Exporting Consultancy Services in the Infrastructure Sectors: The Determinants of Obtaining Assignments

Roger Svensson *

The Research Institute of Industrial Economics (IUI),
Box 5501, S-114 85 Stockholm, Sweden

November 1998

Abstract

A unique database on individual tender documents is used to analyze the relationship between strategical factors and outcomes when technical consultancy firms (TCFs) compete for foreign assignments in the infrastructure sectors. TCFs, which sell services based on human capital, have a large focus on developing countries and thereby a high dependence on aid organizations. These organizations claim that technological factors as, e.g., the quality of the technical offers and the skill and experience of the TCFs' employees, are the most important factors when tender documents are evaluated. The results of the estimations show, however, that long-term relations between the TCF and the client - especially whether the TCF has had previous experience of, or has visited, the client - are at least as important as traditional technological factors. Local presence in the form of local offices has also some influence on the outcome.

----

* The author would like to thank Pontus Braunerhjelm, Karolina Ekholm, Mattias Ganslandt, Erik Mellander and Lars Persson, IUI, and the participants at the IUI-seminars for constructive comments.

1. Introduction

A necessary condition for economic growth and development is investment in, and restructuring of, infrastructure plants and systems, e.g., telecommunication systems, district heating and power plants, roads, railways and air ports (Morrison and Schwartz, 1997). During recent years, services and know-how have become increasingly important elements when supplying or restructuring such systems or plants, e.g., feasibility studies, project management and education. In the case of investments, contractors together with investment material suppliers and technical consultancy firms (TCFs) construct or set up a plant or system to the client (the operator) in the host country.[1] Here, the TCFs account for only a small part of the total cost (around 5-10 percent), but play a significant role with respect to transfer of technology and know-how, since they sell only services based on technology and human capital. They are also advisors to the client and / or the financiers when contractor services, systems and raw materials are purchased from the contractors. On the other hand, the TCFs together with other consultancy firms are the only suppliers in the case of restructuring. TCFs are either consulting engineers, architects or quantity surveyors and provide a wide range of tasks from traditional investment services as, e.g., feasibility studies, design, evaluation of tender documents and supervision, to services connected to restructuring as, e.g., institutional support, education, tariff studies, operation services and privatizations of state-owned operators.

In contrast to the manufacturing sector where trade mainly takes place between developed countries, trade in the technical consultancy sector is characterized to 90 percent by a one-direction flow of exports from developed to developing countries and Eastern Europe (Svensson, 1997).[2] The high focus on these regions means - but may also be a result of - that TCFs have a close relationship to aid organizations. These organizations have during recent years given a higher

[1] The contractor is either a construction or manufacturing firm. The investment material supplier is always a manufacturing firm. The client can either be a government authority, a local private or state-owned firm or a multinational firm operating in the host country. The client can either belong to the physical or social infrastructure, manufacturing or service sectors.

[2] One reason to this feature is that developing countries seldom have skills and experience to undertake investments in, and restructuring of, infrastructure themselves, which means that TCFs account for a significant share of the technology transfer from developed to developing countries. At the same time, export of engineering services is characterized by relatively high transportation costs, which makes export to other developed countries where local competition is hard almost impossible (more about this in section 2).

priority to technology transfer to developing countries with the result that a larger focus has been to purchase engineering services. For TCFs originating from developed countries, aid organizations finance around 60-80 percent of the assignments in these regions (Svensson, 1997).

The client is always the receiver of the engineering services supplied by the TCF, but these services can either be financed by the client himself, aid organizations or a combination of these agents. Generally, the TCFs have to tender in order to obtain assignments - especially when aid organizations are involved.[3] Most of these organizations have strict rules for purchasing of consultancy services and claim that priority is given to skill and experience (technological) factors of the TCFs and these firms' employees when evaluating tender documents. Such factors are, generally, given a weight of 75-85 percent, while the price levels of the tender documents get a weight of 15-25 percent (Svensson, 1997). A problem is, however, that the evaluation of experience and competence factors may be subjective. Not surprisingly, many TCFs operating abroad utilize also other competitive factors and strategies when tendering: 1) Long-term relations (LTRs) with the clients, e.g., previous clients are prioritized and the TCF visits the client before the tender document is submitted; and 2) Local networks, e.g., establishment of offices in the host country and cooperation with local TCFs. Today, we do not know how large influence such factors have for the outcome of the tendering. If these factors do have a significant influence on the outcome, then technological factors may not be as competitive as claimed and, hence, technology transfer to developing countries may be less extensive and less effective than otherwise.

The general purpose of this study is to analyze which factors affect the outcome of tendering in the international technical consultancy market. Focus will be at three main kinds of competitive factors / strategies: 1) Skill and experience factors; 2) LTR factors; and 3) Local network factors. The specific purpose is to examine how these strategies / competitive factors influence the outcome depending on how the assignment was financed. Is it, for example, possible that LTR factors affect the outcome of the tender evaluation, in spite of that aid organizations have strict rules for purchasing? To the best of my knowledge, such issues about service export have not been considered earlier in the literature. In the empirical analysis, a unique data base on more than 400

[3] Some assignments are also directly purchased, i.e. without competition. Today, this occurs most frequently when the assignments have a small value (in dollars). Larger assignments can also be directly purchased, especially in the privately financed market, but also when aid organizations decide to continue further stages of a project whose first stage was purchased in competition.

foreign tender documents of Swedish TCFs during the 1995-97 period is available. Here, assignments financed by aid organizations can be compared with a reference group of commercially financed assignments. The hypotheses are tested on this data base using a probit model.

The paper is organized as follows. In section 2, the characteristics of service firms and export as well as comparisons with the manufacturing sector are discussed. Different tender systems, the data base and the statistical model are described in section 3. In section 4, factors hypothesized to influence the outcome of tendering in the international technical consultancy market are provided. Section 5 shows the results and the final section concludes.

2. Characteristics of TCFs and service exports

Characteristics of services and TCFs

Production, sales and consumption of services can not be separated in time, i.e. stockpiling is not possible. The output of the services can therefore only be evaluated after the services have been purchased. It is then difficult to know the quality of these services *a priori* - a typical adverse selection problem.[4] In the technical consultancy sector, the suppliers market the experience and competence of their employees as signals of the quality of the services to the client. They will also develop a reputation for high quality by marketing their reference assignments. Even more important, previous contracts between a supplier and a client will increase the client's knowledge about the TCF and its services, meaning that historical confidence bonds or LTRs between the supplier and client will be important in this sector. These LTRs take time to create and it is difficult for an outsider-supplier to break existing ones. Thus, one can expect repeated purchases from a specific supplier. In this sense, services are similar to "experience goods" in the IO-literature (Tirole, 1986). Repeated purchases will especially be usual, if it is expensive to choose a bad supplier. That is the case in the technical consultancy sector, where poor technical and economical calculations may cause disastrous consequences for an investment project.

