, 3>>7.8b
7.15b Which client type do you reduce your sales to? **<u>Chose all that applies:</u>** **1.** Clients you generally distribute a small portion of your total distribution to **2.** Clients you deal with repeatedly **3.** Clients you deal with every now and then (occasional) **4.** Other (please clarify)			**7.16b** Which client type did you reduce your sales to? **<u>Chose all that applies:</u>** **1.** Clients you generally distributed a small portion of your total distribution to **2.** Clients you dealt with repeatedly **3.** Clients you dealt with every now and then (occasional) **4.** Other (please clarify)		

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Currently			(5) If 2J,2G≠empty say: prior to the company's internal distribution of fabrics If 2J, 2G=empty and 2.7≠0 say: prior to branch/sister company's distribution to some of your products.		
	(1) **Domestic clients (C)**	**(2)** **Foreign clients (C)**		**(3)** **Domestic clients (C)**	**(4)** **Foreign clients (C)**
Give the level of dis/agreement with the following statements, use the following scale for the next 2 questions: **1. Strongly agree** **2. Agree** **3. Somewhat agree** **4. Somewhat disagree** **5. Disagree** **6. Strongly disagree**			**Give the level of dis/agreement with the following statements, use the following scale for the next 2 questions:** **1. Strongly agree** **2. Agree** **3. Somewhat agree** **4. Somewhat disagree** **5. Disagree** **6. Strongly disagree**		
7.7b <u>Search and switch</u> costs involved in altering clients, **<u>rendered it difficult for you to switch from any of the company's repeated (C) clients.</u>** If company does not have repeated clients, just ask about clients.			**7.8b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), **<u>search and switch</u>** costs involved in altering clients, **<u>rendered it difficult for you to switch from any of the company's repeated (C) clients.</u>** If company does not have repeated clients, just ask about clients.		
7.9b <u>Social and moral costs</u> involved in altering clients, **<u>rendered it difficult for you to switch from any of the company's repeated (C) clients.</u>** (e.g. the cost of losing a friend, family rejection for cutting dealings with a family client or a client who is a family friend.) If company does not have repeated clients, just ask about clients			**7.10b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), **<u>social and moral costs</u>** involved in altering clients, **<u>rendered it difficult for you to switch from any of the company's repeated (C) clients.</u>** (e.g. the cost of losing a friend, family rejection for cutting dealings with a family client or a client who is a family friend.) If company does not have repeated clients, just ask about clients		
7.11b If a (C) client **refused to accept your merchandise, how long would it take you** to find an alternative client to sell it to? **1.** Day **2.** Weak **3.** Month **4.** Year **5.** I would never be able to find an alternative buyer.	Unit Code	Unit Code	**7.12b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), had a (C) client **refused to accept your merchandise, how long would it have taken you** to find an alternative client to sell it to? **1.** Day **2.** Weak **3.** Month **4.** Year **5.** I would have never be able to find an alternative buyer at the time.	Unit Code	Unit Code
7.17b If a client **you've never dealt with before** offered to buy your garment products with a price 10% higher than your repeated (C) client, **would you sell to him instead of your repeated client?** **1.** Yes **2.** No **3.** I'd sell to both of them			**7.18b** Prior to distributing company garments in company affiliated stores (prior to branch/sister company's distribution to some of your products), had a client **you've never dealt with before** offered to buy your garment products with a price 10% higher than your repeated (C) client at the time, **would you have sold to him instead of your repeated client?** **1.** Yes **2.** No **3.** I would have sold to both of them		

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9a) Dispute Resolution: Disputes with Fabric Suppliers
1) **Cross out column (1) from the <u>following table</u> if 4M=0.**
2) **Cross out column (2) from the <u>following table</u> if 4O=0.**

Current Disputes with Fabric Suppliers		
	(1)	**(2)**
	Domestic (C)	**Foreign (C)**
Code for the following 2 questions: **1.** Very frequently **2.** Frequently **3.** Rarely **4.** Very rarely **5.** Absolutely no disputes		
9.11 <u>How frequently</u> do you encounter disputes over quality with your (C) fabric suppliers?		

