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Patterns and determinants of international activities: are SMEs different? An empirical analysis based on firm-level data for the Swiss business sector

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# Arbeitspapiere/ Working Papers

Heinz Hollenstein

## Patterns and Determinants of International Activities: Are SMEs Different?

An Empirical Analysis Based on Firm-level Data for the  
Swiss Business Sector



# **Patterns and Determinants of International Activities: Are SMEs Different?**

An Empirical Analysis Based on Firm-level Data for the Swiss Business Sector

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## **Abstract**

The literature on the internationalisation of firms has paid little attention to SMEs. SME-oriented studies are predominantly descriptive or illustrating theoretical arguments, and those dealing with services are mostly confined to specific industries. The paper aims at correcting some of these deficiencies. To this end, we start with characterising the international activities of Swiss-based firms with special emphasis on differences by size and sector. The pattern we find for SMEs is broadly in line with theory and (the somewhat fragmentary) empirical evidence. The main part of our contribution is devoted to identifying econometrically, based on firm-level data, the factors determining international activities of SMEs. The analysis confirms Dunning's "Ownership-Location-Internalisation" paradigm, with ownership-specific advantages being the main drivers, irrespective of firm size, sector and internationalisation strategy (in terms of business functions transferred abroad). However, we also find important differences by firm size: Location-specific advantages foster international activities only in case of SMEs; internalising advantages are relevant primarily for large firms; application-oriented knowledge and foreign experience are particularly relevant ownership-specific advantages in case of SMEs, whereas R&D is an ownership advantage of prime importance for large firms. Both the descriptive and the explicative analysis imply that international and domestic activities are complements.

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## 1. Introduction

In the literature, the analysis of (direct) cross-border activities is strongly focused on large multinational enterprises (MNEs). Less attention is paid to engagements at foreign locations by small and medium-sized enterprises (SMEs), although the internationalisation of SMEs strongly accelerated in the eighties (UNCTAD, 1993) and gained further momentum in the nineties (see Section 3). The neglect of SMEs is quite surprising, since it is more than ten years ago that Buckley (1989) presented an in-depth analysis of the specific conditions SMEs face when going abroad.<sup>1</sup>

To date, empirical studies of the internationalisation of SMEs are predominantly descriptive or illustrating theoretical arguments, as is revealed, for example, by a series of papers published in a special issue of this journal devoted to the subject (Small Business Economics, 1997), or the OECD account of the globalisation of SMEs (OECD, 1997). In recent years, some econometric studies have become available, which deal, for example, with the choice of the location of foreign direct investments (FDI) made by SMEs (Urata and Kawai, 2000), or with the impact of firm size on the ownership structure of FDI (Mutinelli and Piscitello, 1998); nevertheless, the descriptive approach is still dominating.<sup>2</sup> Concentration on manufacturing is another deficiency of the empirical work dealing with international activities of SMEs. Studies which take into account the service sector are either highly aggregated (e.g. Fujita, 1995a and 1995b drawing on UNCTAD, 1993) or confined to specific industries such as retailing (Service Industry Journal, 1995), business services (Roberts, 1999) or consultancy (Coviello and Martin, 1999). Again, most of these studies are descriptive. Econometric studies related to services (e.g. Moshirian, 1997: insurance, Moshirian, 2001: banking), rarely distinguish between large firms and SMEs.

The aim of the present paper is to contribute to a better understanding of the internationalisation of SMEs. More specifically, we investigate three topics. Firstly, we describe and interpret the pattern of international activities of Swiss-based SMEs in terms of frequency, type (business functions involved, degree of control) and regional orientation as well as with regard to the motives for and the obstacles to internationalisation. Secondly, based on firm-level data, we try to identify econometrically the factors determining international activities of Swiss SMEs. We use the well-known OLI paradigm developed (and updated several times) by Dunning (1988, 1993, 2000) as theoretical framework of the analysis. On the one hand, we model the (simple) decision of a firm to go abroad (without considering the specific type of engagement); on the other hand, we investigate whether specific internationalisation strategies in terms of (combinations of) business functions are determined by different factors. Thirdly, using the results of the descriptive and the explicative analysis, we assess whether, in the Swiss case, international and domestic activities are substitutes or complements. At all three steps of the investigation, the results for SMEs are compared to those for large firms to identify the specifics of foreign engagements of SMEs.

Since our analysis corrects for several deficiencies of previous work, it adds substantially to present knowledge. Firstly, besides manufacturing, it covers the service sector. Secondly, in

contrast to most empirical work, the paper is not confined to a descriptive analysis but, in the first instance, investigates econometrically the determinants of economic activities at foreign locations. Thirdly, we can rely on a rich database in terms of the number of observations (2268 firms) as well as the number and differentiation of variables. The combination of these features enables us to get results which are more informative than those of many other studies. The behaviour of Swiss SMEs might be highly relevant for other economically advanced countries, which are not yet internationalised to the same degree as Switzerland (Fujita, 1995a; OECD, 1997).

SMEs are defined as firms with less than 100 (domestically employed) workers, which, compared to other studies, is a rather low threshold. Nevertheless, our definition is sensible, because the present study also covers services where the share of firms with less than 100 (or even 50) employees is large. Sensitivity analyses in the econometric part of the paper based on a threshold of 200 employees yielded results which are very similar to those presented here. A threshold of 500 employees, as it is used quite often, is much too high in case of a small country like Switzerland where the number of firms employing more than 500 workers is small. In this paper, the term “internationalisation” covers all cross-border activities of domestic firms with the exception of exports. The latter are excluded, since we want to focus on the more recent phenomenon of direct international engagements of SMEs.

The set-up of the paper is as follows: In Section 2, we describe the database. Section 3 is devoted to a descriptive analysis of the pattern of internationalisation of the Swiss economy differentiated by firm size as well as by manufacturing and services. In Section 4, the determinants of international activities of SMEs and large firms are analysed. In addition, it is assessed whether international and domestic activities are substitutes or complements, and whether SMEs differ from large firms in this respect. In Section 5, we summarise the results, indicate some lines of future work and discuss policy implications.

## **2. Data**

The firm data used in this investigation have been collected primarily in the course of a postal survey on the „Internationalisation of the Swiss Economy“ conducted in autumn 1998. The available data are to a high extent qualitative in nature (nominal or ordinal measures). The questionnaire yielded data on various types of international activities differentiated by business function (distribution, fabrication, R&D, etc.) and by the degree of control (wholly-owned affiliate, joint venture, etc.), the regional orientation of exports and international investments, the motives for and the obstacles to expand internationally, the importance of strategies considered as alternatives to an internationalisation of business, etc.. In addition, we collected information about innovative activities and some basic characteristics of the firm (sales, value added, employment, etc.).

The questionnaire has been addressed to a sample of 5567 firms with at least five employees, which covered the whole private sector of the economy. The sample has been (disproportionally)

stratified by 28 industries and three industry-specific firm size classes with full coverage of large firms. The response rate of 43.5% is quite satisfactory in view of the very demanding questionnaire. The structure of the data set in terms of firm size and industry is very similar to that of the underlying sample. To correct for „unit“ non-response, we conducted a non-response analysis with 400 firms (response rate: 95%). Since it did not point to a serious selectivity bias, the data set at hand is representative for the underlying sample. For various reasons, we excluded the construction sector, ending up with a final data set of 2268 firms, of which 64% are SMEs.

“Item” non-response is another problem of survey data. The usual procedure of dropping the observations with incomplete data may produce biased estimates of means, proportions and regression coefficients. To solve this problem, we used „multiple imputation“ (see Rubin, 1987); the details of this method as applied in the present case are documented and discussed in Donzé (2001). By substituting imputed values for missing ones we could avoid a substantial loss of observations. It turned out, however, that the results from estimating the model explaining a firm’s international activities (Section 4) were quite the same whether we used the full sample (i.e. observations with imputed values included) or the reduced one (i.e. only observations with no missing values for the model variables). We are thus quite confident that the presented results relying on the full sample are robust.