In another sense, however, services differ from other experience goods. Production and consumption of services can seldom be separated in room. In the technical consultancy sector, services

[4] There is also a moral hazard problem, where the client must control that the TCF actually supply those services that are specified in the contract. This problem occurs, however, after the supplier has been chosen and is therefore out of the scope of this study.

can not be transported and require therefore a direct contact, and sometimes cooperation, between the supplier and client. Either temporarily, the TCF travels to the client or vice versa, or, permanently, the supplier sets up an office close to the client. This means that good communication and social competence will be important - factors that likewise are difficult to evaluate *a priori*. Thus, also by this reason, one can expect repeated purchases and that LTRs are created between the TCF and the client.

TCFs provide services which rely on human capital which is embodied in the TCFs' employees in the form of technical and managerial competence and experience. In fact, as many as 70-80 percent of the employees in TCFs are engineers or natural scientists with years of formal education, training and experience and the others are economists, administrators, etc. It will, in other words, be difficult to replace an experienced employee who quits. Personnel-specific characteristics should, therefore, be important competitive factors. The TCFs' competitive factors can also be firm-specific, e.g., based on firm-networks or routines, but these firms have almost no resources bounded in physical capital, e.g., machineries and buildings. Physical capital will not be an entry or exit barrier for TCFs as for many manufacturing firms. Entry by new firms into the consulting market will instead rely on the possibility to acquire engineering expertise and know-how as well as to create LTRs with clients. These LTRs may sometimes be firm-specific, but it is more common that they are bound to the individuals employed in the firm. Consultancy firms are therefore vulnerable for employees who quit and bring their competitive factors with them. The high dependence on human capital implies also that the services will be heterogeneous and unstandardized.

Since TCFs do not produce any goods, the costs for R&D are negligible. The TCFs upgrade instead the competence among their employees - mostly through internal education. With the exception of costs for administration and to create a brand name and, as we will discuss below, search and marketing costs when operating abroad, the TCFs have small fixed costs to spread on their number of employees, i.e. there are almost no economics of scale. The consultancy sector is, however, characterized by *economics of scope*. It is advantageous to sell many different services to a specific project, from the first master plan to the starting up of the plant, since the supplier has then already all basic information and can also spread fixed costs associated with a specific project on a larger sales volume.[5] The competition for large assignments will, therefore, be hard and it is, primarily, large TCFs that are able to supply many different kind of services. It may also be optimal from the client's point of view to purchase all services from one supplier, i.e. "one-stop-shop", or at least let one supplier be responsible for the assignment. The reason to this is that the client will then know who is responsible if failures occur.

The economics of scope phenomenon explains why large firms may exist, although there are few scale economics.[6] Most TCFs have between one and 100 employees, but TCFs with up to 1500 employees are not unusual. The TCFs are, however, small in relation to the whole market - also in specific fields of the market - and control only a few percents in market shares. Oligopolistic market structures are, in other words, seldom observed in this sector.

There are two reasons why TCFs exist as separate firms. Firstly, the client needs an independent firm which undertakes feasibility studies and design, selects the contractor and also supervises the contractor in the case of investments.[7] The TCF will in this sense act as a representative of, and advisor for, the client. This explains why the TCF is separated from the contractor. Secondly, if the client or contractor can not employ personnel undertaking specialized services full-time due to, e.g., demand fluctuations or limited need for qualified but expensive services, and such personnel have alternative uses for other firms or clients, subcontracting of these services to other firms (i.e. TCFs) is likely to occur. This will avoid wastage of resources and personnel, and ensure efficiency for both the client (or contractor) and the engineers.[8] In principle, the TCF hires out its only factor of production (employees) to the client and the TCF guarantees the skill of these engineers as well as the supply of reserve engineers. The consultancy character of this sector imply that the sales of services to a specific client will be *discontinuous*. If the client needs

[5] Note that these fixed costs are associated with a specific project and not with a specific service. Such fixed costs can take the form of travel costs, information costs, contract costs, etc.

[6] TCFs have often many sub-divisions as well as several offices which are locally spread - a typical feature for sectors with economics of scope.

[7] This is often a requirement by external financiers - aid organizations or export credit institutions - when large investments are planned and implemented.

[8] For clients in developing countries there is also a practical problem to employ specialist engineers permanently as the latter agents often originate from developed countries.

engineering services permanently, it is cheaper to employ the engineers directly. Therefore, the TCF has to sell services to many different clients and must constantly tender for new contracts.

Compared to manufactured products, infrastructure plants or systems are immobile, i.e. they have to be constructed, set up or restructured at site in the host country. This fact will force the TCFs to be mobile when producing services. Furthermore, the client in the infrastructure sector demands the TCFs' services (as well as other firms' services and products), since he, in turn, faces a demand from his customers, e.g., telephone rentals, railway travels or electricity. The demand on the TCFs' services is in other words a derived demand. The client will therefore lead and take the initiative to the purchases of engineering services (Seymour, 1987). The investment market is also characterized by a relatively high volatility in demand, since investments and restructuring are undertaken during limited time periods. This is one of the reasons why the TCFs' sales are so discontinuous.

Comparison between service and manufacturing exports

The forced mobility of the TCF means that service exports, compared to local TCF's sales in the host country, are associated with extra expenses in the form of travel costs for employees between the home and host countries, hotel costs, subsistent allowance and establishment of temporary offices. As much as 30-40 percent of the TCF's total revenues may, in fact, cover such expenses when exporting, compared to 10 percent when selling in the domestic market.[9] The first figure should also be compared to the transportation costs of 5-10 percent in the case of manufacturing exports. Thus, it should be more difficult to export services than manufactured products. This suggests that international TCFs - compared to local ones - must own or control some firm-specific advantage which is more easy to internalize than to sell or license to local TCFs.[10] In our view, superior technological expertise and knowledge compared to local firms as well as LTRs with clients constitute such firm-specific assets which the TCF must acquire and control in order to gain international competitiveness. This is in line with mainstream theories about multinational firms in the manufacturing sector (OLI-theory, see e.g. Dunning, 1977). The firm-specific assets are, however more temporarily in nature in the consultancy sector, since they are bound

[9] These extra expenses are partly fixed and partly variable costs.

[10] It is not possible to license engineering services, since the employees control the human capital. The employees can, however, be hired out.

to the employees who can quit the firm whenever they want.

