IMAD

Working Papers published by IMAD
ISSN: 1318-1920

Publisher:
Institute of Macroeconomic Analysis and Development
Gregorčičeva 27, 1000 Ljubljana.

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http://www.gov.si/umar/public/dz.php

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Print: SOLOS, Ljubljana
Cover: Sandi RADOVAN, Studio DVA
Circulation: 200

Ljubljana, 2006

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Does Exporting Boost Capital Investments?

The Evidence from Slovenian Manufacturing Firms' Balance Sheets

Working Paper 2 / 2006

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Summary

We investigate the repercussions of exporting on capital investments in Slovenian manufacturing firms. In order to test whether exporters invest more in tangible fixed assets than their non-exporting counterparts we estimate the firm-level investment equation in an error-correcting accelerator specification for unbalanced panel comprising the data on more than 4000 firms in the period between 1994 and 2002. General Method of Moments (GMM) estimation techniques are used to control for heteroscedasticity across firms and simultaneity biases arising from the endogeneity of variables.

After controlling for the key factors that drive the investment behaviour the results indicate significant heterogeneity in investment behaviour between exporters and non-exporters as well as between firms of a different size. Exporting per se is positively correlated with investment intensity and, in addition, larger firms face less pronounced liquidity constraints. Non-exporting micro companies and SMEs appear to be far more bound by their free cash flows when investing in fixed assets. Exporting therefore adds an extra stimulus to firm-level investment activities which come from either positive signals to external capital markets, market diversification and risk dispersion or smaller liquidity constraints.

As exporting firms expand due to amplified investments, on one hand this can be seen as a source of faster overall economic growth, but also as a reallocation from less to more productive activities on the other hand. Thus, not only has exporting been a driving force of Slovenian economic growth in recent years but it will play a significant role in the process of future economy-wide structural adjustment. Regarding the policy implications of our findings we found yet another eligible reason for promoting internationalisation. Further, since the deepening of financial markets results in firms' easier access to external financing our results provide an additional argument in favour of stimulating the deepening of financial markets.

Key words: export, investment, slovenian manufacturing firms, panel data

Povzetek

V delovnem zvezku preučujemo učinke izvoza na kapitalske naložbe slovenskih podjetij v predelovalnih dejavnostih. Da bi ugotovili, ali izvozna podjetja več vlagajo v opredmetena osnovna sredstva kot neizvozna, smo na ravni podjetja ocenili enačbo investicij v akceleratorski obliki s korekcijo napak. Analizo smo naredili na podlagi nebalanciranega panela, ki vključuje podatke za več kot 4000 podjetij v obdobju med letoma 1994 in 2002. Da bi kontrolirali za heteroskedastičnost med podjetij in simultano pristranost, ki izvira iz endogenosti spremenljivk, smo uporabili metodo posplošenih momentov (GMM).

Ob upoštevanju ključnih dejavnikov, ki vplivajo na investicijsko dejavnost podjetij, rezultati kažejo na prisotnost heterogenosti tako med izvoznimi in neizvoznimi podjetji kakor tudi med podjetji glede na njihovo velikost. Ugotavljamo, da je med izvozno aktivnostjo podjetja in intenzivnostjo njegovih naložb povezava pozitivna, poleg tega pa se večja podjetja soočajo z manjšimi likvidnostnimi omejitvami. Mikro, mala in srednja podjetja, ki niso izvozno usmerjena, so pri vlaganjih v osnovna sredstva mnogo bolj odvisna od prostega denarnega toka. Izvoz torej predstavlja dodatno vzpodbudo za investicijsko dejavnost na ravni podjetja, ki bodisi temelji na pozitivnih signalih zunanjim kapitalskim trgom, diverzifikaciji trgov in razpršitvi tveganj ali manjših likvidnostnih omejitvah.

Rast izvoznih podjetij zaradi povečanih vlaganj po eni strani lahko razumemo kot vir hitrejše rasti celotnega gospodarstva, po drugi strani pa tudi kot realokacijo resursov od manj produktivnih dejavnosti k bolj produktivnim. Izvoz tako ni bil le gonilna sila slovenske gospodarske rasti v preteklih letih, temveč bo tudi v prihodnje igral pomembno vlogo v procesu prestrukturiranja celotnega gospodarstva. Z vidika napotkov ekonomski politiki lahko govorimo prvič o dodatnih argumentih v prid nadaljnjega poglabljanja finančnih trgov, ki bi podjetjem zagotovili sredstva za financiranje izvoza in investicij in drugič, o pomembnosti pospešenega spodbujanja internacionalizacije podjetij.

Ključne besede: izvoz, investicije, slovenska predelovalna podjetja, panelni podatki

1 Introduction

The statement that exporters perform better than non-exporters is still tinged with tautology despite numerous empirical analyses. It takes little effort to show that, in comparison to non-exporters, exporting firms are larger, more productive, technologically superior and pay higher wages. What interests us most resembles the prehistoric question about the chicken and the egg: do only better firms become exporters or does exporting per se make them better? Empirical evidence suggests the causal link is two-way: more productive firms self-select into exporting while, on the other hand, there is also the "learning-by-exporting" effect that improves their performance even further.

The link between exporting and capital investment has been unexplored

The question of causality is clearly not superfluous as it can generate valuable policy-oriented answers and recommendations. By knowing which channel is more important or which link is underdeveloped we can adjust industrial policy to be more efficient and supportive at the right spot. If causality is stronger in the direction from productivity to exporting and if performance seems to be the bottleneck underpinning poor external competitiveness, then more needs to be done to encourage firms' innovativeness, promote R&D investments, make labour markets more flexible, reduce the administrative burden and improve market competition. The promotion of export and internationalisation alone cannot substitute the abovementioned provisions when there is no firm basis upon which firms can prosper and advance internationally.