In addition to the data collected in the course of the “Internationalisation Survey 1998”, we used information stemming from the “Swiss Innovation Survey 1996” and the “Swiss Investment Survey 1998” which also were conducted by our institute.<sup>3</sup>

### **3. The pattern of international activities of Swiss firms**

In Switzerland, the share of firms which are engaged in international activities is very high (Table 1). The degree of internationalisation increases monotonously with firm size; this is primarily due to manufacturing where the share of internationalised firms is in the range of 23% (very small firms) and 78% (largest companies). There is no size-dependency in services, except at the lowest and the highest end of the size distribution. Over the nineties, the share of internationally active firms increased by almost 70%, with significantly higher growth rates in case of SMEs, both in manufacturing and in services. The degree of internationalisation of SMEs, in terms of the number of firms, is thus catching-up to that of larger enterprises, and has reached now a remarkable level even in case of very small companies. However, one should keep in mind that large enterprises, which to a high extent were already present at foreign locations at the beginning of the nineties, intensified their international activity too, by expanding the volume of FDI and/or the number of FDI locations.<sup>4</sup>

**Table 1**

Services are distinctly less internationalised than manufacturing industries; only in business and R&D/IT services, the share of internationally active firms is not very much below the average of manufacturing (Table 2). There are three groups of industries exhibiting a particularly high



degree of internationalisation: high-tech manufacturing (electronics/instruments; machinery; pharmaceuticals/chemicals, plastics), followed by two low-tech industries (clothing, textiles) and, in the service sector, the two highly knowledge-intensive industries already mentioned. Internationally-oriented SMEs seem to be concentrated by industry in a similar way as the business sector as a whole, whereas international activities of large firms are spread somewhat more evenly.

**Table 2**

Among the various business functions (Table 3), “distribution” is most frequently internationalised, with “fabrication” coming next. “Procurement”, “R&D” and several more specific engagements (licensing, etc.) clearly remain behind. The same ranking holds true for SMEs and large firms respectively. The latter are more frequently active than SMEs in four out of the six types of business functions we distinguished, whereas the two firm size classes are on equal footing in case of two more heterogeneous types of activities (licensing, etc., service contracts, etc.). Most remarkably, more than a quarter of the responding firms, and this holds true also for SMEs, does some R&D at foreign locations.

Using the data of Table 3a, we constructed a measure of the firm’s “portfolio of international activity” which allows for multiple strategies of internationalisation in terms of a parallel engagement at foreign locations with more than one business function. Table 3b shows that more than 40% of internationalised companies are still present through only a single type of activity; within this group of firms “distribution/other activities only” (see note to Table 3b) holds a larger share than “fabrication/procurement only”.<sup>5</sup> R&D engagements are observed only in combination with other business functions. About a third of firms are active in two types of activities, and almost every fourth company combines all three forms. The distribution of Swiss firms by their portfolio of internationalisation is consistent with the stages approach to internationalisation (see Johanson and Vahlne, 1977), which hypothesises that the direct presence at foreign locations starts with distribution and reaches a final stage when all business functions are internationalised (with R&D coming last). The results are also in line with previous evidence (e.g. OECD, 1997; for Switzerland: Dembinski and Unterlerchner, 1994), although there is some indication of a weakening of the stepwise procedure of internationalisation (Coviello and Martin, 1999).<sup>6</sup> The portfolio of international activity clearly differs by firm size. Engagements of SMEs are more concentrated on a single type of activity (46% vs. 39%), whereas large companies are more frequently fully internationalised; nonetheless, about every fifth small firm has also reached the highest stage of internationalisation.

**Tables 3a and 3b**

When firms go abroad they have to choose between a number of institutional arrangements. Large companies more often have a 100% equity stake in affiliates than SMEs (Table 4). Minority stakes are almost as frequent in case of SMEs, and the latter clearly more often choose co-operative (contractual) agreements. We do not find substantial differences between the two

firm size classes with respect to special non-equity agreements such as licensing, service and management contracts, etc.. On balance, in line with previous evidence (e.g. Fujita, 1995b; Mutinelli and Piscitello, 1998), equity based engagements are more important than non-equity based agreements in case of large firms, in manufacturing as well as in the service sector; for SMEs it is just the other way round. As Buckley (1989, 1997), Mutinelli and Piscitello (1998) and Acs et al. (1997) argue, the higher probability of choosing non-equity agreements in case of SMEs is due to the high uncertainty and risks characterising activities at foreign locations and, as a corollary, the large investments required to gather and process uncertainty-reducing information. SMEs are typically short of management capacities and financial resources to deal with these problems (see Table 7 below). As a consequence, for an SME, it pays off to be cautious in choosing the way of becoming present at a foreign location; in many cases, a non-equity based arrangement might be the most promising arrangement. Nevertheless, even for SMEs, the full ownership of an affiliate is the most frequent type of international presence (primarily in services). This type of arrangement presumably is optimal if a firm, based on very specific knowledge, is a leading player in a market niche. In this case, co-operative agreements, which always involve (some) knowledge-sharing, would probably undermine the strong market position (Kohn, 1997).

**Table 4**

International engagements of Swiss firms, in terms of frequency, are primarily oriented towards the EU, with Northern America as well as Central Europe and High-income Asia coming next (Table 5).<sup>7</sup> Concentration on the EU is even more accentuated in case of SMEs. In addition, the latter are almost as strongly engaged in Central Europe as large firms. A weak presence of SMEs, in relative terms, is observed for China and Latin America. The regional distribution is compatible with what one would expect from the pattern of obstacles to international activities and the underlying theory (see below, Table 7). SMEs concentrate on nearby locations where an engagement is not too risky and does not strain too much management capacity and financial resources, whereas large firms are able to undertake activities at distant locations such as China and Latin America, which are “difficult” in terms of risks (legal and political insecurities, knowledge of local conditions) and require a long-term investment horizon. In manufacturing, the regional profile of small and large firms differs in a similar way as in the business sector as a whole. Surprisingly, the pattern for the two size classes is quite the same in the service sector.

**Table 5**

The survey also yielded detailed information regarding the importance of various motives for international engagements in distribution/other activities, fabrication/procurement and R&D respectively. The data allow a preliminary assessment of the relative merits of the two competing hypotheses regarding the home-country effects of international activities (substitution vs. complementarity). Dunning (1993) distinguishes market-seeking (demand oriented) engagements at foreign locations, which point to a complementary relationship of foreign and domestic activities, as well as resource-seeking and efficiency-seeking (supply-oriented) strategies, which

are rather related to substitution. The domestic effects of strategic asset-seeking FDI, which have become more important in recent years (Acs and Preston, 1997; Dunning, 2000), are less obvious; however, since they are designed to augment firm-specific advantages, they also tend to support the complementarity hypothesis. In the following, we concentrate on the motives for international activities in fabrication/procurement (Table 6).

In the business sector as a whole, market-oriented motives, i.e. securing existing and developing new (export) markets, attaining an early presence on foreign markets as well as securing access to the EU market (motives 14 to 19 and 21), are the most important ones, both for large firms and for SMEs. In the latter case, however, cost-reduction (exploiting lower labour costs, supplying the own firm; motives 6 and 8), which reflects primarily efficiency seeking strategies, is not much less important than market-seeking. Motives related to resource-seeking strategies (motives 1, 2, 4, 5, 7) are hardly relevant. Moreover, for both firm size classes, public policy (regulations, administrative rules, tax regime; motives 10 to 13) does rarely constitute disadvantages of Swiss locations to be compensated for by international engagements. The results by sector show that in services, as one would expect, only market-seeking objectives are relevant. In manufacturing, supply-oriented strategies are somewhat more frequent than in the economy as a whole, but still are less important than demand-oriented ones.

According to these results, which are, as far as comparable, consistent with those found for other countries (OECD, 1997), international and domestic activities in fabrication/procurement seem to be complements rather than substitutes. This also holds true for SMEs, although substitution effects are somewhat stronger in this case. In view of the strongly complementary relationship in distributive functions (Arvanitis et al., 2001), international engagements, on balance, support domestic activities in both size classes. This preliminary conclusion will be re-assessed based on the results of the econometric analysis (Section 4).