The combination of high transportation costs and strong local LTRs in the technical consultancy sector makes it almost impossible to export to other developed countries - unless the client originates from the home country of the TCF.[11] It is also difficult for greenfield offices to survive in such markets due to the strong local LTRs. Therefore, acquisition of local TCFs is the most common strategy when penetrating developed countries. Accordingly, around 90 percent of the exports of TCFs originating from developed countries are directed to developing countries and Eastern Europe where local competition and LTRs are weak and where aid organizations assist with the financing (Svensson, 1997). In the latter areas, there are, however, a limited number of clients. At the same time, demand is led by the client / financier, meaning that it is difficult to get continuity in the exports to specific developing countries. The result is that sector-specific demand shocks arise and the international TCFs are forced to move between different sites and countries when following these shocks. It is not unusual that TCFs with 500-1000 employees export services to 30-60 different countries every year (Svensson, 1997).

As the TCF is relatively small with limited financial resources at the same time as several countries have to be considered for exports, information and observation of these markets will be a problem, especially for small TCFs. In contrast to the home country where the TCF usually has several offices scattered to serve and observe local parts of the domestic market, few fixed consulting offices are located abroad due to the sector-specific demand shocks. The information seeking can be undertaken either through some form of networks or local presence: 1) own local representative offices or contacts with previous clients; 2) "consortiums" or networks with other international TCFs or "alliances" with local TCFs or contact persons;[12] 3) networks with contractors where the TCF may be member in a "group" of suppliers; 4) government authorities (e.g.,

[11] Due to the characteristics of international consulting and the infrastructure market, i.e. client led demand, high mobility and, above all, low physical capital requirements, it is - given that the firm-specific expertise and knowledge are possessed - relatively easy for the TCF to enter and exit different geographical markets compared to manufacturing firms which establish and divest manufacturing units requiring large physical capital. Furthermore, the human capital character of the TCF's services means that the services with slight modifications can be utilized in a number of ways. The market peculiarity of the services is low, i.e. the TCF can move personnel between different markets at short notice, with minor adjustments and at a relatively low cost (Sharma and Johanson, 1987). The large problem when exporting will instead be to create own LTRs, and break local TCFs' already existing LTRs with clients in the host country.

[12] In a consortium, the participating TCFs will pool their skills and resources and behave like a single TCF.

Ministry of Foreign Affairs) and private organizations (e.g., Swedish Trade Council); or 5) aid organizations (Johanson and Sharma, 1983).

The information seeking creates some fixed costs associated with foreign operations, meaning that scale in some sense is important for the TCF to be successful abroad. One such fixed cost is representative offices which also are used in order to create LTRs with clients and affect other decision makers in the host country. Others are the creation and maintenance of networks with contractors, other TCFs and contact persons as well to learn all aid organizations different tendering rules. In Svensson (1997), it was, however, found that utilizing aid organizations is the most common and attractive alternative for the international TCF. This is the least costly way to seek information at the same time as the financing of the consultancy services is guaranteed if such an aid-financed assignment is obtained. This information sourcing role explains partly the TCFs' high dependence on aid organizations.

3. Tender systems, data base and statistical model

Tender systems and documents

Some relevant tender systems in the technical consultancy sector are shown in Figure I. These tender systems can either involve one step for the TCF, where the TCF chooses whether to tender for a contract (Model I), or where the TCF is invited and then chooses to tender (Model II), or several sequential steps for the TCF (Model III). In the last case, the TCFs must first apply for participation in tendering. Some TCFs are then invited (short-listed) by the financier / client to submit a last-step tender document. After that, the financier / client makes the final selection among the TCFs which have submitted tender documents.

When the TCFs are invited to participate in tendering, either with (Model III) or without (Model II) application for participation, they have neither submitted a detailed tender document, nor visited the client. For the invitation, the experience and skills of the whole TCF should, therefore, be the most important competitive factors. When aid organizations finance the assignment, they are often, together with the client, responsible for the invitation and final selection of the TCF.

[Figure 1 about here]

In the last but one node of either Model I, II and III, the TCF submits a tender document. This document consists of detailed information about the TCF's experience and previous assignments, the skills and experience of the TCF's team leader and other employees intended to be used for the assignment as well as price level and technical and organizational offers about how to implement the tasks in the assignment. In connection to the tender document, the TCF will also undertake different strategical actions, as e.g. visits to the client and cooperation with other TCFs. After that in the final selection, it will be definitely decided which TCF will be selected by the financier / client. The tendering in these models can be regarded as a sealed bid for the participating TCFs.[13] The tenderers do not know what the competitors' tender documents include. However, they do have an idea about how many competitors will submit a tender document, but they are not always able to identify these competitors.

Data base and statistical model

For the empirical analysis, we use a unique data base on almost 450 individual tender documents abroad of Swedish TCFs during the 1995-97 period. With a tender document is here meant that the TCF has submitted a tender document to a final selection (see Figure 1), i.e. applications for participation, invitations or other previous steps of the tendering are not available here. Each observation consists of information on whether the TCF obtained the assignment or not and other characteristics such as, e.g., the size, sector, type of client and financier as well as which strategies and competitive factors the TCF used in connection with the tender, e.g., the education and experience of the TCF's team leader. The 25 firms included in the data base are TCFs which export engineering services in connection to investments and restructuring in the infrastructure or manufacturing sectors. They account for more than 95 percent of all export in the Swedish technical consultancy sector.[14]

Considering the sample criteria, only export tender documents in competition will be included

[13] Since the purpose of this study is to focus on empirical relationships, we do not need to model any specific auction model. Here, the tenderers do not only compete with the price, but also with many different competitive factors and strategical actions. This makes the auction relatively complex. It may be possible to model the auction, but we claim that the results in this study are independent of how the auction is modelled.

[14] These 25 TCFs are relatively large (mostly more than 100 employees) and account for almost all Swedish operations abroad in this sector. In the Swedish domestic market, however, there are thousands of, primarily, small TCFs with less than 100 employees which compete with these 25 larger firms.

in the sample, i.e. directly purchased assignments are excluded. If the TCF is subconsultant to a contractor or another TCF, the latter firm will specify the tender document and undertake the necessary strategies in order to obtain the assignment. Since the competitive factors of the sub-consultant are then less relevant and this firm will be passive, such observations are therefore omitted. These criterias generate a sample of 292 observations. An objection against the sample could be that the TCF has been invited to tender rather than chosen itself to tender, as was shown in Figure I. This will, however, not cause sample selection bias or other problems, since an invitation is determined by other factors and takes place in an earlier stage before the tender documents are submitted and evaluated, i.e. the decisions about invitation and which TCF obtained the assignment are obviously sequential. Here, we are only interested in the last step where the client / financier definitely selects a TCF - irrespective of whether it is Model I, II or III. As the type of model (tender system) partly will determine the number of competitors, however, it is necessary to control for the competition level in the estimations. Finally, we assume in line with Models I-III that the TCF only submits tender documents if it expects to have a chance to obtain the assignment.