The aim of the paper is to examine the export-investment relationship in Slovenian manufacturing firms

The majority of empirical research at the micro level has studied the relationship between exporting and productivity while the link between the former and capital investment has remained relatively unexplored. In this paper we try to fill this void by investigating the repercussions of exporting on firm-level investment in tangible fixed assets. Capital investments are beyond question one of the most vital productivity leverage, apart from R&D investments, human capital and organisational improvements. If there is a recurring positive effect on the performance of exporters, we will try to identify and possibly confirm one of the channels of the benevolent effect of exporting. By examining the exporting-investment relationship we will be able to better understand what is happening beneath the surface of the phenomenon called learning-by-exporting.

The rest of the paper is organised as follows. In Section 2 we develop a theoretical framework and present a short review of the literature. Section 3 discusses the data and presents some stylised facts. In Section 4 we present empirical methodology and the following chapter reports the results. The last section concludes the paper.

2 Literature review and theoretical framework

Theories of the effects of exporting on firms' investment behaviour

There are various ways exporting can theoretically affect a firm's decision to invest. It is however important to note some facts about this relationship and about capital investments in particular. First, investment decisions are strategic decisions. This means that they involve risk and expectations about future positive returns. Second, the commitment of a certain amount financial resources is necessary for implementing investment projects which implies that sooner or later a firm will have to seek financial sources externally. Third, external capital markets are not fully efficient. Therefore, some marginal or even mediocre investment projects, although profitable, are not undertaken.

The difference between exporters and non-exporters is that the former diversify sales revenues across several markets and are not fully dependent on only the domestic one. Sales stabilisation is a benefit of diversification stemming from the incomplete correlation of business cycles across home and foreign markets (Hirsch and Lev, 1970). At an equal level of sales, exporters will realise smaller fluctuations in revenues than non-exporting firms, like a well-diversified portfolio of stocks has less variance than a particular individual stock in finance theory. Diversification benefits will be higher the larger number of export markets a firm operates in and the lower the correlation of the business cycles between them. Exporters are therefore likely to have more stable cash inflows and, if they are to rely more heavily on internal resources, they will be more confident about the expected revenues in an investment project's future lifetime.

Due to various imperfections such as information asymmetry and supervisory costs, external financial and capital markets are generally less efficient than internal ones. Firms will hence have to face liquidity constraints (e.g., Fazzari, Hubbard, and Petersen, 1988). These more stable cash flows of exporting firms will improve their credit rating as external lenders or investors will feel greater assurance that the firm will be able to meet its obligations. Substantial entry costs to foreign markets entail a high level of persistency in exporting since firms do not find it profitable to enter or exit export markets from one year to another. The export hysteresis literature (Roberts and Tybout, 1997; Campa, 1998) argues that firms cannot instantly switch to foreign markets in a situation of poor domestic demand. Established exporters have, however, already covered their sunk costs and can divert their sales efforts to foreign markets not hit by recession more easily than non-exporters. More stable future cash flows and a greater ability to compensate for segmental downturns gives a positive signal to external sources of funds.

In addition, lenders and investors perceive exporters as being better and more reliable firms. A growing amount of empirical literature supports this fact (Roberts and Tybout, 1997; Clerides, Lach, and Tybout, 1998; Bernard and Jensen, 1999; Alvarez and Lopez, 2004; Van Biesebroeck, 2004). In order to effectively compete with indigenous rivals, exporters have to perform better to be able to cover their additional export-related costs. Commencing with exporting demands certain competitive advantages which provide an assurance that a firm will be able to service its external financing. Therefore, we expect exporters to be less constrained by the amount of internal free cash flows, to be able to receive the required funds externally (at home as well as abroad)[1] and that they will therefore carry out higher and more regular investments.

[1] According to Bank of Slovenia, at the end of 2004 around 20-25% of overall commercial debt in Slovene companies was from abroad.

If a domestic firm is initially bound to a small national market, as is the case of Slovenia, exporting can provide the substantial expansion of revenues and the ability to take advantage of economies of scale. Additional export sales lower the required rate of return on investment and increase returns on the existing ones. The first assertion follows from the fact that fixed investment costs are now spread across higher sales, while the second stems from the fact that projects running can be more fully utilised. Exporters can therefore decide on capital investments that would otherwise be left out. The required rate of return on investment on the other hand depends on the weighted average cost of capital. If exporters get some concessions in external markets then their reference cost of capital is lower and the investment project is more profitable.

The effects of exports are more pronounced when firms are initially bound to the small domestic market

3 Model of investment

In the empirical research a microeconomic approach has become dominant

The quest for an appropriate investment model has gone through vigorous changes in the last fifty years and is by no means completed. Empirical analyses became predominantly microeconomic since empirics over and over rejected the adequacy of the macroeconomic approach. On the other hand, quality longitudinal firm-level data became increasingly accessible and econometric techniques improved enormously as well. One of the earliest turning points was definitely the cornerstone and frequently disputed paper by Modigliani and Miller (1958) which stated that in a world of perfect capital markets investment decisions do not depend on a firm's financing decisions or its capital structure but solely on the cost of capital in the market. There is no room for any liquidity variables, such as free cash flows, in their neoclassical model in the sense of their restrictive effect on capital investment. Shortly after, a wave of empirical counterfacts followed, refuting the MM proposition and suggesting a strong role for cash flow or profits in the investment equation. On these theoretical grounds, models supporting empirical evidence on the cost wedge between internal and external funds emerged and explicitly allowed for asymmetric information, agency costs, adjustment costs and delivery lags in investment (Jensen and Meckling, 1976; Stiglitz and Weiss, 1981). This strain of literature culminated in Tobin's empirical q literature (e.g. TOBIN, 1969; SUMMERS, 1981) which provided a theoretically better measure of the rate of return on investment. Instead of the marginal product of capital, the marginal change in a firm's value from an increase in investment was often used to proxy for average or Tobin's q (Hayashi, 1982).

Apart from the just mentioned Tobin's q methodology, two other approaches have been used recently to incorporate expectations about future returns on investment: the approach of Abel and Blanchard (1986) where projections of future profits are used as a proxy, and the Euler equation which is a structural model explicitly derived from a dynamic optimisation problem on the assumption of symmetric, quadratic costs of adjustment.