1) **Cross out column (1) from the <u>following table</u> if 4N=0.**
2) **Cross out column (2) from the <u>following table</u> if 4P=0.**

Previous Disputes with Fabric Suppliers		
	(1)	**(2)**
	Domestic (C)	**Foreign (C)**
9.14 Prior to your internal production of fabrics, <u>how frequently</u> do you encounter disputes over quality with your (C) fabric suppliers?		

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1) **Cross out column (1) from <u>the following</u> table if 4M=0.**
2) **Cross out column (2) from <u>the following</u> table it 4O=0..**

Disputes with Fabric Suppliers	(1) Domestic (C)	(2) Foreign (C)
9.3 In case of a large dispute between you and a fabric supplier, on a scale from 0 to 10 **indicate the importance of each of the following methods for your company.** Importance of any given method should reflect: 1) Frequency of use 2) The method's effectiveness Such as: **0…………………………..10** The method is never used or is absolutely ineffective The method is very frequently used and it is very valuable to the company		
9.3.1 Company cuts future trade relations with the (C) supplier		
9.3.2 Company files a lawsuit against (C) supplier.		
9.3.3 Company arranges with an individual or a group of individuals to threaten (C) supplier with the use of violence.		
9.3.4 Use of an international dispute resolution mechanism (please mention name)		
9.3.5 Use of a trade/industry association for dispute resolution (please mention name)		
9.3.7 Use of a private association for dispute resolution (please mention name)		
9.3.8 Inclusion of a third party, who is wise and knowledgeable of industry issues (e.g. another garment producer).		
9.3.9 Inclusion of an influential figure in the geographic area of the company or factory (e.g. Kebir el-heta, kebir el-hai or omda)		
9.3.10 Inclusion of a religious figure (e.g. the imam of the main mosque or the priest of the main church)		
9.3.11 Refuse to accept defective merchandise		
9.3.12 Impose a fine or reduce the price of merchandise		
9.3.13 Badmouth supplier (e.g. letting friends and acquaintances know the inferiority of the supplier's merchandise)		
9.3.14 Return merchandise to (C) supplier to rectify		
9.3.15 Accept merchandise and pay agreed upon price		
9.3.16 Other (please clarify)		

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9b) Disputes with Clients:
1) Cross out column (1) from the following table if 3K=0   2) Cross out column (2) from the following table if 5Q=0

Current Disputes with Clients		
	(1) **Domestic Clients (C)**	**(2)** **Foreign Clients (C)**
Code for the following 2 questions: **1.** Very frequently **2.** Frequently **3.** Rarely **4.** Very rarely **5.** Absolutely no disputes		
9.4 How frequently do you encounter disputes over late payments with your (C) clients?		
9.5 How frequently do you encounter disputes over non-payments with your (C) clients?		

Skip following table if 2J=2G=0

a) Cross out column (3) if 5T=0   b) Cross out column (4) if 5R=0

Previous Disputes with Clients		
	(3) **Domestic Clients (C)**	**(4)** **Foreign Clients (C)**
9.6 Prior to distributing company produced garments in company affiliated stores, how frequently did you encounter **disputes over late payments** with your (C) clients?		
9.7 Prior to distributing company-produced garments in company affiliated stores, how frequently did you encounter disputes over non-payments with your (C) clients?		

Ask the questions of the following table only if any of the answers to question 2.7≠0%

Previous Disputes with Clients		
	(1) **Domestic Clients (C)**	**(2)** **Foreign Clients**
9.6b Prior to branch/sister company's distribution to some of your products, how frequently did you encounter **disputes over late payments** with your (C) clients?		
9.7b Prior to branch/sister company's distribution to some of your products, how frequently did you encounter disputes over non-payments with your (C) clients?		

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1) **Cross out column (1) if 5S=0**