### **Table 6**

Although the Swiss business sector is highly internationalised, a majority of the sampled firms (66%) were not (yet) engaged in international activities in 1998. About 30% of them have not really a potential of going abroad, e.g. affiliates of foreign parent firms exclusively oriented towards the Swiss market, or (non-innovative) small firms serving local niche markets. For the major part of the remaining firms, internationalisation might be an option. However, at the time, it is not (yet) necessary to go abroad, since other strategies such as rationalisation, reorganisation, outsourcing or concentration on high end products still seem to be more promising. Presumably, some of these firms will change their mind, to remain competitive or to profit from new opportunities in the course of a deepening of the globalisation process. To what extent this will happen also depends on the constraints which prevent firms, especially SMEs, to expand internationally. As Table 7 shows, across the board, SMEs are more frequently confronted with serious problems than large companies. The two most important obstacles (in both size classes) are high financial risks and insufficient management capacity which, however, are more often an obstacle in case of SMEs. For the latter, financial resources (primarily in manufacturing) and,

somewhat less accentuated, insufficient knowledge of foreign locations as well as restrictive government regulations and legal insecurities are other important impediments. The overall pattern of obstacles to the internationalisation of SMEs broadly confirms the hypotheses put forward by Buckley (1989) and others (e.g. Acs et al., 1997; Mutinelli and Piscitello, 1998).

**Table 7**

In sum, we find that Swiss manufacturing and services firms are highly internationalised. This holds true to a remarkable degree also for SMEs, both in terms of frequency of international engagements and the range of business functions involved. In manufacturing, international engagements are strongly size-dependent what reflects the more serious constraints SMEs are faced with when going abroad as compared to large firms. The main obstacles are high financial risks and insufficient management capacity and, to a lesser extent, deficiencies with respect to financial resources and knowledge about foreign locations. The pattern of impediments shapes also the regional orientation of international activity of SMEs. Nearby and “less risky” locations are clearly preferred, whereas large firms are engaged more often also in more distant and “difficult” markets. Industrial concentration of international activities is somewhat higher in case of SMEs, with high-tech manufacturing, low-tech textiles/clothing, and, in the service sector, knowledge-based business services taking the lead. Institutional arrangements of international activities substantially differ between SMEs and large firms; the former choose more often non-equity forms, whereas the latter prefer equity-based arrangements. Demand-oriented strategies of internationalisation are more important than supply-oriented ones in both size classes, but in case of SMEs, supply-orientation is also quite important. On balance, international and domestic activities seem to be rather complements than substitutes. The Swiss pattern of internationalisation is more or less in line with theory and the (fragmentary) empirical evidence provided for other countries.<sup>8</sup>

#### **4. Determinants of the international activities**

##### **4.1 Theoretical background**

There are basically three strands of theory to explain international investments of firms. The classical theory of international trade stresses the factor endowment of an economy and implies that a firm’s investment follows the comparative advantages of different locations. According to the „new trade theory“ firms exhibit specific capabilities (technology, marketing, etc.) that can be successfully exploited at home as well as at foreign locations (independently from the economic attractiveness of different countries). Transaction cost theory, finally, hypothesises that a firm tends to engage in FDI whenever the costs of setting up and running a transnational (hierarchical) organisation are lower than those arising from external market transactions. In addition to these basic theories, there is a whole number of partial hypotheses to explain specific aspects of internationalisation, which are rooted in different “sub-disciplines” of economics such as

industrial organisation, management sciences, evolutionary economics, economic geography or finance (see Dunning, 2000).

It dates back to the seventies that Dunning hypothesised that no single approach is able to fully explain a firm's international activity. Therefore, he proposed as framework of analysis an eclectic theory of international production, the "OLI paradigm". In his understanding, it covers the most important theories in a way that it is more than just a sum of the constituent hypotheses. Although this framework has been further developed during the last two decades to take into account new forces and patterns of internationalisation as well as progress made in theoretical and empirical research, the basic structure of the eclectic paradigm remained unchanged (Dunning, 2000).<sup>9</sup> The OLI paradigm serves as theoretical framework of our econometric analysis of the determinants of the international activities of Swiss firms.

Dunning distinguishes three groups of variables which explain international engagements of a firm, that is „ownership-specific“ (O), „location-specific“ (L) and „internalising advantages“ (I)“: O-advantages are firm-specific characteristics and capabilities that make a firm superior to local competitors irrespective of general locational characteristics. This type of advantages arises from the availability of human, knowledge and physical capital as well as specific intangibles related to marketing, organisation, information processing, governance, finance, experience with foreign markets, etc.. L-advantages represent advantages which a firm can realise by optimising its activities along the value chain across locations. Such advantages are rooted mainly in country-specific differences with respect to factors of production (availability, quality, price), infrastructure, transport and communication costs, taxes and subsidies, regulatory framework, etc.. I-advantages can be realised by internalising market transactions through mergers and acquisitions or by forming co-operations/alliances. In this way, a firm can reduce search and transaction costs, secure availability and high quality standards of key materials and components, etc.. The three groups of variables are clearly related to the basic theoretical approaches mentioned above: O-advantages capture the main ingredients of new trade theory, L-advantages are related to the classical trade theory, whereas I-advantages represent the transaction cost approach.

## 4.2 The empirical model

### *Specification of the dependent variable*

We shall present cross-section estimates for two models. Model I refers to the (simple) decision to engage in foreign activities, irrespective of the specific type of activity. The probability to be internationally active ( $FA_i$ ) is estimated using a binary probit model. The dependent variable of model II represents specific (multiple) strategies of internationalisation in terms of (combinations of) business functions as set out in Table 3b. For statistical reasons (minimum number of observations), the two strategies involving international R&D are merged. We thus end up with four internationalisation strategies which represent the "measurement levels" of the multiple strategy variable  $FA_i\_MULT$ . The four levels stand for an international presence with

„distribution/other activities only“ (D), „fabrication/procurement only“ (F), „distribution/other activities and fabrication/procurement combined“ (DF) and „R&D combined with D or F or both“ (RDF). Firms without foreign activities are used as reference group. D, F, DF and RDF are conceptualised as unordered categories. Therefore, the multinomial logit model, which yields for each measurement level a specific estimate of the parameters of the explanatory variables, is an appropriate estimation procedure. In this way, we can identify for each strategy of international activity the specific pattern of factors that determines the probability of its occurrence.

Both models are estimated separately for SMEs and large firms using the same set of explanatory variables. Hence, we can investigate whether the internationalisation of firms of the two size classes is driven by different forces, and whether the explanatory variables that are relevant in both cases differ in importance.

#### *Specification of the explanatory variables*

Table 8 shows the specification and measurement as well as the expected signs of the explanatory variables we used to capture the main determinants of international activities as proposed by the OLI paradigm and listed in some detail in Dunning (1993, p. 81).

A first group of variables represents O-advantages which are expected to be positively related to international activities. Technology and innovation are highly important dimensions of this type of advantages. We use three proxies to capture them. Two measures are related to the input side of the innovation process, that is a dummy variable (RD) which indicates whether a firm is active in R&D, and a more specific variable (DPD) representing the intensity of outlays for developing new products. Whereas RD is measured at firm level (data from the Internationalisation Survey 1998), DPD refers to the 3-digit industry level (data from the Innovation Survey 1996); more specifically, for each firm, the value of DPD has been approximated by the 3-digit-share of the firms with high outlays for product development (i.e. value 4 or 5 on a five point Likert scale). This (frequently used) procedure had to be applied, because matching the firm data from the two surveys would have produced a significant loss of observations. In the same way, we proceeded in specifying the third innovation-related variable (INNOPD) capturing innovation output, i.e. the introduction of (mostly incremental) product innovations at the market. We did not include variables related to process innovations, since firm-specific advantages are presumably less important in this case (free access to new capital goods). The availability of human capital, measured by the share of personnel holding university or similar degrees (HUMCAP), is another important dimension of O-advantages. We also included physical capital intensity, taking as an indicator the flow of capital services (i.e. gross capital income) per employee (CL). In view of the easy access to capital goods, it is an empirical question whether the firm-specific component of physical capital is large enough to produce O-advantages.

Other specific capabilities of a firm representing O-advantages are more difficult to measure. To mention are assets in the field of organisation (e.g. highly developed systems of information gathering and processing; efficient incentive structures for management and workforce, skill

development), marketing (e.g. well-known brand name; well-developed relationships to users), or financial matters (e.g. access to the stock market). Since our data base did not allow to capture such capabilities explicitly, we included two proxies, that is an overall measure of the firm's productivity QL (value added per employee) and firm size hypothesising that several of the mentioned unspecified factors are size-dependent; firm size is measured by the number of employees  $L$  and, to allow for scale effects, its square  $L^2$ . The size variable, however, does not represent O-advantages only: firstly, since large firms originating from small economies like Switzerland tend to be active across the border more often than small ones for quite natural reasons, firm size has also the character of a control variable; secondly, as set out below, firm size also captures I-advantages. These different meanings of firm size can hardly be disentangled at the empirical level; therefore, one has to be cautious in interpreting estimates regarding this variable.