We use an error-correction model of investment…

The model we use for our empirical investigation is the error-correction model of company investment that was first introduced into the investment literature by Bean (1981) and, among others, also used by Mairesse et al. (1999) and Bond et al. (2003). It is based on the assumption that, in the absence of adjustment costs, the desired capital stock in the long run is proportional to the firm's output and cost of capital:

$$k_{it} = \theta s_{it} + h_{it}, \qquad (1)$$

where k_{it} denotes the natural log of the desired capital stock for firm i in period t, s_{it} denotes the log of output and h_{it} is a function of the real user cost of capital and the parameters of the production function. Equation (1) is obtained from a simple neoclassical model of a firm that maximises the net present value of future profits and has a CES production function and no adjustment costs. In the specific case of constant returns to scale the above equation takes the following form:

$$k_{it} = \eta_i + \theta s_{it} - \sigma c_{it}, \qquad (1a)$$

where η_i is the firm-specific intercept and c_{it} indicates the log of the real user cost of capital. To incorporate a slower adjustment of the actual stock of capital to the desired level, we simply consider an autoregressive-distributed lag specification with a second-order lag (ARDL(2,2) specification), and make some necessary assumptions. First, we assume that a firm's desired capital stock in the presence of adjustment costs is proportional to its desired capital stock in the absence of adjustment costs (as in Caballero, Engel, and Haltiwanger, 1995: 14). Second, we implicitly assume that the short-term adjustment process is stable over time so that it can be approximated by the ARDL model in the first place. Last, we assume that the real user cost of capital can be well described by including time-specific and firm-specific effects. This gives us the following equation:

$$k_{it} = \gamma_1 k_{i,t-1} + \gamma_2 k_{i,t-2} + \beta_0 s_{i,t} + \beta_1 s_{i,t-1} + \beta_2 s_{i,t-2} + \eta_i + d_t + \varepsilon_{it}, \qquad (2)$$

where η_i is an unobserved firm-specific effect, d_t denotes a time dummy and ε_{it} is an error term. This accelerator-type equation can be rewritten in an error-correcting form which yields the next equation:

…which allows us to capture both short-term and long-term dynamics

$$\begin{aligned} \Delta k_{it} &= (\gamma_1 - 1)\Delta k_{i,t-1} + \beta_0 \Delta s_{i,t} + (\beta_0 + \beta_1)\Delta s_{i,t-1} \\ &+ (\gamma_1 + \gamma_2 - 1)(k_{i,t-2} - s_{i,t-2}) \\ &+ (\beta_0 + \beta_1 + \beta_2 + \gamma_1 + \gamma_2 - 1) s_{i,t-2} + \eta_i + d_t + \varepsilon_{it} \end{aligned} \qquad (3)$$

The advantage of this basic specification in comparison to plain differentiating is that we do not lose levels even though we obtain new variables in the form of first differences. From equation (3) we see that the growth rate of capital is a function of the growth rate and levels variables. Growth rate variables are the lagged growth rate of capital, current and lagged growth in sales. Levels variables are the error-correction term (the log of the capital-sales ratio) and the scale factor (the log of sales). Error-correcting behaviour requires that the coefficient on the error-correction term is negative, which means that when a firm's capital stock is below the desired level its future investments will be higher. The first three regressors capture short-term investment dynamics and we expect the coefficients on sales growth rates to be positive since these variables ought to capture investment opportunities. The second (error-correction term) and the third (scale factor) column describe the long-run properties. If the coefficient on the log of sales is not statistically different from zero, the validity of the assumption that q from equation (1) is unity.

In the next step we add to equation (3) additional current and lagged cash flow terms (CF) to investigate the role of financial constraints. These free cash flow variables are expressed in relative terms with regard to the capital stock at the end of the previous year and capture liquidity constraints or changes in profitability that are not included in sales growth variables. The interpretation of the coefficients on these variables is unfortunately ambiguous in this type of investment equation. It is possible that, although significant, the cash flow effects would not be an outcome of financial constraints on a firm's investment. This could happen if cash flow helps to explain future output which, in turn, determines the desired stock of capital and hence current investments (e.g. Fazzari, Hubbard, and Petersen, 1988). Therefore, even in the absence of financial constraints we can obtain a significant coefficient on cash flow terms. However, to the extent that the relationship between current free cash flow and expected future profitability is similar across firms, it may be that large and significant differences in coefficients between exporters and non-exporters are more likely to indicate different financial

To investigate the role of financial constraints we add cash flows in to the basic specification

constraints. We will hence focus on the differences between the values of cash flow coefficients rather than their levels. To be able to assess the difference between liquidity constraints we interacted the cash flow variables with the non-exporters dummy. The sign of the augmented cash flow variable is expected to be positive and significant, which would imply that the availability of internal finance is a more important constraint on non-exporters' capital investment.

To control for firms' entry or exit from the foreign market dummies are used

Because incipient firms invest intensively in the first years to move closer to the optimal capital stock, we also included dummy variable(s) that indicate the proximity of the year of a firm's entry. We denote these with *start* and lag them depending on the estimation technique. Similarly, we include dummy variable(s) that designate the proximity of a firm's year of exit and mark them with *end*. Unlike the *start* variable, we expect the coefficient on *end* to have a negative sign.

We also control for firms' size

In the alternative estimation setting we include in addition the firm size variable, measured with the log of employees (lemp). We expect the number of employees to be positively correlated with current capital investments because larger firms have greater negotiating power with regard to lenders. In Slovenia, many large firms are still partially state-owned as privatisation has not been completed yet. These firms have strong ties with national banks or are even their owners so their access to funds is made easier. Due to the possibly lower cost premium for the use of external sources of investment finance we can expect larger firms to be less sensitive to financial variables and that they will invest more than non-exporters.