Our dependent variable, $OUTC_{aijt}$, is the outcome of a tender document. It is dichotomous in nature taking the value of 1 if the firm obtained the assignment and 0 otherwise, where subscripts here refer to assignment *a*, firm *i*, country *j* and year *t*. Given this feature, a probit model, via non-linear maximum-likelihood procedures, is then an appropriate statistical model to use when estimating the variation in *OUTC*:

$$F^{-1}(P_{aijt}) = Z = \alpha + X_a'\beta_a + X_i'\beta_i + X_j'\beta_j + X_t'\beta_t \quad , \qquad \textbf{[1]}$$

where P_{aijt} is the estimated probability that the assignment will be obtained and F^{-1} is the inverse of the cumulative normal distribution function. $\boldsymbol{X_a}$ is a vector of characteristics of the assignment, $\boldsymbol{X_i}$ is a vector representing strategies and competitive factors of the tendering firm and $\boldsymbol{X_j}$ is a vector of host country characteristics and $\boldsymbol{X_t}$, is finally a vector of time-specific variables.[15] The $\boldsymbol{\beta}$'s are the corresponding vectors of parameters, which can be interpreted as the impact of various assignment, firm, host country and time period attributes on the outcome of the tendering.

[15] The subscription of the vectors of explanatory variables is made in order to simplify the denotation. These variables can, for example, be assignment-, firm- and time-specific or country- and time-specific.

One can ask whether the sample is representative or not for Swedish TCFs' tender documents submitted abroad. When collecting information about tender documents it is more easy for the TCF to give information about assignments that have been obtained than about assignments which have been lost. In the sample, 36 percent, or 106 of 292 observations, are won assignments and the rest are lost. This may, in fact, be an over-representation of "ones", but this is partly explained by that about one third of the assignments in the sample are financed by Sida where seldom more than three tenderers participate. The bias doe not seem to be correlated with any of the explanatory variables included in the model, i.e. there is no systematic bias. The bias should therefore not be a problem of great concern in the estimations.

4. Factors influencing the outcome of tendering

The ultimate goal for the TCF when exporting engineering services is, of course, to make profits. Therefore, the TCF will undertake strategies and utilize competitive factors so that profitable assignments are obtained in the long run. The client wants to receive as good quality of the services as possible, but he must also be able to assimilate the knowledge transferred by the supplier, i.e. good communication between the supplier and client is favored. At the same time, he wishes that restrictions and concessions should be so few as possible when aid organizations are involved. Although the latter organizations claim that the purpose with their involvement is to assist poor countries with economical and social development, they may have other purposes as, for example, political-economical (e.g., liberalization of trade, privatizations of state-owned properties) or bilateral trade contracts where the client is forced to purchase other goods from the donor country. This means that the interests of the client and the financier may not be the same, although they often sit on the same side of the table when evaluating tender documents. Though LTRs are not officially prioritized by aid organizations, it may also be in the interest of these organizations that the cooperation is good between the TCF and client.

Skill and experience factors

Since the demand on engineering services is led by the client, the TCF will not try to use persuading marketing. The TCF will instead market the skill, education and experience of its employees as well as the reputation and previous assignments of the whole firm. As the services can not be evaluated before they have been purchased, these factors are essential signals when the tender documents are evaluated by the client / financier. Especially the experience and education of the team leader and the composition of the team are important competitive factors that aid organizations give high priority to. For the whole firm, experience of the host country and of similar assignments abroad should be relevant factors. As the tender systems and rules differ across aid organizations, it may also take time to learn these rules. Previous tender documents to, and assignments for, a financier should be an indication of the TCF's experience and increase the probability to obtain an assignment. However, we do not expect that this type of experience create networks or LTRs between the TCF and the financier, since the TCFs are seldom allowed to visit the financier for lobbying during the tendering.

Two variables measuring the skill and experience of the TCF's employees are included in the estimations: the team leader's education level, $TLED_{ait}$, and international experience, $TLEXP_{ait}$. Both variables take on values from 1 to 4, where high values are associated with high education and long experience.[16] Regarding the experience of the whole TCF, $TCFEXP_{ait}$ measures the TCF's experience of similar assignment abroad during the last 10 years, $HCEXP_{ijt}$ is a dummy variable taking the value of 1 if the TCF has previous assignments in the host country and 0 if not, and $FINEXP_{ait}$ is a dummy variable that equals 1 if the TCF has had previous assignments for the financier and 0 if not.[17] We expect that all these five variables will exert a positive impact on *OUTC*, although the last three experience factors related to the whole firm should, as suggested in Svensson (1998b), be more relevant for previous steps of the tendering (invitation and short-listing) which we do not examine here. We have no measure of the technical and organizational offers included in the tender document. The skill and experience factors stated above should, however, be positively related to the quality of these offers.

LTR factors

As noted above, LTRs between suppliers and clients are important in service sectors due to the

[16] *TLED* equals 1 for Secondary school, 2 for University level, 3 for Licentiate level and 4 for Doctor level. Thus, a unit increase in *TLED* corresponds to approximately 3 years education. *TLEXP* equals 1 for 0-2 years of experience abroad, 2 for 2-5 years, 3 for 5-10 years and 4 for more than 10 years. *TLEXP* is, thus, measured like a variable in logarithmic form.

[17] *TCFEXP* equals 1 for 1-5 similar foreign assignments during the last 10 years, 2 for 6-10 assignments, 3 for 11-15 assignments, 4 for 16-20 assignments and 5 for 21-25 assignments. A unit increase in *TCFEXP* corresponds to approximately 5 assignments.

adverse selection problem and that communication must be good. This means that a TCF which has had previous assignments for a specific client has a comparative advantage - compared to TCFs which have not - when this client will purchase services in the future. The LTRs between the TCF and the client, $CLEXP_{aijt}$, is here measured as a dummy variable taking the value of 1 if the TCF has had previous assignments for the client, and 0 otherwise. A positive relationship with *OUTC* is expected.

One frequently used strategy by the TCFs is to visit the client in connection to the tendering.[18] $CLVIS_{aijt}$ is a dummy with a value of 1 if the TCF paid such a visit to the client and 0 if not. The TCF may undertake visits by two main reasons: 1) To create LTRs, to improve the communication with the client or to market the firm's skills and experiences; or 2) To source knowledge about the assignment, host country and other factors in order to be able to submit a better tender document. In Svensson (1998), it is suggested that the former reason dominates. This can only occur when the client may influence the selection of supplier.[19] *CLVIS* is therefore constructed as a combined interaction-variable with another dummy taking the value of 1 when the client may influence the selection and 0 otherwise. It should be noted that *CLVIS* also will be an indica-tor of the effort that the TCF spend to obtain the assignment.