Experience on international markets is another important O-advantage suggested in the literature. According to the stages approach to internationalisation, exporting enables a firm to acquire specific knowledge about foreign markets, institutions, etc., which facilitate more far-reaching international engagements such as setting up foreign affiliates. We use the export to sales ratio  $X$  and, to control for (potential) non-linearity, its square  $X^2$  as indicators of international experience.

L-advantages are captured by three variables. The first and the second one refer to labour input. It is hypothesised that difficulties in recruiting qualified manpower (QLABOUR) and high labour costs (WAGECOST) in the Swiss economy are an incentive for firms to invest at foreign locations that are more favourable in this respect (positive sign expectation). The third L-variable (CHLOC) is an overall measure of the attractiveness of Switzerland as a location for investments, reflecting assessments of the respondents of the Swiss investment survey 1998. The less attractive Swiss locations are (high values of CHLOC), the higher the propensity to invest abroad. Regressing CHLOC on a set of specific locational variables (level of taxation, problems of financing investments, regulatory framework, etc.) yielded a very good fit; the information content of CHLOC should thus be quite high. L-variables are measured at the 3-digit industry level for the same reasons and in the same way we explained when discussing the specification of DPD.

With respect to I-advantages, we note that large firms presumably are in a better position than small ones to reduce free market transaction costs through internalising some of the (external) market relationships. Moreover, we use a firm's propensity to co-operate with other firms, which is a strongly growing practice in modern capitalism, as a second measure of I-advantages (COOP: share of co-operating firms at the 3-digit industry level). The variable COOP, however, covers only co-operations in R&D, because our database does not contain information about co-operation in other fields. Since the data at hand did not allow to measure specific I-advantages ("reducing uncertainty with respect to the quality of key components", etc.), we dispose only of

two rough proxies of I-advantages. Therefore, and because firm size stands also for some O-advantages, it will be difficult to identify unambiguously the importance of I-advantages.

A further set of variables is used to characterise a firm's market conditions. Although these can be partly related and interpreted in the OLI framework, we conceptualise them rather as control variables, assuming that a firm's decision to undertake international activities is not independent of the market environment in which it operates. A high intensity of price competition (IPC) might favour activities at foreign locations as a way to reduce cost pressures (offensive strategy); however, it might also lead to passive strategies (e.g. closing-down of part of production and specialising on high-end products). The sign of IPC is thus an empirical matter. Whether a high intensity of non-price competition (INPC) induces international engagements, has also to be decided at the empirical level. In some cases, it is advantageous to centralise production and marketing of high quality products at home (realisation of economies of scales, etc.), in other instances, it may be necessary to combine product development and fabrication at foreign locations to adjust the product to the local market. Concentration on international markets (CONC) is expected to be positively correlated with engagements at foreign location, since oligopolistic competition usually requires a direct presence in the most important markets. Concentration is measured at world scale by using information about the number of the firm's principal competitors wherever these are located. Finally, the prospects for market growth, measured by the trend development of demand on the firm's markets (DEMAND) in the nineties, also might influence international activities (positive sign expectation). If expected demand is low, going abroad can be too risky and resources to finance such a step insufficient; on the other hand, when market opportunities become more favourable, local presence might help to fully exploit them (first mover advantages, developing stable relationships with important users, etc.). The four variables we used to capture a firm's market environment are also measured at the 3-digit industry level.

Finally, we inserted some control variables. A first one captures the firm's (foreign) ownership status with "affiliate of a foreign company" (FOREIGN) expected to be negatively related to a presence at foreign locations, since many foreign-owned firms are established in Switzerland to serve exclusively the domestic market. Besides, a number of industry dummies are included to avoid an omitted variable bias.

Finally, it is necessary to point to the special role the variable "firm size" plays. On the one hand, it may prove to be an independent (additional) determinant of international activities, in which case it stands for various factors that are not explicitly modelled (unspecified O- and I-advantages). On the other hand, it may (also) capture some features of the variables explicitly specified in the model when it is correlated with them (size-dependency of the model). It is this second aspect which is analysed when we separately run the model for SMEs and large firms.



### 4.3 Empirical results

#### *Model I*

The results for the dichotomous variable “international activity yes/no” (model I) are presented in Table 9 for the full sample as well as for two size-specific sub-samples which in turn are differentiated by sector. In all cases, the model fits the data quite well. The overall pattern is consistent with the underlying OLI hypotheses, since all three types of advantages proposed by the OLI paradigm, although not to the same extent, exert a significant impact.

For the full sample (column 1), we find overwhelming evidence for the expected positive effect of O-advantages and firm size (which is assumed to represent O- as well as I-advantages). L-advantages also exert an influence on the probability to go abroad, but to a much lesser extent than O-advantages do. Among the latter, firm-specific capabilities with respect to innovation (RD, INNOPD), knowledge in general (HUMCAP), previous experience in foreign markets (X) as well as various unspecified capabilities (organisation, marketing, finance, etc.), captured by labour productivity and firm size (QL, L), are highly important. Capital intensity CL is insignificant what is, as argued in the previous section, not very surprising. Furthermore, there is evidence for decreasing scale effects with respect to firm size and export orientation (negative sign of  $L^2$  and  $X^2$  respectively); from this result, we conclude that firm size (i.e. the firm-specific capabilities captured by the firm size variable) and international experience are particularly important up to a certain threshold. Among the L-variables, only WAGECOST yields statistically significant results; as expected, high wages in Switzerland induce engagements at foreign locations. As far as market conditions are concerned, we find a statistically significant negative impact for the intensity of non-price competition (INPC); in markets characterised by strong non-price competition, foreign users obviously can be efficiently served by exports from domestic locations. The results for the intensity of price competition (IPC) are statistically insignificant; the countervailing forces (offensive vs. defensive strategies) seem to balance each other. Finally, as expected, domestic affiliates of foreign parents (FOREIGN) are less often engaged in international activities.

As already mentioned, the probability to go abroad is significantly higher for large firms than for SMEs. However, additional estimates, not reported here, show that the explanatory power of the model decreases only slightly when the firm size variable is excluded. Firm size is thus hardly an independent (additional) variable determining international activities of Swiss firms. The results rather point to a certain size-dependency of the model. It turns out that, as a consequence of dropping firm size from the model, the impact of the productivity variable (supposed to capture unspecified O-advantages) gets larger; the same holds for the measures related to innovation and knowledge. Nevertheless, the basic pattern of explanation remains quite the same, pointing to the robustness of the OLI approach as explanatory framework.

The results from separate model estimates for SMEs and large firms, which give insights into the size-dependency of the explanatory pattern, are provided in the columns 2 to 7 of Table 9.

Indeed, the results differ to some extent between the two size classes; this holds true for the business sector as a whole as well as for the manufacturing and the service sector. Most importantly, we find that L-advantages are only relevant in case of SMEs (manufacturing only). This finding is consistent with the pattern of motives for engaging in international activities reported in Section 3, that pointed to a more important role of cost-oriented strategies in case of SMEs than for larger firms. Although a more detailed inspection of the size-specific results (see next paragraph) reveals some further differences between SMEs and large firms, the estimates as a whole imply that the overall pattern of explanation for the two firm size classes differs rather in degree than in kind.

The specifics of the explanatory pattern in case of SMEs (as compared with that of large firms) may be characterised as follows: International activities of SMEs are supported by almost all O-advantages included in the model, i.e. the availability of firm-specific assets related to innovation, skills, international experience and some unspecified intangible assets (organisational capabilities, etc.) captured by the efficiency variable QL; the same holds true for SMEs of the manufacturing and the service sector. This pattern, with the exception of QL, is qualitatively the same in case of large firms; in quantitative terms, however, as assessed by referring to standardised regression coefficients, the importance of the various dimensions of O-advantages partly differs between the two size classes. With respect to innovation-related assets, we find that international activities of SMEs are more strongly based on the ability to generate (incremental) product innovations (INNPD) than on R&D-activities, whereas it is just the other way round in case of large firms. Moreover, international experience (X) seems to play a slightly more important role in case of SMEs, what is, at least as a tendency, confirmed by the sector-specific estimates. Another tendency (although statistically not significant) is detected for capital intensity (CL); internationally active SMEs tend to be labour-intensive, whereas the capital intensity of large (services) firms engaged at foreign locations is above-average. This result is consistent with the observation (see above) that high labour costs in Switzerland induce international engagements only in case of SMEs (manufacturing). With respect to market conditions, we find that intensive price competition (IPC) favours international engagements of large firms (services only), whereas the negative impact of an intensive non-price competition (INPC) we identified for the full sample reflects strategies of SMEs in manufacturing and those of large firms in services.