Final specification of the investment model

The estimation specification can finally be written in the following way:

$$\begin{aligned}\Delta k_{it} &= \alpha_0 + (\gamma_1 - 1)\Delta k_{it-1} + \beta_0 \Delta s_{it} + (\beta_0 + \beta_1)\Delta s_{i,t-1} + \\ &+ (\gamma_1 + \gamma_2 - 1)(k_{i,t-2} - s_{i,t-2}) + \\ &+ (\beta_0 + \beta_1 + \beta_2 + \gamma_1 + \gamma_2 - 1)s_{i,t-2} + \\ &+ \delta_0 \frac{CF_{it}}{K_{i,t-1}} + \delta_0^{nex} \frac{CF_{it}}{K_{i,t-1}} * Dnoex + \delta_1 \frac{CF_{i,t-1}}{K_{i,t-2}} + \delta_1^{nex} \frac{CF_{i,t-1}}{K_{i,t-2}} * Dnoex + \eta Dnoex + \\ &\tau^s start_{t+s} + \tau_2^e end_{t-2} + \tau_1^e end_{t-1} + \tau_0^e end_t + \pi lemp_{it} + \eta_i + d_t + \varepsilon_{it}\end{aligned} \tag{4}$$

4 Data and stylised facts

We use a panel of almost 4,000 Slovenian manufacturing firms in the period between 1994 and 2002

In the empirical part we use firms' balance sheets data collected by the Agency for Public Legal Records and Related Services (*AJPES*). *The data set contains detailed accounting information as well as information on external trade, covers the period between 1994 and 2002 and we have restricted it to only encompass manufacturing firms* (*NACE rev. 1 industries 15 to 37*). Unfortunately, we do not have access to firm-level investment data so we had to derive them from annual capital stocks.

Construction of the investment variable, as described in the following paragraphs, corresponds fully with the econometric specification but, like other variables derived from accounting data, suffers from measurement error due to possible bookkeeping manipulations (e.g. accelerated depreciation, capital revaluation). We exclude all firms with a zero value of sales or negative value added so at the end the dataset used for the estimations included information on 3,699 establishments (in 1994) up to 4,462 firms (in 2002). Altogether in our estimations an unbalanced panel of 36,340 observations was used.

Variables used in regression model are as follows:

Variables used

- *inv*: time difference of the log value of tangible fixed assets;
- *dls*: time difference of the log value of sales;
- *lcs*: log of the capital-sales ratio[2];
- *ls*: log of sales;
- *cfc*: free cash flow, defined as net profit plus long-term assets depreciation, altogether divided by capital at the end of the previous year;
- *start*: dummy for the startup year[3];
- *end*: dummy for the year before exit, defined similarly as for the start dummy;
- *Dnoex*: dummy for continuous non-exporters;
- *lemp*: log of the number of employees.

All values are in thousand Slovenian tolars and have been deflated by the consumer price index (for data relating to capital) and the producer price index (at the 2-digit NACE industry level) for the remaining data.

According to firm size and export orientation, in addition we constructed the following set of dummy variables:

Dummies used

a) size dummies[4]:
- *Dmi*: micro enterprises (<10 employees);
- *Dm*: small enterprises (between 10 and 49 employees);
- *Ds*: medium enterprises (between 50 and 249 employees);
- *Dv*: large enterprises (250 or more employees).

[2] Capital is a short word for tangible fixed assets.

[3] Because of the obligatory reporting, we take the year of establishment of a firm to be the first year it appears in the database, except of course if this year is 1994 when the observation period begins.

[4] Firms were placed in a group if they belonged to it in at least half of the observed years.

b) export dummies:

- *Dex*: continuous exporters, which we further partition into:
  - i. *Dexup*: continuous exporters with a growing value of exports;
  - ii. *Dexdown*: continuous exporters with a falling value of exports;
- *Dswitch*: sporadic exporters, firms that started and firms that stopped exporting:
  - i. *Dswup*: switchers with a positive average growth of exports;
  - ii. *Dswdown*: switchers with a negative average growth of exports;
- *Dnoex*: continuous non-exporters.

Descriptive analyses:

• Firms' structure with respect to export status

The structure of firms in the sample with respect to their export status is described in Table 1. The shares of the three main groups are relatively stable and evenly distributed. Around 27% of manufacturing firms exported every year and only 4% of the firms or 15% of permanent exporters in the sample showed declining exports throughout the period. Out of the 40% of switchers in the sample the majority (36%) are rising exporters. One-third of the companies exported in none of the observed years, although on average 54% of the firms did not export in the 1995-2002 period.

Table 1: **Structure of manufacturing firms with respect to export status for the 1995-2002 period, in %**

	1995	1996	1997	1998	1999	2000	2001	2002
Dex	**29.3**	**28.6**	**27.8**	**27.4**	**27.0**	**27.0**	**27.4**	**27.2**
Dexup	21.9	22.4	22.4	22.4	22.3	22.8	23.1	23.0
Dexdown	7.4	6.1	5.4	5.0	4.7	4.2	4.3	4.2
Dswitch	**37.2**	**38.2**	**39.5**	**39.4**	**40.4**	**40.4**	**40.1**	**39.7**
Dswup	31.8	32.9	34.4	34.7	35.9	36.4	36.0	35.7
Dswdown	5.4	5.2	5.0	4.7	4.4	4.0	4.1	4.0
Dnoex	**33.5**	**33.3**	**32.7**	**33.2**	**32.7**	**32.6**	**32.5**	**33.1**
Total N	*3699*	*3551*	*3802*	*3895*	*4026*	*4053*	*4113*	*4249*

Source: AJPES, authors' calculations.

• Size structure of different export groups

The next feature of the data that might be of interest is the size structure of distinct export status groups. As reported in Table 2, the majority of permanent non-exporters and switchers are micro companies, while the number of large enterprises in these two groups is extremely low. Micro enterprises are obviously confined to the local market or they supply their products only to domestic firms up the supply chain and most often lack the resources and ambition to enter foreign markets. Small firms are clearly more outward-oriented since in 2002 almost half of them were continuous exporters and two-fifths were sporadic exporters. Almost 80% of medium-sized and 90% of large enterprises were continuous exporters, the rest fell almost entirely into the switchers group.