Local network factors

As suggested above, a fixed or representative affiliate in the host country or contacts with local TCFs are two ways to get information about potential assignments in the host country. A fixed affiliate in the host country means also that expensive transportation costs for some of the employees are reduced, i.e. the price can be lowered in the tender document. Both own affiliates and cooperation with local TCFs can be used to create LTRs and contacts with clients and the name of the local affiliate or local TCF can be used to gain access to local decision-makers and clients

[18] It should be noted that this visit of the client *in connection to the tendering* is something else than that the TCF is forced to be mobile and visits the client *when producing and selling services*.

[19] When aid organizations are involved as financiers, the client is sometimes not allowed to influence the selection of the TCF. This is the case when the financing take the form of pure aid or technical assistance. When the client has to borrow or finance some parts himself, he is allowed to influence the selection. If the visits are posi-tively related to the probability of obtaining the assignment, irrespective whether the client may influence the tender evaluation or not, then the visit would mainly be undertaken in order to source information about the assignment. In Svensson (1998a), however, it was shown that the positive relationship only holds when the client is allowed to influence the selection of supplier. Thus, it is then plausible that the TCFs visit the client in order to create LTRs.

as well as local financing.

Since the infrastructure plants / systems are immobile, environment and soil conditions at site must be taken into account when undertaking feasibility studies and design. Knowledge about such conditions are often possessed by local engineers. This motivates contacts and cooperation with local TCFs. Government authorities in developing countries and aid organizations often encourage, or sometimes enforce, international TCFs to enter partnerships with local TCFs when the former firms operate in the host country. The idea is that technology and knowledge will be transferred from international to local TCFs which in the long run will decrease the host country's dependence on foreign firms. At the same time, local engineers are employed in connection with the assignments. Local engineers are less expensive than engineers from developed countries. A competitive strategy could then be that the international TCF implements the more complex tasks in the assignment, while less complex or standard tasks could be subcontracted to local TCFs or engineers. However, if the TCF is enforced to cooperate with local TCFs, then coopera-tion is not a choice variable for the TCF and should then have no impact at all on the outcome.

If the TCF has a local affiliate in the host country, then the dummy variable $LOCAFF_{ijt}$ equals 1, and 0 otherwise. A positive impact on *OUTC* is hypothesized. Cooperation with local TCFs, $LOCCO_{aijt}$, is measured as the percentage in time that local firms was planned to be awarded if the TCF obtained the assignment.

[Table 1 about here]

Competition level factors

The number of competitors will, of course, affect the probability to obtain an assignment. Since the technical consultancy sector is characterized by economics of scope, the larger the value of the assignment the more TCFs will compete, or will be invited to compete, for this assignment. Here, we use the value in MSEK of the TCF's tender document as an approximation for the size of the assignment, $SIZE_{aijt}$. This variable has a range between 0.03 and 129 MSEK and a mean of 7.3 MSEK - a typical skewed distribution with some extreme high values. The competition level is hardly expected to increase linearly with the value of such a skewed variable, but rather in a positive and decreasingly way. Therefore we will also use this variable in logarithmic form,

$size_{aijt}$, in the estimations.[20]

Some aid organizations limit competition among the TCFs. For example, bilateral technical aid and assistance are almost exclusively purchased from suppliers in the home country. This means that only Swedish TCFs are allowed to compete when Sida (Swedish International Development and Cooperation Agency) finances the assignment. Nordic aid organizations only allow TCFs from the Nordic countries to tender, etc. The choice of tender system in Figure 1 is also different among financiers.[21] Therefore, we include additive dummy variables for different aid organizations in order to control for tender systems and limited competition.[22]

Other factors

As mentioned in section 2, the consultancy sector is characterized by relatively high transportation costs. A longer distance between the home and host countries should therefore lower the probability to win an asssignment. This is, however, a premature conclusion. Only Swedish TCFs are allowed to tender when Sida finances the assignment. Thus, the distance will then have no effect at all. In the case of Nordic aid organizations, the competing TCFs from the neighboring countries have approximately the same distance to the host country as the Swedish TCF. This argument holds also when European aid organizations are involved, since only European TCFs are allowed to compete. Local TCFs are only allowed to participate as sub-contractors to the TCFs from the European countries. When non-European and local TCFs are allowed to compete, however, as in the case of commercial assignments or when the World Bank is involved, distance may have an influence on the outcome.

$DIST_j$ is here defined as the distance in kilometers between the capitals in Sweden and the host

---

[20] *SIZE* is the only variable in the estimations which have such a skewed distribution. Most other variables are dummies or variables taking on a few different discrete values.

[21] Practically, Model I is almost only applied in architecture competitions. Here, competition is fierce. Model II is used for most commercial assignments and when Sida and sometimes multilateral organizations are financiers. Otherwise, multilateral aid organizations mostly use Model III where short-listing is praxis due to that too many TCFs are interested. Models II and III cover 99 percent of all observations in the sample. Note that for commercial assignments the financier and client is the same agent.

[22] Dummies are included for: Sida, Nordic aid organizations (NDF, NOPEF, NEFCO), EBRD, EU-funds (PHARE, TACIS, ALA, ACP), World Bank, Regional development banks (AsDB, AfDB, IDB) and other aid organizations (UN, bilateral organizations). The reference group is commercially financed assignments.

country.[23] Since distance should only be a factor of importance when non-European TCFs are allowed to compete, *DIST* is constructed as a combined interaction variable with a dummy that equals 1 if the assignment is financed by the client himself (commercial) or financed by some of the world-wide multilateral organizations (e.g., World Bank, AsDB) and 0 if financed by Sida or a European aid organization. In our database, we will, however, never know whether the competing TCFs are from the host country or any other country. Another problem is that the transportation costs may be absorbed by other factors in the model. A strategy to decrease the transportation costs could, for example, be to either subcontract tasks to local TCFs or to establish fixed affiliates in the host country.

Networks and cooperation with other TCFs and contractors are also important in order to get information about potential assignments as many different countries must be observed. It is also a way to limit competition and to complement the, often specialized, TCF's own skills. However, cooperation could also be an expression of that competition is very hard in the area of the technical consultancy sector and may also be enforced by the financier, e.g., if EU-funds are involved. *INTCO* is here measured as a dummy variable with the value of 1 if cooperation was planned with other international TCFs, and 0 otherwise. The impact on *OUTC* is unsettled.

We do not have any measure of the TCF's price offer compared to the other competitors in the data base. Practically, the international price level, especially in fee per hour, is well-known in the technical consultancy sector, meaning that large differences in price levels are not likely to occur. If price differences do occur, however, this factor will seldom get a weight more than 20 percent according to the tender evaluation rules of most aid organizations. Further, the more unstandardized and heterogenous goods or services the less important should prices be as competitive factor. Engineering services are very heterogenous in nature and, thus, prices should be less important than for other services and goods.