### *Model II*

In practice, firms do not make a (binary) choice between “going abroad” and “staying at home”, as it is assumed in model 1; they rather dispose of a whole set of alternative domestic and international business strategies. Therefore, we estimated the probability of a firm to choose a specific (multiple) internationalisation strategy in terms of type and number of internationalised business functions, with firms staying at home as reference group. This model has been separately estimated for SMEs and for large firms.

The results from the multinomial logit estimates of the four internationalisation strategies D, F, DF and RDF, as defined in Section 4.2, are presented in Table 10. Each column shows the factors explaining the choice of a specific strategy.<sup>10</sup> We present the results from estimating (restricted) models, which include only variables whose parameters were statistically significant at the 10% level in a prior estimation of the full model; in this way, the very large number of parameters to be estimated (132 in the full model) could be somewhat reduced. As a consequence, the pattern of explanation becomes more accentuated (and easier to read) with the basic results remaining unchanged. The overall fit of the multinomial model estimates for both size classes is satisfactory.

The results may be summarised as follows: Firstly, O-advantages are highly important in case of all strategies and for both firm size classes. In the SMEs' sample, we also find evidence for L-advantages, whereas, in concordance with the estimates of model 1, these are irrelevant in case of large firms (negative or insignificant sign of WAGECOST). We do not find evidence for I-advantages in case of SMEs, at least as far as our model is able to capture them (variables L and COOP), whereas these are relevant in three out of four strategies in the large firms' sample. Market conditions are practically unrelated to the choice of a specific internationalisation strategy in the SMEs' sample, whereas the intensity of price competition between large firms fosters all types of internationalisation with the exception of strategy F ("fabrication/procurement only").

Secondly, for both size classes, we find that the impact of O-advantages is highest in case of RDF, i.e. the most developed internationalisation strategy (international engagements in R&D *and* distribution/other forms and/or fabrication/procurement), whereas the influence of this group of variables seems to be rather weak in case of the exclusively fabrication/procurement-oriented strategy F (particularly for large firms). The strategies D and DF, when pursued by SMEs, are driven by O-advantages more or less to the same extent, whereas in the large firm sample strategy DF relies more on O-advantages than strategy D.

Thirdly, the relative importance of the various O-variables differs between the four strategies. The RDF strategy, for example, relies very strongly on O-advantages related to R&D and product development, innovation and human capital (both size classes), whereas the strategies DF and F, in case of SMEs, are based primarily on human capital and (incremental) innovation.

Fourthly, additional estimates, not reported here, show that, in terms of the underlying model, all strategies significantly differ from "staying at home", whereas the differences among the four internationalisation strategies (with the exception of RDF), although not negligible, are not very large. In case of SMEs, we find (statistically) different patterns of explanation between three groups of strategies: a) "no internationalisation", b) "strategies D or F or DF", c) "strategy RDF"; in the large firms' sample four groups of strategies are to be distinguished: a) "no internationalisation", b) "strategy F", c) "strategy D or DF", d) "strategy RDF".

Finally, we consider differences between the two size classes for each strategy. (column 2 vs. 5 for strategy D, column 3 vs. 6 for strategy F, etc.). As far as the most developed strategy RDF is

concerned, we note that O- and I-advantages are relatively more important in case of large firms, whereas L-advantages matter only for SMEs. In addition, among the O-advantages, the knowledge base of international engagements of SMEs is not as large as that of big firms and stresses, in relative terms, incremental innovation more than R&D, outlays for product development and human capital. Strategy D (“distribution/other activities only”) shows also some size-specific aspects: L-advantages (again) are only relevant in case of SMEs. Among the O-advantages, we find that SMEs tend to be labour-intensive and rely relatively more than large firms on various unspecified intangible assets (QL) and the experience factor X, whereas human capital is particularly relevant in large companies; other knowledge-related determinants (RD, INNOPD) are of similar importance in both size classes. Strategy F (“fabrication/procurement only”) is supported much less by OLI variables than the other ones. It is the only strategy for which we do not find evidence for L-advantages even for SMEs. Among the O-advantages, foreign engagements of SMEs are driven primarily by human capital, with some importance also of incremental innovation and experience. Finally, strategy DF is characterised by the presence of O-advantages in both size classes, whereas L-advantages (SMEs) and I-advantages (large firms) are relevant only in case of one size category. In case of SMEs, the knowledge base is somewhat more application-oriented (product development DPD) than in large firms that rely more on R&D.

In sum, we find important size-specific differences in explaining both the simple decision “foreign activity yes/no” and the choice of a specific (multiple) internationalisation strategy in terms of business functions. Therefore, a size-specific modelling of foreign activities might be a promising way to get more insights into the forces driving internationalisation of firms.

#### **4.4 Are international and domestic activities substitutes or complements?**

The descriptive analysis presented in Section 3 implies that international and domestic activities, on balance, are rather complements than substitutes, even in case of manufacturing. The same holds true for SMEs, although substitution effects are somewhat more pronounced than in case of large firms.

To assess whether this result is confirmed by our econometric analysis, we first have to relate the main components of the OLI-model to complementary and substitution effects respectively. We assume that O-advantages imply a complementary relationship, since they allow to capture additional returns on (past) investments in firm-specific assets, by extending the scale of activities across the borders. In contrast, L-(dis)advantages tend to be related to substitution effects, because they favour the dislocation of (part of the) activities towards low cost locations. The impact of I-advantages might be small; the prime effect of internalising, for example, the supply of components is a substitution of intra-firm imports for imports from the free market.

Against this background, the model estimates unequivocally imply that, on balance, foreign and home activities of Swiss firms, independent of firm size, are complements: According to both model I and model II, O-advantages are much more important than L-advantages, which are

statistically significant only in the sub-sample of SMEs (manufacturing). The results of model-based analysis are thus completely in line with those of the descriptive analysis.

These findings are also consistent with the results of an investigation where we analysed the impact of the economic relations between Eastern Europe and Switzerland on the Swiss economy (Hollenstein, 2001); evidence for L-effects are found solely for the strategy “fabrication only” which, as in the present case, were stronger in case of SMEs than for large firms. The results of the present paper are also broadly in line with those of Urata and Kawai (2000), one of the rare econometric studies of internationalisation differentiating by firm size.<sup>11</sup> Fontagné (1999), who surveyed in detail the econometric literature dealing with the home-country effects of FDI, also concluded that, on balance, international and domestic activities tend to be complements; this survey (as other ones), however, does not deal with size-specific effects of foreign engagements.

## 5. Conclusions

This paper has been devoted, firstly, to describing and interpreting the pattern of internationalisation of Swiss firms, differentiated by firm size and sector. Secondly, we investigated econometrically the factors determining international engagements of SMEs and large firms in the manufacturing and the service sector. The well-known OLI paradigm has been used as theoretical framework of the analysis. Thirdly, we assessed whether international engagements and domestic activities are complements or substitutes, and whether SMEs differ from large firms in this respect. The analysis is based on survey data for 2268 manufacturing and services firms with 5 and more employees.

In Switzerland, private business in manufacturing as well as in services is highly internationalised. This holds true to a remarkable (and rapidly growing) degree also for SMEs in terms of frequency and range of business functions involved. In manufacturing, international activities are strongly size-dependent, what partly reflects specific constraints SMEs are faced with when expanding internationally. The main obstacles are high financial risks and insufficient management capacity and, to a lesser extent, deficiencies with respect to financial resources and knowledge about foreign locations. The pattern of impediments also shapes the regional orientation of the presence of SMEs; nearby and “less risky” locations (EU, Central Europe) are clearly preferred, whereas large firms are more often (also) engaged in distant and “difficult” markets. Industrial concentration of international engagements of SMEs is somewhat higher than that of large firms, with high-tech manufacturing, low-tech textiles/clothing and, in the services sector, knowledge-based business services taking the lead. Institutional arrangements of international activities differ substantially between SMEs and large firms; whereas the former choose more often non-equity arrangements, the latter prefer equity-based forms. Demand-oriented strategies of internationalisation are more frequent than supply-oriented ones; this also holds true for SMEs although, in this case, cost reduction is quite an important motive too. The pattern of internationalisation we found for Swiss firms is more or less in line with theory and the somewhat fragmentary empirical evidence.