• Coefficient of variation of firms' total sales according to export status and size

The sales stabilisation hypothesis from the theoretical part is corroborated by observing variations in coefficients on total sales according to export status (Table 3). Regardless of size, non-exporting firms on average face larger sales fluctuations in time. On aggregate, continuous exporters reported an almost two-times smaller coefficient of variation and the difference was also confirmed by a two-sample t test with unequal variances. In total, switchers have intermediate sales fluctuations although this is only due to the micro firms. Small, medium and larger switching firms' sales variations were the highest of all. Among switchers, those with an increasing level of exports also had on average lower variation in their total sales

Table 2: **Number of manufacturing firms according to export status and size for 2002**

	Micro firms	Small firms	Medium firms	Large firms	Total
Dex	**376**	**303**	**373**	**149**	**1,201**
Dexup	280	268	304	110	962
Dexdown	96	35	69	39	239
Dswitch	**1,284**	**269**	**89**	**15**	**1,657**
Dswup	1,158	242	78	15	1,493
Dswdown	126	27	11	0	164
Dnoex	**1,424**	**109**	**17**	**1**	**1,551**
Total	*3,084*	*681*	*479*	*165*	*4,409*

Source: AJPES, authors' calculations.

compared to switchers with decreasing exports. The difference between the increasing and decreasing group among permanent exporters is, on the other hand, insignificant which may follow from the ever present exports acting as a buffer in the sense of mitigating sales variations despite decreasing exports. As expected, the variability of sales decreases with firm size.

Table 3: **Coefficient of variations of firms' total sales according to export status and size for the 1995-2002 period, in %**

	Micro firms	Small firms	Medium firms	Large firms	Total
Dex	**49.31**	**34.10**	**23.77**	**20.29**	**40.12**
Dexup	49.93	34.75	23.81	21.04	41.20
Dexdown	46.50	30.89	23.67	18.77	35.99
Dswitch	**76.03**	**47.33**	**42.32**	**39.95**	**72.47**
Dswup	72.06	46.93	41.37	38.36	68.91
Dswdown	96.69	50.00	46.06	46.31	90.95
Dnoex	**80.62**	**43.02**	**29.82**	**24.38**	**78.37**
Total	*77.55*	*42.87*	*30.47*	*25.40*	*73.26*

Source: AJPES, authors' calculations.

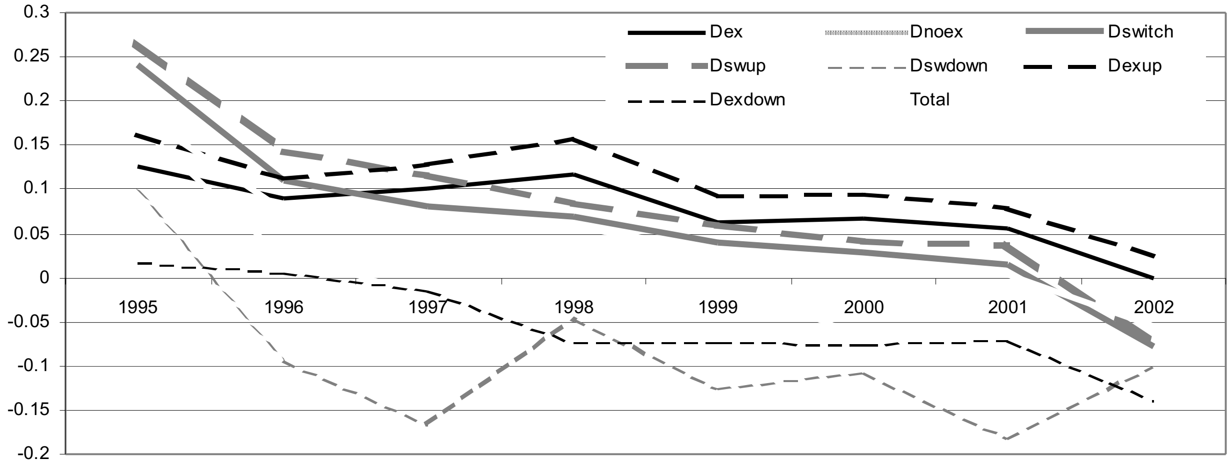
Growth rates of tangible fixed assets in manufacturing firms by export status

Investment behaviour, namely the focus of our study, is illustrated in Figure 1 where the growth rates of capital (variable *inv*) are depicted for every year and for different export groups. It can be seen that continuous exporters invested on average more than non-exporters and above average in all years but 1995. One possible explanation for this exception is the fact that in the early transition period from 1991-1995 there were substantial entry (as well as exit) dynamics with the subsequent growth of predominantly non-exporting firms. On the other hand, continuous exporters were mainly already well-established firms that on average grew slower and invested less than startups. Switchers also experienced higher capital growth than non-exporters in all years but the last year of the period.

The most successful groups in terms of capital investments were prosperous permanent exporters and switchers

The most successful groups in terms of capital investments were prosperous permanent exporters and switchers whereas, on the opposite extreme, we can notice diminishing continuous exporters and switchers. Firms with a negative exporting trend apparently invest significantly less than their export-thriving counterparts. This is of course not credible evidence for our hypothesis that exporters invest more than non-exporters because of the positive effects from exporting. If

Figure 1: **Growth rates of tangible fixed assets in manufacturing firms by export status in the 1995-2002 period; all firms included**



Source: AJPES, authors' calculations.

we omit other essential factors that drive investment decisions we get seriously biased results. For example, we already know that exporters are more productive and perform better in the market so these factors power their investments (possibly) in addition to exports.

5 Methodology

The empirical analysis is performed using the specification in equation (4) which is an improved error-correcting version of accelerator specification of the investment equation. As already noted it enables us to study short-term as well as long-run investment dynamics and has been recently used in a number of papers (e.g. Bond et al., 1997; Hall et al., 1998; Bond et al., 2003).

Advantages of dynamic specification and some estimation problems

We estimate a dynamic model from panel data, which has many advantages as well as some estimation problems. Since we have individual firm-level observations there are no aggregation biases and we are able to exploit the time-series property of the data despite the small number of time periods. To briefly explain the problems encountered in the analysis of such a model, let us write it in the simplest ARDL form:

$$y_{i,t} = \alpha y_{i,t-1} + \beta x_{i,t} + \left(\eta_i + \varepsilon_{i,t}\right); \qquad i=1,2,\ldots,N; \qquad t=1,2,\ldots,T \qquad (5)$$

where x is a vector of current and lagged values of additional explanatory variables that may be predetermined, endogenous or strictly exogenous.[5] η_i are unobserved individual-specific time-invariant effects and $\varepsilon_{i,t}$ is a disturbance term. The problem is that even if the coefficient on the lagged dependent variable is not of direct interest, due to the dynamics inherent in the model consistent estimates of β are impossible to recover with conventional estimation techniques such as OLS and FE estimators.