Other strategies undertaken by competitors are neither measurable. The factors related to the competition level discussed above as well as other factors specific for the assignment - for example, sector-, region- and time-specific factors - should, however, in some sense represent the non-observable actions of the competitors. Additive dummy variables for sectors, regions and

[23] Since the employees will be transported by air, the distance will be measured as the crow flies.

time periods are therefore included.[24] An additive dummy is also included showing whether the client is from Sweden or not, and another dummy for whether the client is a contractor or not.

Since communication should be important in this sector, the TCF must master the language of the host country. We do not expect, however, that this factor will affect the probability to obtain an assignment *given* that the TCF has been invited to tender and has chosen to submit a tender document. If the TCF do not master the local language, it is much more likely that the firm does not submit any tender document at all, alternatively will not be invited by the client / financier, i.e. language factors will determine the outcome of previous steps in Figure 1.

5. Empirical results

Four different variants of the model are estimated in order to test for robustness. The variable *SIZE* is used in non-logarithmic (Model A) and logarithmic form (Model B) and sector dummies are used on a broad and fine level. The parameter estimates and their significance levels are satisfactorily stable across the four variants, as can be seen in Table 2. As a measure of goodness of fit of the estimations, the number of correctly predicted observations is between 70 and 73 percent. What is more important, however, is that only 106 of 292 observations take on the value 1 for the dependent variable. The more uneven the distribution of "zeroes" and "ones", the more difficult to correctly predict the small group, i.e. "ones" in this case. Between 48 and 53 percent of the "ones" are correctly predicted, which is satisfactorily high as only 36 percent of the observations are "ones". Model A1 has the best performance with respect to the first measure of goodness of fit and Models A2 and B2 with respect to the second.

Turning to the skill and experience factors, both the team leader's education level, *TLED*, and foreign experience, *TLEXP*, exert an expected positive impact on *OUTC*. The significance of the estimated parameters varies between the 10 and 5 percent-levels. Aid organizations claim that

[24] There are twelve regions in the sample: Western Europe, Central Europe, the Baltic countries, Russia and other former Soviet-countries, North America and other industrialized countries, Latin America, Northern Africa, Southern Africa (Sub-Sahara), the Middle East, the Indian subcontinent, South-East Asia, and Eastern Asia. There are three time periods in the sample: 1995, 1996 and 1997. The sector dummies are assigned on a broad and a fine level. The broad level comprises eleven different groups: Transport infrastructure, telecommunication, power and electricity, hydro power, district heating, manufacturing, buildings, water supply and waste water, environment, primary sector, and other sectors. In the fine level, these sectors are each divided into two or three sub-sectors which gives 19 groups.

these two factors are among the most important when they evaluate tender documents. The three variables reflecting the experience of the whole firm, *TCFEXP*, *HCEXP* and *FINEXP*, have mostly negative parameter estimates, but these estimates are not significant. As suggested in Svensson (1998b) such firm-specific variables are, in the first place, positively related to the probability that the TCF will be invited to tender rather than the probability that the TCF will win an assignment given that the firm has been invited. Thus, an experienced firm may well win more assignments than an unexperienced firm, since the former firm is invited to compete for more assignments.

[Table 2 about here]

The two variables measuring LTRs between the TCF and the client, *CLEXP* and *CLVIS*, have positive and significant parameter estimates at the 1 and 5 percent-level, respectively. This is in line with economic theory (section 2). The coefficient of *LOCAFF* is also positive and significant as expected. Thus, local presence in the form of an office increases the probability that the TCF will obtain the assignment. Both *LOCCO* and *INTCO* fail, however, to show any significant impacts on *OUTC*. This may depend on that cooperation with local TCFs is enforced by the client or financier and, in the case of *INTCO*, that the tenderer is very specialized or that com-petition is hard. The negative and significant coefficients of *SIZE* and *size* confirm our hypothesis that economics of scope is present in the technical consultancy sector. The coefficient of *DIST* is, surprisingly, positive and significant - maybe due to the reasons mentioned in section 4.

In Appendix Table 4, the effect on the probability to obtain an assignment of a unit increase in some independent variables has been calculated. Here, we apply calculations on Model A1 which had most correctly predicted observations, but only for the variables whose coefficients were significant in Table 2.[25] The quantitative effects of the dummies, *CLEXP*, *CLVIS* and *LOCAFF*, are mutually comparable as well as those of the variables that has a range between 1 and 4, *TLED* and *TLEXP*. It is, however, more difficult to compare the quantitative effects between these two groups. A unit increase in *TLED* and *TLEXP* have similar effects on the probability, but never more than 10 percent.[26] Of the dummies, *CLEXP* turns out to have the largest effect on *OUTC*.

[25] The estimated quantitative effects are similar for Models A1, B1 and B2.

[26] Since the probit function is non-linear, the effect of a unit increase on the probability will vary depen-ding on where we are on the distribution. The effect is the largest in the middle of the distribution where *Z* is close

If the TCF has had previous experience of the client compared to if it has not, the probability to obtain the assignment may increase with as much as 28 percent. A change in *CLVIS* and *LOCAFF* may increase the probability with as much as 20 and 26 percent, respectively. Thus, the LTR factors and local presence in the form of offices, which are not given a large weight when aid organizations evaluate tender documents, have indeed a considerable impact on *OUTC* in quantitative terms. Their estimated parameters have also at least as high significance levels as those of the skill and experience factors.

Determinants across financiers

Here, we analyze whether the determinants of obtaining assignments vary across financiers. There are four main groups: Assignments financed by Sida, EU-funds and other multilateral organizations (World Bank, regional development banks, etc.) as well as commercially financed assignments.[27] These groups have 105, 43, 74 and 70 observations, respectively. The tests are implemented by constructing interactive dummy variables for three of the four groups for the eight most interesting explanatory variables.[28] The estimated parameters are then recalculated for each group as shown in Table 3.

A problem when using interaction dummies is that the significance levels for the estimates in the individual groups will be lower than for the basic estimates in Table 2. Since there are fewer observations in each group, the standard errors of the parameters will be higher. Not surprisingly, the Sida group which has more than 100 observations is also the group whose parameter estimates have the highest significance levels. In the case of *CLEXP*, *CLVIS* and *LOCAFF*, for example, the parameter estimates for the commercial group are almost as high as for the Sida group, but significant on a lower level anyway.

There are significant differences across financiers only for three variables. *TLEXP* has clearly a more positive impact on *OUTC* for Sida-financed assignments. The LTR factors, *CLEXP* and *CLVIS*, have a more positive influence on *OUTC* for Sida, EU and commercial assignments compared to multilateral assignments. Generally, commercial assignments do not differ significantly

---

to 0 and *F(Z)* is close to 0.5.

[27] The 5 assignments in the sample financed by Nordic aid organization are included in the Sida group.