The second (more innovative) part of the paper focuses on explaining the propensity to take up (direct) international activities and the probability to choose a specific (multiple) internationalisation strategy in terms of (combinations of) business functions involved (ranging from “distribution/other activities only” up to “R&D *and* distribution/other activities and/or fabrication/procurement”). The econometric results confirmed the main propositions of the OLI paradigm. Disaggregation by firm size, sector and internationalisation strategy, however, showed, that location-specific disadvantages of Switzerland (high wages) induced international activities only in case of SMEs (manufacturing; distribution-oriented strategies, distribution/fabrication/-R&D-based strategies), whereas internalisation of market relationships, as far as it could be captured at all, is primarily relevant for large firms. Ownership-specific advantages turned out to be the most important drivers of international activities, irrespective of firm size, sector or type of internationalisation strategy. To mention are innovation- and knowledge related capabilities (R&D, incremental innovative activities, human capital), experience on foreign markets and some unspecified firm-specific assets in fields like marketing, organisation, finance (captured by productivity and firm size). The relative importance of the individual O-advantages varies by firm size, with SMEs drawing more heavily on application-oriented knowledge components and foreign experience, whereas R&D is of particularly high importance in case of large firms.

The results of both the descriptive and the explicative analysis imply that, in the Swiss case, international and domestic activities are complements rather than substitutes at the aggregate level. This finding is in line with the majority of previous studies. Besides, we get the same result for the two firm size classes and sectors we distinguished. In case of SMEs (primarily in manufacturing) substitution effects are stronger than for the economy as a whole, since efficiency-seeking motives of internationalisation and locational disadvantages of Switzerland are quite important. This result is not contradicted by the very few SME-oriented econometric studies dealing with this topic.

Since the econometric part of the analysis is quite innovative, additional studies along these lines would be interesting. Moreover, our analysis should be further developed in several respects. Firstly, the empirical model could be improved, in particular by explicitly taking into account some of the now unspecified O-advantages, such as capabilities in areas like marketing, information processing, organisation, human resource development, etc.;<sup>12</sup> similarly, one should try to improve the specification of I-advantages. Secondly, it would be sensible to enrich the model with variables representing motives for and obstacles to international engagements.<sup>13</sup> Thirdly, cross-section information should be complemented by time-series data to open the way for panel estimations.

Since the impact of international activities both on the home economy (as shown in this paper) and the host countries (as shown in the vast literature on inward investments) is positive, we conclude that the process of internationalisation, in general, increases welfare. In view of the specific barriers SMEs face when expanding internationally, government support to overcome these impediments is a straightforward and seemingly sensible policy prescription. However,

policy support for SMEs, such as, for example, providing information about foreign locations, negotiating foreign investment risk schemes, initiating (or intensifying) training courses for international management, financing and organising missions to potential host countries, etc., might be costly and/or not very effective. As argued by Acs et al. (1999), indirect internationalisation of SMEs, where (large) MNEs are intermediary agents in global marketing (of SMEs' products), could often be more efficient, at least if policy prevents large firms from abusing monopsony power. To what extent this problem exists, and whether corrective government measures are practicable, remains an open question.

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## Notes

- <sup>1</sup> It is very revealing that Dunning (1993) in his very comprehensive book dealing with multinational activity of firms does not treat explicitly the internationalisation of SMEs.
- <sup>2</sup> We also note the growing number of econometric studies dealing with the internationalisation of R&D, which, however, refer almost exclusively to large MNEs; for an overview see OECD (1998).
- <sup>3</sup> The questionnaires of the three surveys are available on [www.kof.gess.ethz.ch](http://www.kof.gess.ethz.ch).
- <sup>4</sup> The data do not enable us to quantify the process of internationalisation in terms of investment volumes.
- <sup>5</sup> "Distribution" and "other activities as well as "fabrication" and "procurement" have been aggregated, to make sure that the sub-samples, constructed by combining the criteria "firm size" and "sector", are large enough to get robust estimates in modelling multiple internationalisation strategies.
- <sup>6</sup> These authors argue that increasing knowledge intensity of economic activity, shortening product cycles, the growing necessity for many SMEs to concentrate on niche strategies, etc. make it indispensable, in many instances, to go abroad from the very beginning of market presence.
- <sup>7</sup> In terms of the volume of FDI, Central Europe is clearly a less important destination than Northern America and, to a lesser extent, also Latin America and High-income Asia.
- <sup>8</sup> A comprehensive descriptive analysis of the Swiss pattern of foreign engagements is provided in Arvanitis et al. (2001, ch.2).
- <sup>9</sup> Dunning (2000) provides a summary account of the actual state of the eclectic paradigm as well as a very comprehensive review of the literature.
- <sup>10</sup> Since the parameters of each strategy are estimated with the option "no international activity" as reference, the results in Table 10 do not indicate whether the pattern of explanation, e.g. for strategy F and DF, is (statistically) different. Notwithstanding this limitation, we are able to identify the strategy-specific patterns of explanation we are interested in.
- <sup>11</sup> These authors found that FDI undertaken by Japanese SMEs of four manufacturing industries are more responsive to locational advantages than those of large firms, and that L-advantages are statistically significant only for FDI in developing (mainly Asian) countries.

- <sup>12</sup> Such specific capabilities could be measured by indicators representing marketing expenditures, the relevance of brand names, the use of ICT, the number of hierarchical layers, the adoption of modern work practices, the outlays for training activities, etc..
- <sup>13</sup> Bezzola and Hollenstein (2000) show that this procedure is feasible for certain types of models.

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TABLE 1: Percentage share of Swiss firms with international activities *by firm size*

Number of Employees	Manufacturing		Services		Total	
	1990	1998	1990	1998	1990	1998
5-19	10.4	23.1	5.7	15.9	8.3	19.8
20-49	12.9	28.6	13.5	22.6	13.4	25.8
50-99	25.1	43.1	8.3	22.9	19.4	36.3
100-199	33.9	50.4	14.5	28.2	27.8	43.4
200-499	48.6	67.1	12.6	21.4	35.1	50.0
500-999	54.9	74.5	6.1	18.2	35.7	52.4
1000+	68.3	78.1	30.0	37.5	49.4	58.0
Total	26.6	42.5	10.9	21.8	20.3	34.2

TABLE 2: Percentage share of Swiss firms with international activities *by industry*, 1998<sup>a</sup>

Sector / industry	SMEs	Large firms	All firms
<i>Manufacturing</i>	<i>31.4</i>	<i>60.5</i>	<i>42.5</i>
Food, beverages, tobacco	22.9	47.5	34.4
Textiles	37.9	60.0	46.9
Clothing	42.9	83.3	50.0
Wood products	16.0	57.1	25.0
Paper	40.0	47.4	44.1
Printing, publishing	16.0	36.0	26.0
Pharmaceuticals, chemicals	44.4	79.0	57.4
Rubber, plastics	37.3	62.1	46.3
Non-metallic mineral products	11.6	30.0	17.5
Metal production	30.8	47.4	40.6
Metalworking	25.5	55.8	33.5
Machinery, vehicles	40.1	75.3	54.7
Electrical machinery	31.0	78.1	51.4
Electronics, instruments	42.9	74.5	55.5
Watches	18.5	36.8	26.1
Other manufacturing	22.2	40.0	27.7
<i>Services</i>	<i>19.8</i>	<i>25.9</i>	<i>21.8</i>
Wholesale trade	16.1	30.1	19.8
Retail trade	11.1	8.5	9.9
Transport, telecommunication	17.4	21.4	18.5
Banking/insurance	14.1	29.5	21.6
R&D and IT services	39.5	28.6	36.8
Other business services	28.2	42.2	31.7
Personal services	0.0	0.0	0.0
Total	26.5	48.0	34.2

TABLE 3a: Percentage share of Swiss firms with international activities *by business function*, 1998 (*multiple answers*)

Business function	SMEs	Large firms	All firms
Distribution	77.7	84.6	81.2
Fabrication	55.2	63.8	59.5
Procurement	23.6	26.2	24.9
R&D	25.1	29.7	27.4
Licensing, franchising	17.9	18.7	18.3
Service, management, consulting contracts, etc.	18.7	16.7	17.7

TABLE 3b: Percentage share of Swiss firms with international activities *by combinations of business functions*, 1998

Combination of business functions	SMEs	Large firms	All firms
Distribution/other activities <sup>a</sup>	33.2	29.5	31.3
Fabrication/procurement only	13.0	9.2	11.1
R&D only	0.0	0.0	0.0
Distribution/other and fabrication/procurement	28.2	31.3	29.8
Distribution/other and R&D <i>or</i> fabrication/etc. and R&D	5.2	3.8	4.5
Distribution/other and fabrication/procurement and R&D	20.4	26.2	23.3
Total	100	100	100

<sup>a</sup> Other activities: Licensing and franchising; service, management, consulting contracts, etc..