The OLS estimator is biased upwards

The individual effects η_i are correlated with the lagged dependent variable $y_{i,t-1}$ which together with the assumption of serially uncorrelated disturbances ($E(\varepsilon_{i,t}\varepsilon_{i,s})=0$ for $t \neq s$) implies that the OLS estimator of α is inconsistent. In fact, we know that it is biased upwards as a consequence of the positive correlation of $y_{i,t-1}$ with the aggregate error term ($\eta_i+\varepsilon_{i,t}$).

The within estimator it is biased upwards

First-differencing equation (5) removes the individual effect and eliminates a potential source of omitted variable bias. However, the within groups transformation produces a negative correlation between the transformed lagged dependent variable and the transformed error term in panels with a short time period (Bond, 2002, p. 144). In large samples the within groups estimator is biased downwards. Therefore, a consistent estimator has to lie in between the ceiling and the floor values provided by the OLS and FE estimators, respectively.

Properties of different GMM estimators

We use state-of-the-art methods for the dynamic panel data models, that is the first-differenced GMM method (Arellano and Bond, 1991) and the extended linear GMM estimator, the so-called system GMM, from Arellano and Bover (1995) and further developed in Blundell and Bond (1998). First-differencing equation (5) removes the unobserved heterogeneity and generates an equation that can be estimated with instrumental variables. Arellano and Bond (1991) developed a Generalised Method of Moments estimator for the above model. The predetermined and endogenous variables in first differences are instrumented with suitable lags of their own levels, whereas strictly exogenous regressors enter the instruments matrix in the conventional instrumental variables fashion: in first differences. If the error

[5] $x_{i,t}$ is said to be endogenous if it is correlated with $\varepsilon_{i,t}$ and earlier shocks but uncorrelated with subsequent shocks; it is predetermined if there is no contemporaneous correlation but $x_{i,t}$ is correlated with $\varepsilon_{i,t-1}$ and earlier shocks; or strictly exogenous if it is uncorrelated with past, present and future shocks.

term $\varepsilon_{i,t}$ is serially uncorrelated, then the error term in first differences is MA(1) and instruments dated t-2 and earlier should be valid in the differenced equation. The asymptotically efficient GMM estimator based on the appropriate moment conditions minimises a criterion function[6] using one of the weight matrices, depending on whether a one-step or two-step procedure is used. Simulation studies have suggested that even in the presence of considerable heteroscedasticity, a two-step estimator is only modestly more efficient than the one-step variant. In applied work, although asymptotically less efficient the one-step estimator has received more weight, especially after the results of simulations that showed the two-step procedure underscores standard errors much too often (Bond and Windmeijer, 2002). In our dif-GMM estimations we use both one- and two-step variants. We test the validity of the instrument sets with Sargan's test of the overidentifying restrictions and also report a direct test for serial correlation in the residuals (Arellano and Bond, 1991, pp. 282-283).

A problem with the original Arellano-Bond differenced GMM estimator is that lagged levels are often poor instruments for first differences as it has been found that the estimator produced a large finite sample bias and poor precision when the time-series component is short (see Alonso-Borrego and Arellano, 1996; Blundell and Bond, 1998). Arellano and Bover (1995) developed an alternative estimator designed to improve the properties of the differenced GMM estimator. Original equations in levels are added to the system and the lagged differences of regressors are used as instruments in addition to the lagged levels as instruments for equations in first differences. These additional moment conditions significantly improve the efficiency in cases where first-differenced GMM performs poorly (a short time period and high coefficient on the lagged dependent variable; see Blundell and Bond, 1998).

[6] When the number of available time periods is greater than 3, the system is overidentified and it is necessary to reconcile all the sets of estimates that can be produced, which is done in this case with minimizing a criterion function.

6 Results

The econometric analysis is split into two halves. In the first stage we estimate equation (4) without the employment variable while in the next step we examine the full model. In each, we firstly run OLS regression that theoretically yields upwardly biased results on the lagged dependent variable. This prediction is realised in every estimation. Next we present the results of two alternative non-dynamic panel techniques: fixed effects and random effects estimators. Both variants deal with firm-specific heterogeneity but are inappropriate for estimating the given model specification. However, the FE estimator produces a downwardly biased coefficient on the lagged dependent variable so it serves as a floor reference value. The results are also consistent with the latter theoretical prediction. Finally, we perform first-differenced and system GMM estimations experimenting with different instrument sets and one-/two-step estimations. We also test whether the results are robust to the data sample by stepwise excluding first those firms that had at least two employees in each year and next the micro enterprises (the firms with less than 10 employees). All estimations include year dummies to capture shocks common to all the firms in the sample in the given year. The results are presented in Tables 1-6 in the Appendix.

We report the OLS, FE, RE and GMM estimation results

The results show that all the variables of the basic specification (equation 3) are generally significant and correctly signed. The coefficient of the growth rate of capital in the preceding year is negative, which is in line with previous results of Hall et al. (1998) and Bond et al. (2003). Firms on average cannot sustain continuous high investment rates and after an exceptional investment in one year there is a lower investment in the subsequent period. We find that sales growth has a positive short-run effect on investment that is statistically significant in all the estimations.

The capital growth rate is negatively correlated with its lagged value

Sales growth has a positive effect on investment

The error-correction term (ln c/s) is correctly signed and significant in all the tests as well. This implies that the lower the stock capital of a firm the higher is its current investments rate so that it can converge to the desired long-run level of capital. The scale factor (ln *s*) is mostly times negative and significant, although the results of sys-GMM generate contradictory estimates.