2) **Cross out column (2) if 5Q=0**

	(1) **Domestic Clients (C)**	(2) **Foreign Clients (C)**
9.8 In case of a dispute over late payment between you and a client of yours, on a scale from 0 to 10 **indicate the importance of each of the following methods for your company.** Importance of any given method should reflect: 1) Frequency of use 2) The method's effectiveness Such as: **0**…………………………………………...**10** The method is never used or is absolutely ineffective The method is very frequently used and it is very valuable to the company		
9.8.1 Company cuts future trade relations with the (C) client		
9.8.2 Company files a lawsuit against (C) client		
9.8.3 Company arranges with an individual or a group of individuals to threaten (C) client with the use of violence.		
9.8.4 Use of an international dispute resolution mechanism (please mention name)		
9.8.5 Use of a trade/industry association for dispute resolution (please mention name)		
9.8.7 Use of a private association for dispute resolution (please mention name)		
9.8.8 Inclusion of a third party who is wise and knowledgeable of industry issues (e.g. another garment producer).		
9.8.9 Inclusion of an influential figure in the geographic area of the company or factory (e.g. Kebir el-heta, kebir el-hai or omda)		
9.8.10 Inclusion of a religious figure (e.g. the imam of the main mosque or the priest of the main church)		
9.8.11 Badmouth client (e.g. letting friends and acquaintances know his/her dishonesty and untrustworthiness)		
9.8.12 Patience with the client knowing he won't betray on account of your long lasting relationship		
9.8.13 Other (please clarify)		

Firm ID:						
Questionnaire:	Q.3					

9.9 What are the three most important factors in determining your products' prices? Mention starting with the most important. 1. Cost of production 2. Relationship with consumer 3. Consumer's ability to haggle 4. Competitors' prices (competition drives prices) 6. Other (please clarify)	9.10 In the garment and textile businesses what constitutes a good reputation for a fabric supplier? Mention the most important three starting with the most important. 1. On time delivery of merchandise 2. Producing the required quality level 3. High quality level 4. Giving out customer credit 5. Being mercy on cheaters 6. Being mercy on clients in times of need 7. Other (please clarify)	9.11 Will other companies know if a supplier failed to deliver merchandise, delivered defective merchandise or if a client refused to pay? 1. Yes 2. No

8a) Contracts: Contracts with Clients   **With respect to <u>section 8a</u>:**
1) cross out column (1) if 3K=0   2) Cross out column (2) if 5Q=0.
Fill out by row. Watch out for skip instructions in the columns.

Current Period: Clients' Contracts		
	(1) **Domestic Market (C)**	**(2)** **Export Market (C)**
8.1 With respect to company-produced garments sold on the (C) make, do you produce them to fulfill orders or do you first produce then look for buyers? **1.** To fulfill orders>>8.3 **2.** I first produce then search for buyers>> 8.4 **3.** Both	If 1>>8.3 If 2>>8.4	If 1>>8.3 If 2>>8.4
8.2 What is the proportion <u>of fulfilling orders to your total garment sales on the (C) market</u>?	**%**	**%**
8.3 Are the agreements for these orders oral or written**?** **1.** Oral **2.**Written **3.**Depends on my relationship with the client **4.** Other (please clarify)		

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Firm ID:					
Questionnaire:	Q.3				

Current Period: Clients' Contracts		
	(1) **Domestic Market (C)**	**(2)** **Export Market (C)**
Code for the following 4 questions: **1.** Detailed **2.** Somewhat detailed **3.** Absolutely non-specified **4.** Depends on my relationship with client **5.** Depends whether contract is written or oral **6.** Other (please specify)		
8.4 In what manner does the (C) client mention quality specifications in his agreements with your company? (e.g. finishing specifications: non-straight seams are a defect, unequal stitches are a defect, dangling threads are a defect)		
8.5 In what manner does the (C) client mention penalties related to quality defects (like the ones mentioned in the last question) **in the agreement?**		
8.6 In what manner are delivery times specified in the (C) client's agreements with your company?		
8.7 In what manner are penalties related to late delivery specified in the client's agreements with your company?		
8.8 Does the **execution** of any kind of penalty on your company by its (C) client depend on the nature of the relationship with him/her? **1.** Yes **2.** No>> 8.10 **3.** Penalties are not executed>>8.11	If 2>>8.10 If 3>>8.11	If 2>>8.10 If 3>>8.11
8.9 Indicate on a scale from 0 to 10 -from your point of view- the importance of each of the following as a reason for the (C) client's lenience in executing penalties related to quality or late delivery. Such as: **0**…………………...**10** This reason is absolutely unimportant This reason is extremely important		
8.9.1 You are amongst his repeated suppliers		
8.9.2 You are a main supplier of his (i.e. you provide him with a high proportion of his total distribution)		
8.9.3 You are a friend of his		
8.9.4 You are a family member of his		
8.9.5 You belong to the same business network he belongs to		
8.9.6 He knows that the reason for the defect is outside your control		
8.9.7 Other (please specify)		
8.10 Do you consider the executed sanctions on the (C) 1. Extremeley harsh 2. harsh 3. gentle 4. extremely gentle		