TABLE 4: Percentage share of Swiss firms with international activities *by type of arrangement*, 1998 (*multiple answers*)

Type of Arrangement	Manufacturing		Services		Total	
	SMEs	Large Firms	SMEs	Large Firms	SMEs	Large Firms
Wholly-owned subsidiary	56	83	57	75	57	81
Minority stake, joint venture	35	39	38	46	36	40
(Permanent) co-operation	63	50	41	51	56	50
Subcontracting	27	18	15	7	23	16
Licensing, franchising	20	21	14	11	18	19
Other arrangements	13	15	30	22	19	17

TABLE 5: Percentage share of Swiss firms with international activities *by host region*, 1998 (*multiple answers*)

Region <sup>a</sup>	Manufacturing		Services		Total	
	SMEs	Large firms	SMEs	Large firms	SMEs	Large firms
European Union	94	93	89	92	92	93
Central Europe	47	58	36	41	43	54
South Eastern Europe	26	43	23	24	25	39
Former USSR	21	35	21	26	21	33
Northern America	47	69	33	36	42	63
Latin America	24	44	21	28	23	41
High-income Asia	36	57	30	30	34	52
Low-income Asia	30	50	26	28	29	46
China	24	45	14	26	21	41
Other countries	22	39	24	32	23	38

<sup>a</sup> Central Europe (Poland, Hungary, Czech Republic, Slovak Republic, Baltic), South Eastern Europe (all Balkan countries), High-income Asia (Korea, Taiwan, Hong Kong, Singapore), Low-income Asia (only a selection of countries, i.e. India, Thailand, Malaysia, Indonesia, Philippines).

TABLE 6: Motives for fabrication/procurement at foreign locations, 1998  
*(% of internationalised firms assessing a specific motive as important: value 4 or 5 on a 5-point scale)*

Advantage of foreign locations with respect to:	Manufacturing		Services		Total	
	SMEs	Large firms	SMEs	Large firms	SMEs	Large firms
1 Availability of natural resources	14	9	9	8	12	9
2 Supply of intermediate goods	23	13	6	6	17	12
3 Transport costs	24	22	16	12	21	20
4 Availability of qualified manpower	19	18	15	16	18	18
5 Availability of unqualified manpower	14	15	1	6	10	13
6 Wage costs	55	44	27	14	46	39
7 Availability/price of infrastructure	30	28	16	8	25	25
8 Base for supplying the own firm	42	33	21	14	35	30
9 Exchange rate risks	27	24	16	4	24	21
10 Tax burden, investment subsidies	26	20	20	14	24	19
11 Labour market regulations	21	20	11	12	18	19
12 Environmental regulations	15	6	7	0	12	5
13 Bureaucracy	26	22	15	14	22	20
14 Base for exports to other countries	44	48	29	37	40	46
15 Securing/developing existing markets	63	63	45	59	57	63
16 Entering/developing new markets	59	67	44	57	54	66
17 Presence of main client	40	43	28	37	36	42
18 Presence of competitors	26	22	22	18	25	22
19 First mover advantages	36	35	32	39	35	36
20 Trade barriers in general	31	30	22	22	28	28
21 Restricted access to EU market	40	37	32	37	37	37

TABLE 7: Obstacles to international activities, 1998  
 (% of firms without international activities <sup>a</sup> assessing a specific obstacle as important:  
 value 4 or 5 on a 5-point scale)

Obstacle	Manufacturing		Services		Total	
	SMEs	Large firms	SMEs	Large firms	SMEs	Large firms
1 Deficiency of financial resources	33	10	16	6	27	8
2 High financial risks	37	28	38	27	38	28
3 Restricted transfer of profits	11	7	14	8	12	8
4 Insufficient knowledge of foreign locations	17	7	18	4	18	5
5 Insufficient management capacity	33	26	32	12	33	21
6 Restrictive market regulations	15	12	22	25	17	17
7 Insufficient patent/trademark protection	11	4	7	4	10	4
8 Legal insecurities	15	13	19	6	17	13
9 Political instability	18	19	12	8	13	15
10 Other obstacles	8	23	12	14	9	20

<sup>a</sup> Only firms which consider international activities as an option.

TABLE 8: Specification of the explanatory variables

Variable <sup>a</sup>	Description	Sign
<i>Ownership advantages</i>		
RD	R&D performing (yes / no; dummy variable)	+
DPD	Share (%) of firms with high outlays for product development (score 4 or 5 on a 5-point Likert scale); 3-digit industry level	+
INNOPD	Share (%) of firms with product innovations (3-digit industry level)	+
HUMCAP	Share (%) of highly qualified personnel	+
CL	Gross capital income per employee (in 100'000 sFr.)	(+)
QL	Value added per employee (in 100'000 sFr.)	+
X, X <sup>2</sup>	Sales share of exports (%) and its square	+, ?
<i>Firm size, I-advantages</i>		
L, L <sup>2</sup>	Number of employees and its square (in 1000)	+, ?
COOP	R&D co-operation (yes / no; dummy variable)	+
<i>L-advantages</i>		
CHLOC	Share (%) of firms assessing Switzerland as an unattractive location for investments (score 4 or 5 on a 5-point Likert scale); 3-digit industry level	+
QLABOUR	Share (%) of firms confronted with strong recruitment problems for qualified manpower (score 4 or 5 on a 5-point Likert scale); 3-digit industry level	+
WAGECOST	Share (%) of firms with wage cost reduction as an important objective of innovation activity (score 4 or 5 on a 5-point Likert scale); 3-digit industry level	+
<i>Market conditions</i>		
IPC	Share (%) of firms confronted with strong price competition according to their own assessments (score 4 or 5 on a 5-point Likert scale); 3-digit industry level)	?
INPC	Share (%) of firms confronted with strong non-price competition according to their own assessments (score 4 or 5 on a 5-point Likert scale); 3-digit industry level)	?
CONC	Share (%) of firms with less than 10 principal competitors in the world market (3-digit industry level)	+
DEMAND	Share of firms with above average growth of their markets in the period 1994-99 (3-digit industry level)	+
<i>Control variables</i>		
FOREIGN	Affiliated to a foreign parent firm (yes / no; dummy variable)	-
INDUSTRY	Industry dummies (food, textiles/clothing, wood/paper/metals/non-metallic mineral products, etc., pharmaceuticals/chemicals/plastics, metal products, machinery/vehicles, electrical machinery/electronics/instruments, wholesaling, transport/ telecommunication, financial services, IT-/R&D services, (other) business services, retailing/restaurants/personal services) (with “other manufacturing” as reference group)	?