Controls for market entry were significant only in those tests where micro firms were excluded from analysis and even in these cases only within the OLS, RE and FE frameworks. One possible explanation for the poor explanatory power of the entry dummy is that we could consider no earlier than the third year after a firm's entry due to the time-unit consuming structure of the model and its variables. On the contrary, indicator variables for the year of a firm's exit from the market appear to be more important for describing firm-level investment behaviour. Besides the last year of a firm's activity we include dummies for one and two years before the exit. In the majority of estimations we are able to observe an interesting orderly pattern: with a maturing exit dummy the corresponding coefficients become larger in absolute terms (otherwise they are negative) and also more significant. As expected, vanishing firms disinvest or at least radically reduce their capital investments in the years prior to their closure.

Heterogeneity between groups

More interesting are the results for the coefficients on the cash-flow variables. Once again, the central question of our paper is whether exporters depend less heavily on cash flow variables when performing capital investments than non-exporters. Current values of free cash flow relative to the stock of capital in exporting

Small firms face more pronounced liquidity constraints

firms and switchers have a significant but mixed effect on investment. When all firms are included in the estimations we find positive coefficients on current cash flows throughout the various estimation techniques. The values are spread between +0.001 and +0.002, which is roughly 100-times smaller than the effects of basic model variables. However, when we exclude firms with less than two employees and in the next step all micro companies, the coefficient becomes negative, statistically significant and, interestingly, of the same (absolute) magnitude. Obviously smaller firms in the group of continuous and sporadic exporters are more liquidity-constrained since the effect of current free cash flows on investment is positive as opposed to larger firms in the same group.

The current cash flow variable's interaction with the non-exporters dummy shows us the marginal effect of being a non-exporting firm. The coefficient is almost all of the time highly significant and positive while its range is roughly between +0.01 and +0.07, which is of a much greater scale than the coefficients for exporters. This suggests that the sensitivity of investment to current financial variables is both statistically and quantitatively more significant for non-exporters than for exporters.

Size plays a more significant role for investment than export status

Lagged free cash flows have mixed effects on capital investment and the results suggest that firm size plays a more significant role than export status. When all size classes are included, cash flows in the preceding period generally do not affect exporters' investment levels, while non-exporters demonstrate a positive correlation between the lagged cash flow variable and investment. The latter positive effect is weaker than that of the current cash flow on investment, by up to ten times. However, when smaller companies are omitted from regressions the coefficient on the lagged cash flows for exporters becomes negative as in the case of current cash flow variables. The inconsistent results on non-exporters' liquidity constraints make any inference of any significant difference between exporters and non-exporters impossible. Once again though, the results suggest that exporting status matters more for smaller firms.

The dummy variable for non-exporters is negative and significant in most of the estimations although it is sensitive to the broadness of the data sample. This is weak evidence that even after controlling for other factors that propel investment decisions, exporters' investment rates were significantly higher than non-exporters'. The employment variable that proxies for firm size has a positive effect on a firm's capital investment but it loses strength and significance when smaller firms are left out. This implies that only the smallest firms (individual proprietorships) are constrained in their investments by their size whereas larger firms do not appear to be investing more due to sheer company size.

The m_2 statistic which tests for the lack of a serial correlation in the first-difference residuals suggests that there is no second-order serial correlation. This pattern is consistent with the maintained assumption that the $\varepsilon_{i,t}$ disturbances are serially uncorrelated so that $\Delta\varepsilon_{i,t}$ should have a significant negative first-order serial correlation but no significant second-order serial correlation. The statistics confirm both requirements and, in addition, the Sargan/Hansen test of overidentifying restrictions under the null hypothesis of the validity of moment conditions does not become rejected at the 5-percent significance level if the values of the associated two-step estimators are examined.

Robustness

The results from the sys-GMM estimations[7] confirm the previous outcomes since there is a significant difference in the current cash flow effect on investment in all three firm sets and in both specifications (with and without the employment variable). The coefficient for non-exporters is around 0.1 to 0.3 higher than the coefficient for exporters and is always positive in total. Lagged cash flows also appear to be significant for non-exporters, but when micro firms are excluded the effect is no longer statistically significant or it even reverses sign. Apparently, the story repeats itself: smaller non-exporting firms face larger financial constraints than larger companies because they lack collateral, credit histories and connections.

[7] However, for the sake of the space we report only one-step estimation results; two-step variant is available upon request.

7 Conclusions

Exporters have advantages over non-exporters when financing investments in tangible fixed assets

Empirical evidence to date provides strong evidence for exporting as an outcome. This implies that causality is stronger in the direction from an exceptional firm characteristic to exporting. Our proposition was that exporting also substantially affects certain firm behaviour such as capital investment. If this is in fact the case, exporting is not only a consequence but a catalyst for productivity growth as well. In this paper we show that exporters have advantages over non-exporters when financing investments in tangible fixed assets. The hypothesis is tested on a large unbalanced panel of Slovenian manufacturing firms in the 1994-2002 period. We use an error-correcting accelerator model of capital investment and employ modern GMM estimation techniques that should correct for simultaneity biases and the presence of firm-specific effects. We experiment with different instrument sets and different data sets in order to check the sensitivity of our estimates.

Even after controlling for other factors cash flow effects seem to be dominant in investment behaviour

Several conclusions emerge from our results. First, a significant difference in current cash flow effects is found between exporters and non-exporters. Earlier cash flows affect investment differently only in smaller exporting and non-exporting firms. Second, the difference in the magnitude of financial constraints is greatest when firms of all sizes are included in regressions, suggesting the positive effects of exporting at the level of capital investment are the most pronounced in smaller firms. Third, even after controlling for other factors that propel investment decisions, exporters' investment rates were significantly higher than those of non-exporters. Overall, the availability of internal finance appears to have been a more important constraint on a firm's capital investment for those small manufacturing companies that did not export. This leads us to conclude that exporting adds an extra stimulus to firm-level investment activities either via market diversification and risk dispersion, smaller liquidity constraints, or positive signals to external capital markets.