[28] Since this makes 24 interaction dummies, multicollinearity problems will arise. Therefore, we run 8 separate estimations where interaction dummies are used for one explanatory variable in each estimation.

from the other groups. The differences are, in fact, at least as large between Sida and the multilateral groups as between commercial assignments and any of the aid organization groups.

Both *CLEXP* and *CLVIS* have a positive influence on *OUTC* for Sida and, in the most cases also for EU and commercial assignments. *LOCAFF* exerts only a positive impact on *OUTC* for Sida and partly for the commercial group. For the multilateral group, only *TLED* seems to be a relevant factor for the outcome. Many TCFs which I have discussed with when collecting the database claim that Sida primarily priorities the experience of employees, while multilateral organizations favor the education level of the employees. This is confirmed in the estimations. The reason may be that Sida has more experience and knowledge about Swedish TCFs and their employees, and can therefore better estimate the competence and experience of these employees, while multilateral organizations must compare the education levels across tender documents.
[Table 3 about here]

6. Conclusions

This study has analyzed the relationship between strategical factors and outcomes when TCFs submit tender documents in order to obtain foreign assignment. Since 90 percent of these firms' exports are directed to developing countries and Eastern Europe, TCFs have a high dependence on aid organizations (c. 60-70 percent). These organizations have strict rules for purchasing consultancy services and give priority to technological factors when evaluating tender documents, e.g., the experience and competence of the suppliers' employees use to get a weight of 50-70 percent and the experience of the firm 15-25 percent. Economic theory states, however, that LTRs or confidence bonds between the supplier and the client, in the form of previous contracts and good communication, should be important in service sectors where it is not possible to evaluate the services before they have been purchased and when the supplier and client have to cooperate in some sense.

The estimations show that LTR factors, measured as the TCF's experience of, and visits to, the client, have at least as strong impact on the probability to obtain an assignment as the factors reflecting the competence and experience of the TCF's employees - where the parameters of both groups of factors are positive and significant. Also local presence in the form of offices in the host country has a positive influence on the outcome. These offices can either be used to source information about the host country, create LTRs with clients, save transportation costs or influence decision-makers in the host country. The factors representing experience and competence of the whole firm fail, however, to show any significant impact on the outcome. The latter factors are instead expected to determine which firms are invited by the client / financier to submit tender documents.

When dividing the sample into one group of commercial assignments and three different aid organization groups, the LTR hypotheses holds not only for the Sida group but mostly also for the commercial and EU groups. There are no evidence that there, in general, would be differences between commercial assignments, where there are no rules for tender evaluations, and the three aid groups. In fact, the differences among the aid groups are larger than the differences between commercial assignments and any of the aid groups.

Finally, some of the results in this study should not only be valid for TCFs abroad, but also for TCFs' domestic operations and for firms in other service sectors where it is difficult to evaluate the quality of the services *a priori* and when direct contact and cooperation are necessary between the supplier and the client. Examples are management and construction firms as well as consultancy firms in the health, environment, computer and education sectors. There is, however, a need for fur-ther studies to test whether the results also are valid for these other consultancy firms.

References

Dunning, J, 1977, 'Location of Economic Activities and the MNE: A Search for an Eclectic Approach', in B. Ohlin, P.O. Hesselborn and P.M. Wijkman (eds.), *The Allocation of International Production: Proceedings of a Nobel Symposium in Stockholm*, London: MacMillan.

Johanson, J. and D.D. Sharma, 1983, 'The Foreign Operations of Swedish Technical Consultancy Firms: An Empirical Study', CIF Working paper 1983/5, Uppsala: Uppsala University.

Morrison, C.J. and A.E. Schwartz, 1997, 'State Infrastructure and Productive Performance', *American Economic Review*, 86, pp. 1095-1111.

Seymour, H., 1987, *The Multinational Construction Industry*, London: Croom Helm.

Sharma, D.D. and J. Johanson, 1987, 'Technical Consultancy in Internationalization', *International Marketing Review*, 4, pp. 20-29.

Svensson, R., 1997, *Svenska tekniska konsulters tjänsteexport: Investeringsprojekt, teknologi och* *biståndsfinansiering (Service Exports by Swedish Conculting Engineers: Investment Projects, Technology and Aid Financing.)*, Stockholm: Sida.

Svensson, R., 1998a, *Visits to the Client when Exporting Services. Sourcing Information or Creating Long-Term Relations?*, Discussion paper, Stockholm: IUI.

Svensson, R., 1998b, *Consultancy Export in the Infrastructure and Construction Sectors: Long-Term Relations and Restructuring Services*, mimeo.

Tirole, J., 1996, *The Theory of Industrial Organization*, Cambridge: MIT Press.

Appendix

[Table 4 here]

Table 1. Basic statistics and hypotheses for the variables

Denotation	Description	Mean	Std.dev.	Expected impact
Dependent variable				
OUTC	Outcome of a tender document (dummy)	0.36	0.48	XXXX
Explanatory variables				
TLED	Team leader's education level	2.08	0.76	+
TLEXP	Team leader's international experience	3.00	1.04	+
TCFEXP	The TCF's international experience of similar assignments	3.21	1.23	+
HCEXP	The TCF's experience of the host country (dummy)	0.73	0.45	+
FINEXP	The TCF's experience of the financier (dummy)	0.65	0.48	+
CLEXP	The TCF's experience of the client (dummy)	0.35	0.48	+
CLVIS	The TCF visited the client (dummy)	0.61	0.51	+
LOCAFF	The TCF owns a local affiliate in the host country (dummy)	0.20	0.40	+
LOCCO	Local TCFs' planned share in the assignment (percents)	14.48	18.39	+
SIZE	Size of the assignment (million SEK)	7.31	13.74	-
size	*SIZE* in logarithmic form	1.11	1.37	-
INTCO	Planned cooperation with other international TCFs (dummy)	0.49	0.50	?
DIST	Distance between Sweden and the host country (kilometers)	1939	3703	-