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Firm ID:					
Questionnaire:	Q.3				

Current Period: Clients' Contracts		
	(1) **Domestic Market (C)**	**(2)** **Export Market (C)**
Code for the following 2 questions: **1.** Detailed **2.** Somewhat detailed **3.** Absolutely non-specified **4.** Depends on my relationship with client **5.** Depends whether contract is written or oral **6.** Other (please specify)		
8.11 In your <u>agreements</u> with (C) clients, how is their payment schedule (to you) <u>specified?</u> (e.g. I'll take 50% in advance and the remainder at delivery of merchandise, or I'll take 30% at delivery and the remainder within the following 2 months…etc.)		
8.12<u>How do you specify penalties related to late payments in your agreements with your (C) clients?</u>		
8.13 In general, **does your execution of late delivery penalties or fines on (C) clients depend on your relationship with them?** 1. Yes 2. No>>next section 3. I don't execute any penalties	If No>>next section	If No>>next section
8.14 Indicate on a scale from 0 to 10 the importance of each of the following as a reason for your lenience with your (C) client in executing penalties related to late payment. Such as: **0……………………..10** This reason is absolutely unimportant This reason is extremely important		
8.14.1 He is a repeated distributor or client of mine		
8.14.2 He is a main client of mine (i.e. you give him a large proportion of your total distribution)		
8.14.3 He is a friend of yours		
8.14.4 He is a member of your family		
8.14.5 He is an Egyptian		
8.14.6 He belongs to the same business network you belong to		
8.14.7 You are absolutely sure that he is facing financial difficulty and therefore cannot pay on time		
8.14.8 You'd love to execute those penalties but there is no way to enforce them		
8.14.9 Other (please specify)		

Firm ID:					
Questionnaire:	Q.3				

8b) Contracts: Contracts with Fabric Suppliers   With respect to <u>section 8b</u>:
1) Cross out column (1) if 4M=0.   2) Cross out column (2) if 4O=0.

		(1) Domestic (C)	(2) Foreign (C)
Current Period: Fabric Suppliers' Contracts			
8.15 Do you place orders for your fabric purchases in advance or do you buy directly from the market (i.e. by paying fully and receiving the fabrics on the spot)? **1.** I place an order **2.** I buy from the market the fabrics I like and so pay and receive merchandise on the spot>>next section **3.** Both		If 2>>next section	If 2>>next section
8.16 Are your agreements with (C) fabric suppliers written or oral? **1**. Oral **2**. Written **3**. Depends on my relationship with the supplier **4**. Other (please clarify)			
Code for the following 4 questions: **1.** Detailed **2.** Somewhat detailed **3.** Absolutely non-specified **4.** Depends on my relationship with supplier **5.** Depends on whether contract is written or oral **6.** Other (please specify)			
8.17 <u>In what manner </u>do you mention <u>quality specifications</u> in your <u>agreements</u> with your (C) suppliers? (e.g. degree of shrinkage, weight, width and number of stitches.)			
8.18 <u>In what manner </u>do you specify <u>penalties</u> related to quality defects (like the ones mentioned in the last question) **in the agreement?** (e.g. if you find that the fabric is not the right weight, or not the right stitch number or it shrinks)			
8.19 <u>In what manner </u>are delivery times specified in your agreements with (C) suppliers?			
8.20 <u>In what manner are penalties related to late delivery </u>specified in your agreements with (C) suppliers?			
8.21 In general, **does your execution of penalties or fines on your (C) suppliers depend on your relationship with them?** 1. Yes 2. No>>8.23 3. I don't execute any penalties		If No>>8.23	If No>>8.23
8.22 Indicate on a scale from 0 to 10 the importance of each of the following as a reason for <u>**your lenience**</u> with your (C) suppliers in executing **penalties related to quality or late delivery**. Such as: **0…………………...10** This reason is absolutely unimportant This reason is extremely important			
8.12.1 He is a repeated supplier of yours			
8.12.2 He is a main supplier of yours (i.e. he supplies you with a high proportion of your total fabric requirements)			
8.12.3 He is a friend of yours			
8.12.4 He is a member of your family			
8.12.6 He belongs to the same business network you belong to			
8.12.7 You are absolutely sure that the reason for poor quality or late delivery is outside his control			