TABLE 9: Model I: International activity “yes/no” (FA<sub>i</sub>) by firm size and sector (probit estimates) <sup>a</sup>

Explanatory Variable <sup>b</sup>	Business sector			Manufacturing		Services	
	All firms	SMEs	Large firms	SMEs	Large firms	SMEs	Large firms
<i>Intercept</i>							
a1	-3.52*** (.58)	-4.14*** (.81)	-3.85*** (.98)	-4.93*** (.58)	-3.41*** (1.2)	-4.19*** (1.5)	-7.62*** (2.1)
<i>O-advantages</i>							
RD	.993*** (.13)	.725*** (.17)	1.22*** (.22)	.534** (.21)	1.09*** (.27)	1.26*** (.32)	1.80*** (.41)
DPD	.005 (.01)	.006 (.01)	.010 (.01)	.009 (.01)	.009 (.01)	.004 (.02)	.007 (.02)
INNOPD	.813*** (.13)	.945*** (.18)	.711*** (.24)	1.35*** (.24)	.919*** (.30)	.398 (.29)	.399 (.43)
HUMCAP	1.80*** (.32)	2.15*** (.41)	2.41*** (.66)	2.69*** (.68)	2.53** (1.1)	1.89*** (.57)	1.91* (1.0)
CL	-1.11 (1.5)	-1.54 (1.8)	1.71 (2.7)	-1.20 (3.9)	-1.30 (5.9)	-2.66 (2.3)	7.46* (4.0)
QL	2.78** (1.3)	2.84* (1.5)	.567 (2.1)	5.20 (3.5)	1.63 (5.2)	2.10 (1.7)	.852 (2.3)
X	.078*** (.01)	.083*** (.01)	.067*** (.01)	.079*** (.01)	.063*** (.01)	.100*** (.02)	.077** (.03)
X <sup>2</sup>	-.001*** (.00)	-.001*** (.00)	-.000*** (.00)	-.001*** (.00)	-.000*** (.00)	-.001*** (.00)	-.000 (.00)
<i>Firm size, I-advantages</i>							
L	.751*** (.16)	2.72 (11.1)	.510*** (.18)	7.71 (14.3)	.621 (.46)	15.1 (19.2)	.500** (.25)
L <sup>2</sup>	-.029*** (.01)	126 (116)	-.015 (.01)	165 (147)	-.017 (.11)	52 (205)	-.017 (.02)
COOP	-.013** (.01)	-.015** (.01)	-.013 (.01)	-.020** (.01)	-.022* (.01)	.009 (.02)	.012 (.02)
<i>L-advantages</i>							
CHLOC	-.004 (.01)	-.018* (.01)	.010 (.01)	-.019 (.01)	.007 (.01)	-.003 (.02)	.011 (.03)
QLABOUR	-.003 (.01)	.002 (.01)	-.009 (.01)	.009 (.01)	-.013 (.01)	-.008 (.02)	-.007 (.02)
WAGECOST	.012** (.00)	.025*** (.01)	-.008 (.01)	.024*** (.01)	-.010 (.01)	.027 (.03)	.041 (.03)
<i>Market conditions</i>							
IPC	.004 (.01)	-.005 (.01)	.023** (.01)	-.001 (.01)	.017 (.01)	-.001 (.01)	.046** (.02)
INPC	-.010** (.00)	-.012* (.01)	-.011 (.01)	-.012* (.01)	-.003 (.01)	-.023 (.02)	-.052** (.02)
CONC	-.002 (.00)	-.004 (.01)	.005 (.01)	-.003 (.01)	.005 (.01)	-.017 (.02)	.001 (.02)
DEMAND	-.004 (.00)	-.010 (.01)	-.002 (.01)	-.014* (.01)	-.001 (.01)	.019 (.02)	.016 (.02)

<i>Control variable</i>							
FOREIGN	-.271* (.16)	.071 (.22)	-.888*** (.24)	.247 (.29)	-.885*** (.29)	-.267 (.39)	-1.21** (.53)
<i>Statistics</i>							
N	2268	1456	812	840	519	616	293
McFadden R <sup>2</sup>	32.1	30.6	35.0	30.1	27.2	34.6	39.8
% concordance	86.1	85.9	87.0	85.3	82.8	87.2	89.5

<sup>a</sup> The table shows the estimated parameters and the standard errors in brackets. The statistical significance of the parameter estimates is indicated with \*\*\*, \*\* and \* respectively, representing the 1%, 5% and 10%-level.

<sup>b</sup> The coefficients of the industry dummies have been throughout omitted.

TABLE 10: Model II: Multiple internationalisation strategies (FA<sub>i</sub>\_MULT) by firm size <sup>a, b</sup>

Explanatory Variables <sup>c</sup>	SMEs				Large firms			
	Multinomial logit FA <sub>i</sub> _MULT				Multinomial logit FA <sub>i</sub> _MULT			
	D	F	DF	RDF	D	F	DF	RDF
<i>Intercepts</i>								
A1	-5.36*** (.66)				-4.81*** (1.0)			
A2		-3.26*** (.74)				-4.03** (1.6)		
A3			-4.81*** (.69)				-5.38*** (1.1)	
A4				-6.48*** (.82)				-8.24*** (1.4)
<i>O-advantages</i>								
RD	.901*** (.24)	.319 (.35)	.404 (.26)	1.65*** (.32)	1.01*** (.28)	.568 (.43)	1.31*** (.31)	2.02*** (.43)
DPD	.005 (.01)	-.015 (.01)	.020** (.01)	.001 (.01)	.001 (.01)	.041*** (.01)	.006 (.01)	.019** (.01)
INNOPD	.702*** (.25)	.583* (.34)	.990*** (.27)	1.67*** (.39)	.665** (.32)	.273 (.47)	1.03*** (.36)	.721* (.42)
HUMCAP	1.05* (.57)	1.72** (.74)	1.63*** (.60)	3.02*** (.64)	2.29*** (.79)	1.73 (1.3)	1.97** (.88)	4.13*** (.87)
CL	-4.84** (3.1)	-3.68 (2.8)	.455 (3.9)	1.41 (2.3)				
QL	5.30*** (1.8)	3.26 (3.1)	.894 (2.4)	1.75 (2.8)				
X	.101*** (.01)	.051*** (.02)	.084*** (.01)	.085*** (.01)	.060*** (.01)	.065*** (.02)	.078*** (.01)	.088*** (.02)
X <sup>2</sup>	-.001*** (.00)	-.000** (.00)	-.001*** (.00)	-.001*** (.00)	-.000*** (.00)	-.001** (.00)	-.001*** (.00)	-.001*** (.00)
<i>Firm size, I-advantages</i>								
L					-.190 (.25)	.559*** (.14)	.388*** (.13)	.535*** (.13)
L <sup>2</sup>								
COOP	-.016** (.01)	-.007 (.01)	-.019** (.01)	-.008 (.01)	-.004 (.01)	.003 (.02)	-.028*** (.01)	-.003 (.01)
<i>L-advantages</i>								
CHLOC								
QLABOUR								
WAGECOST	.031*** (.01)	.009 (.01)	.019** (.01)	.033*** (.01)	.001 (.01)	-.042*** (.00)	-.009 (.01)	-.020* (.01)
<i>Market conditions</i>								
IPC					.022** (.01)	.012 (.01)	.025** (.02)	.033** (.01)

INPC	-.006 (.01)	-.015 (.01)	-.013 (.01)	.007 (.01)	-.011 (.01)	-.014 (.01)	-.003 (.01)	-.034*** (.01)
CONC	-.001 (.01)	-.009 (.01)	-.001 (.01)	-.026** (.01)	.007 (.01)	-.035** (.02)	.010 (.01)	.013 (.01)
DEMAND								
<i>Control variable</i>								
FOREIGN	.328 (.29)	.763* (.42)	-.532 (.36)	.605* (.33)	-.487* (.29)	-.575 (.52)	-1.37*** (.35)	-1.04*** (.34)
<i>Statistics</i>								
N			1456				812	
McFadden R <sup>2</sup>			.230				.251	

<sup>a</sup> FA<sub>i</sub>\_MULT has 5 response levels with „no international activity“ as reference; the other responses are: D (“distribution/other activities only”), F (“fabrication/procurement only”), DF (“distribution/other activities and fabrication/procurement”) and RDF (“R&D and distribution/other activities and/or fabrication/procurement”).

<sup>b</sup> The multinomial logit model estimates for each explanatory variable several slope parameters (number of responses minus 1), what allows to evaluate whether the parameter value of a specific response differs significantly from the reference level. The significance of the parameters is indicated with \*\*\*, \*\* and \* respectively, representing the 1%, 5%- and 10%-level with the standard errors in brackets. We show only the parameter estimates for variables which were significant at least at the 10% level in the a prior estimation of the full model.

<sup>c</sup> The coefficients of the industry dummies have been throughout omitted.