Table 2. Results of the estimations

Statistical model: Probit model				
Dependent variable: *OUTC* = Outcome of a tender document				
Explanatory variables:	Model A1	Model A2	Model B1	Model B2
TLED	0.294 ** (0.136)	0.253 * (0.146)	0.304 ** (0.134)	0.265 * (0.142)
TLEXP	0.208 ** (0.105)	0.254 ** (0.114)	0.179 * (0.103)	0.217 * (0.112)
TCFEXP	-0.141 (0.086)	-0.085 (0.091)	-0.109 (0.085)	-0.051 (0.088)
HCEXP	-0.061 (0.251)	-0.051 (0.269)	-0.021 (0.248)	-6.22 E-3 (0.266)
FINEXP	-0.154 (0.392)	0.108 (0.444)	-0.195 (0.387)	0.018 (0.437)
CLEXP	0.730 *** (0.240)	0.811 *** (0.259)	0.667 *** (0.236)	0.752 *** (0.254)
CLVIS	0.520 ** (0.229)	0.530 ** (0.243)	0.545 ** (0.232)	0.542 ** (0.244)
LOCAFF	0.667 *** (0.254)	0.702 ** (0.274)	0.602 ** (0.251)	0.609 ** (0.268)
LOCCO	7.74 E-4 (5.73 E-3)	-4.10 E-4 (6.30 E-3)	5.76 E-5 (5.59 E-3)	-2.02 E-3 (6.04 E-3)
SIZE	-0.039 *** (0.013)	-0.046 *** (0.016)	- - - -	- - - -
size	- - - -	- - - -	-0.225 *** (0.081)	-0.222 *** (0.085)
INTCO	-0.094 (0.205)	0.085 (0.231)	-0.026 (0.208)	0.137 (0.230)
DIST	8.77 E-5 ** (4.32 E-5)	1.14 E-4 ** (4.69 E-5)	8.96 E-5 ** (4.20 E-4)	1.11 E-4 ** (4.57 E-5)
Sector dummies (broad level)	Yes	*No*	Yes	*No*
Sector dummies (fine level)	*No*	Yes	*No*	Yes
Number of observations	292	292	292	292
of which *OUTC*=1	106	106	106	106
Percentage of correctly predicted observations at critical probability of 0.5.	72.3	71.9	70.2	71.9
Percentage of correctly predicted "ones" (*OUTC*=1) at critical probability of 0.5.	50.9	52.8	48.1	52.8
Percentage of correctly predicted "zeroes" (*OUTC*=0) at critical probability of 0.5.	84.4	82.8	82.8	82.8

Note: Standard errors in parenthesis. ***, ** and * indicate significance on the 1, 5 and 10 percent-level, respectively. Intercepts and dummies for financiers, sectors, regions and time periods, etc., are not shown but are available from the author on request.

Table 3. The determinants of obtaining assignments across financing

	Recalculated parameter estimates for								Significant differences
	Sida		Multilateral		EU-funds		Commercial		
	A1	B2	A1	B2	A1	B2	A1	B2	
TLED	0.12	0.07	0.62 **	0.54 *	0.16	0.39 *	0.38	0.56 *	No
TLEXP	0.63 ***	0.60 ***	0.16	0.14	-0.27	-0.29	0.08	-0.06	Sida vs other three groups
TCFEXP	0.02	0.08	-0.23	-0.09	-0.14	0.05	-0.43 **	-0.34 *	Sida vs commercial
HCEXP	-0.01	0.00	-0.63	-0.32	0.62	0.72	0.03	-0.18	No
CLEXP	0.86 **	0.76 **	-0.06	-0.03	1.85 ***	2.28 ***	0.71 *	0.76 *	Multilateral vs Sida and EU
CLVIS	0.98 ***	1.13 ***	-0.67	-0.65	1.03 *	0.78	0.95 **	0.97 *	Multilateral vs other three groups
LOCAFF	0.92 **	0.78 **	0.21	0.15	0.14	0.29	0.81 *	0.73	No
LOCCO	0.01	0.01	-6 E-3	-4 E-3	0.09	-0.02	-3 E-3	-0.01	No

Note: ***, ** and * indicate significance at the 1, 5 and 10 percent-level, respectively. Exact standard errors are not shown but are available from the author on request. The results for Models A2 and B1 are similar to them shown in the table above and can be obtained by the author on request.

Table 4. Effect on the probability of *OUTC* when the independent variables change. Model A1.

		Change in *F(Z)* when the independent variable increases with 1 unit.				
Z	*F(Z)*	*TLED*	*TLEXP*	*CLEXP*	*CLVIS*	*LOCAFF*
-2.0	0.023	0.021	0.014	0.079	0.047	0.069
-1.9	0.029	0.025	0.017	0.092	0.055	0.080
-1.8	0.036	0.030	0.020	0.106	0.064	0.093
-1.7	0.045	0.035	0.023	0.121	0.074	0.106
-1.6	0.055	0.041	0.027	0.137	0.085	0.121
-1.5	0.067	0.047	0.031	0.154	0.097	0.136
-1.4	0.081	0.054	0.036	0.171	0.109	0.151
-1.3	0.097	0.060	0.041	0.188	0.121	0.167
-1.2	0.115	0.067	0.046	0.204	0.133	0.182
-1.1	0.136	0.074	0.051	0.220	0.145	0.197
-1.0	0.159	0.081	0.056	0.235	0.157	0.211
-0.9	0.184	0.088	0.060	0.248	0.168	0.224
-0.8	0.212	0.095	0.065	0.260	0.178	0.235
-0.7	0.242	0.100	0.069	0.270	0.186	0.245
-0.6	0.274	0.106	0.073	0.277	0.194	0.252
-0.5	0.309	0.110	0.077	0.282	0.199	0.258
-0.4	0.345	0.113	0.079	0.285	0.203	0.261
-0.3	0.382	0.116	0.081	0.284	0.205	0.261
-0.2	0.421	0.117	0.083	0.281	0.205	0.259
-0.1	0.460	0.117	0.083	0.275	0.202	0.254
0.0	0.500	0.116	0.082	0.267	0.198	0.248
0.1	0.540	0.113	0.081	0.257	0.192	0.239
0.2	0.579	0.110	0.079	0.245	0.185	0.228
0.3	0.618	0.106	0.076	0.231	0.176	0.215
0.4	0.655	0.101	0.073	0.215	0.166	0.202
0.5	0.691	0.095	0.069	0.199	0.155	0.187
0.6	0.726	0.089	0.065	0.182	0.143	0.172
0.7	0.758	0.082	0.060	0.166	0.131	0.156
0.8	0.788	0.075	0.055	0.149	0.118	0.141
0.9	0.816	0.068	0.050	0.132	0.106	0.126
1.0	0.841	0.061	0.045	0.117	0.094	0.111
1.1	0.864	0.054	0.040	0.102	0.083	0.097
1.2	0.885	0.048	0.036	0.088	0.072	0.084
1.3	0.903	0.041	0.031	0.076	0.062	0.072
1.4	0.919	0.036	0.027	0.064	0.053	0.061
1.5	0.933	0.030	0.023	0.054	0.045	0.052
1.6	0.945	0.026	0.020	0.045	0.038	0.043
1.7	0.955	0.021	0.016	0.037	0.031	0.036
1.8	0.964	0.018	0.014	0.030	0.026	0.029
1.9	0.971	0.015	0.011	0.024	0.021	0.024
2.0	0.977	0.012	0.009	0.020	0.017	0.019

Note: Similar estimations for Models A2, B1 and B2 can be obtained by the author on request.