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Firm ID:					
Questionnaire:	Q.3				

Current Period: Fabric Suppliers' Contracts	(1) Domestic (C)	(2) Foreign (C)
8.12.8 You'd love to execute those penalties but there is no way to enforce them		
8.12.9 Other (please specify)		
Code for the following 2 questions: **1.** Detailed **2.** Somewhat detailed **3.** Absolutely non-specified **4.** Depends on my relationship with supplier **5.** Depends on whether contract is written or oral **6.** Other (please specify)		
8.23 <u>In what manner </u>do (C) suppliers specify <u>your payment schedule</u> **(to them) in their agreements with your company?** (e.g. give us 50% in advance and the remainder at delivery of merchandise, or give us 30% at delivery and the remainder within the following 2 months…etc.)		
8.5 <u>In what manner </u>do (C) suppliers mention <u>penalties</u> related to late payments in their agreement with your company?		
8.13 In general, **does their execution of late delivery penalties or fines on your depend on their relationship with you?** 1. Yes 2. No 3. Penalties are never executed		

Firm ID:				
Questionnaire:	Q.3			

5. Size and Ownership   Fill table by row.

	Last completed financial year (LCFY (C))		The year preceding the company's internal production of fabrics: yyyy ☐☐☐☐		Year of start of production in company: i.e. yyyy ☐☐☐☐	
5.1 In the indicated periods (C), on average, what was the **total number of employees** working in this company?	☐☐☐☐☐		☐☐☐☐☐		☐☐☐☐☐	
5.2 In the indicated periods (C), on average, what was the **total number of employees** working in the garment production unit?	☐☐☐☐☐		☐☐☐☐☐		☐☐☐☐☐	
5.3 In the indicated periods (C), how much was the **total value of garment sales**? £E=1; $=2	**Unit**	Code	**Unit**	Code	**Unit**	Code
	☐☐☐☐☐☐☐☐☐☐		☐☐☐☐☐☐☐☐☐☐		☐☐☐☐☐☐☐☐☐☐	
5.4 Was this value of sales: 1. Absolutely expected 2. Expected 3. Somewhat expected 4. Somewhat unexpected 5. Unexpected 6. Absolutely unexpected						
5.5 In the indicated periods (C), how much was the **total value of company sales**? (i.e. this includes garment sales and any other sales the company may have) £E=1; $=2	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code
5.6 In the indicated periods (C), how much was the value of the company's net assets? £E=1; $=2	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code
5.7 In the indicated periods (C), what was the legal status of the company? 1.Sole Proprietorship>>5.9 2. General Partnership 3. Limited Partnership 4. Joint Stock Company 5. Limited partnership by shares 6. Limited liability company 7. Foreign branch 8. Franchise 9. The company is non-registered 10. Other	If 1>>5.9		If 1>>5.9		If 1>>5.9	
5.8 In the indicated periods (C), was this company owned to: (chose all that applies) **1.** Blood relatives **2.** Relatives by marriage **3.** Friends **4.**Unrelated individuals **5.** Other (please specify)	☐☐☐☐☐		☐☐☐☐☐		☐☐☐☐☐	
5.9 In the indicated periods (C), how much was the **value of the company's issued capital**? £E=1; $=2	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code
5.10 In the indicated periods (C), what was the proportion of foreign ownership in this company?	**%**		**%**		**%**	
5.11 In the indicated periods (C), was the company listed on the stock market? **1.** Yes **2.** No						
5.12 In the indicated periods (C), what was **the number of sewing machines** in the **garment production unit**?						
5.13 In the indicated periods (C), approximately what was the **productive capacity of the garment production unit** in the company? Give answer in terms of pieces per: 1. Day 2. Weak 3. Month 4. Year	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code	**Unit** ☐☐☐☐☐☐☐☐☐	Code

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Firm ID:	☐☐☐☐☐
Questionnaire:	Q.3

Questionnaire (1) Vertical Integration Question

		Domestic Market					
2.5 With Respect to the Domestic Market: ☻ **With respect to the fabrics used for garments you sell on the domestic market ask:** (During the last completed financial year/prior to internal production of fabrics), what **percentage of the total value of these fabrics requirements** did you produce internally, **what percentage** did you **purchase** from domestic producers and **what percentage** did you **purchase** from foreign producers (i.e. imported)? **With respect to retail ask:** (Prior to fabric production/during the LCFY) what **percentage of the value of your total sales on the domestic market was distributed in company retail stores** (i.e. either owned by or rented to the company)? **After obtaining the answer to this question fill 3ʳᵈ flap table** **With respect to dyeing ask:** (During the last completed financial year/prior to internal production of fabrics), what **percentage of your total dyeing requirements for clothes sold on the domestic market did you perform internally** (i.e. in company's factories)?		**LCFY (1)**			**First Completed Financial Year(2)**		
		Fabrics	**Retail**	**Dyeing**	**Fabrics**	**Retail**	**Dyeing**
	Internal Production/Distribution	f	e	d	c 0%	b	a
	Domestic Suppliers	h ■			g ♥		
	Foreign Suppliers	j ♫			i ●		
	Total	**100 %**			**100 %**		

		Export Market			
2.6 With Respect to the Export Market ☻ **With respect to the fabrics used for garments you sell on the export market ask:** (During the last completed financial year/prior to internal production of fabrics), what **percentage of the total value of these fabrics requirements** did you produce internally, **what percentage** did you **purchase** from domestic producers and **what percentage** did you **purchase** from foreign producers (i.e. imported)? **After obtaining the answer to this question fill 4ᵗʰ flap table** **With respect to dyeing ask:** (During the last completed financial year/prior to internal production of fabrics), what **percentage of your total dyeing requirements for the clothes you export did you perform internally** (i.e. in company's factories)?		**LCFY (1)**		**First Completed Financial Year(2)**	
		Fabrics	**Dyeing**	**Fabrics**	**Dyeing**
	Internal Production/Distribution	n	m	l 0%	k
	Domestic Suppliers	p ■		o ♥	
	Foreign Suppliers	s ♫		q ●	
	Total	**100 %**		**100 %**	

Firm ID:					
Questionnaire:	Q.1				

APPENDIX C: Maximum Likelihood Estimation for Average Profits

Table A1:

	(1)	(A1)	(A2)	(A3)
Quality disputes	0.502	0.463	1.076	0.666
	(0.059)*	(0.047)**	(0.034)**	(0.003)***
Search & switch cost	0.259	0.215	0.721	0.175
	(0.115)	(0.17)	(0.036)**	(0.034)**
Social & moral cost	0.366	0.336	0.174	0.412
	(0.031)**	(0.032)**	(0.592)	(0.546)**
Temporal specificity (D)	1.758	1.657	2.290	1.815
	(0.001)***	(0.001)***	(0.080)*	(0.072)*
Fashion turnover rate	0.002	0.002	0.000	-0.000
	(0.499)	(0.538)	(0.836)	(0.506)
Monitoring Cost	-0.284	-0.237	-0.477	-0.366
	(0.086)*	(0.135)	(0.119)	(0.039)**
Demand variability	-1.036	-0.934	-1.667	-1.121
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Demand uncertainty	-0.483	-0.476	-1.212	
	(0.025)**	(0.016)**	(0.002)***	
Issued capital	0.583	0.516		0.571
	(0.000)***	(0.000)***		(0.000)***
Fabrics unit investment cost	-1.170	-1.078	-2.033	-1.015
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
% Foreign ownership	0.000	0.000	0.039	0.008
	(0.953)	(0.955)	(0.012)**	(0.000)***
Listed on stock market (D)	-0.893	-0.709	0.177	-.675
	(0.276)	(0.391)	(0.922)	(0.512)
Tax incentive	0.046	-0.035	0.200	-0.072
	(0.823)	(0.852)	(0.555)	(0.681)
% of fabrics provided by sister company or branch	-0.122	-0.110	-0.134	-0.105
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Average profits		0.233	0.727	0.177
		(0.375)	(0.136)	(0.084)*
Observations	243	243	254	246
Log Likelihood	-44.815	-44.574	-55.344	-47.254

1) MLE as specified above, coefficients are marginal effects, p-values in parentheses, variables followed by (D) are dummy variables.
2) p-weights are used in all regressions.
3) Robust standard errors are specified in all regressions.
4) * significant at the 10% level ; ** significant at the 5% level; *** significant at the 1% level

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