Policy implications

As exporting firms expand due to amplified investments this can, on one hand, be seen as a source of faster overall economic growth but also as a reallocation from less to more productive activities on the other. Thus, not only has exporting been a driving force for Slovenian economic growth in recent years but it will play a significant role in the process of future economy-wide structural adjustment. Regarding the policy implications of our findings we found yet another salient reason for promoting internationalisation. Further, since the deepening of financial markets results in firms' easier access to external financing our results provide an additional argument in favour of stimulating the deepening of financial markets.

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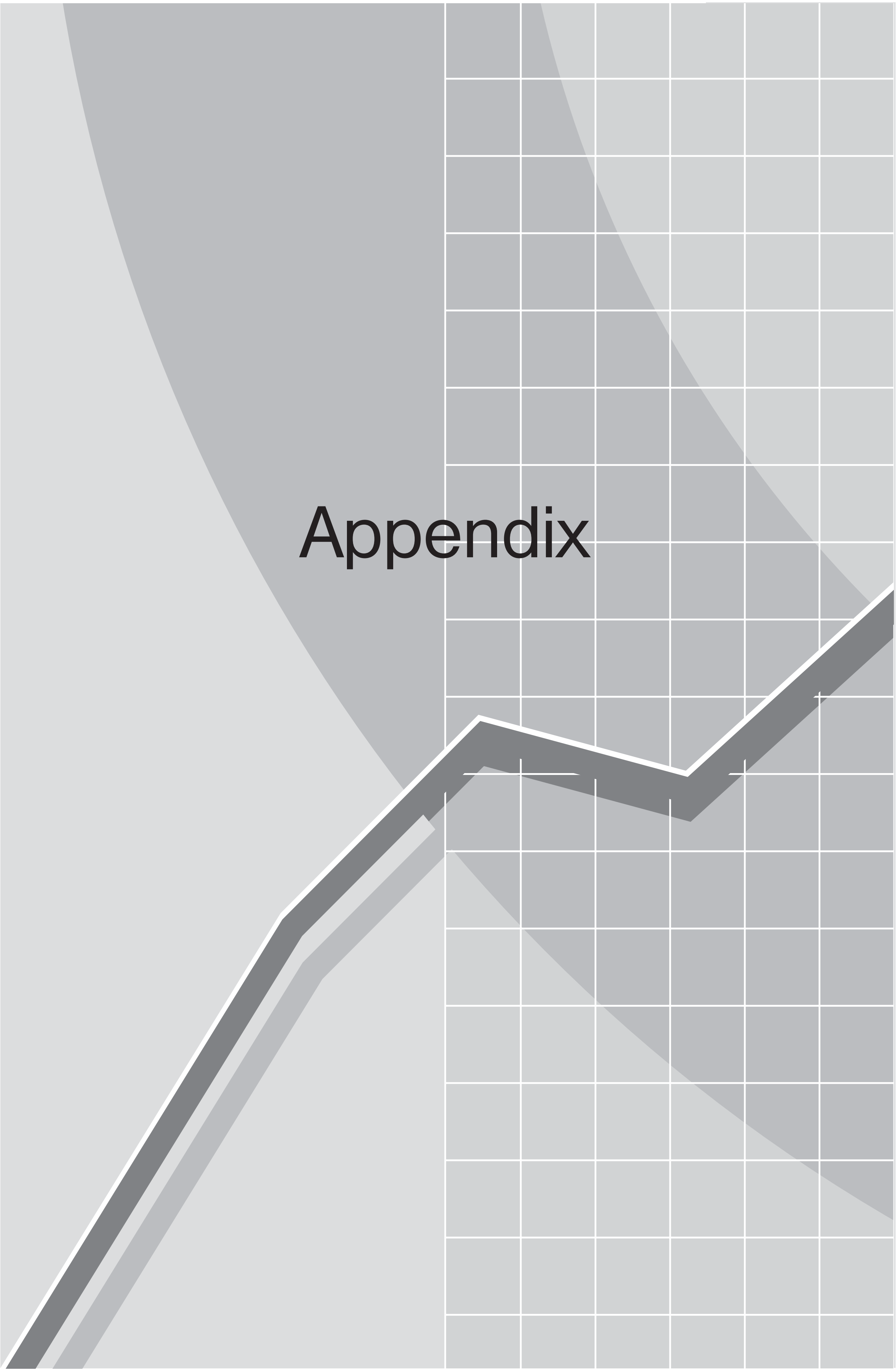
Appendix



Tables 1-6 report the results of econometric analysis. We report coefficient estimates and standard errors in parentheses. For easier inspection, statistically significant coefficients are in bold. Tables 1-3 include employment variable as a regressor, while Tables 4-6 leave this variable out. In columns (5) all the regressors are treated as endogenous and we use lagged levels of the right-side variables dated *t*-2 and earlier as instruments for the first-differenced equation. Columns (6) consider the lagged regressors ($ln\ c/s_{t-2}$, $ln\ s_{t-2}$, and cf/c_{t-1}) as predetermined and the others as endogenous. Dummy variables are always considered as strictly exogenous regressors. Right-side variables are treated as endogenous, except for dummy variables which enter as strictly exogenous regressors. For each time period, all available lags of the specified variables in levels dated t-1 or earlier as instruments for the first-difference equations, and contemporaneous first differences as instruments in the levels equations are used. All estimations include time dummies.

Table 1

Dep. var.: inv all firms:	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	RE	FE	GMM-DIF 1-step	GMM-DIF 1-step	GMM-SYS 1-step
inv(t-1)	**-0.073*** **	**-0.162*** **	**-0.441*** **	**-0.287*** **	**-0.338*** **	**-0.107*** **
	(0.006)	(0.007)	(0.007)	(0.020)	(0.016)	(0.010)
dls	**0.285*** **	**0.276*** **	**0.265*** **	**0.199*** **	**0.201*** **	**0.324*** **
	(0.009)	(0.009)	(0.011)	(0.014)	(0.014)	(0.014)
dls(t-1)	**0.190*** **	**0.208*** **	**0.267*** **	**0.185*** **	**0.202*** **	**0.268*** **
	(0.009)	(0.009)	(0.013)	(0.018)	(0.017)	(0.018)
ln c/s(t-2)	**-0.112*** **	**-0.169*** **	**-0.521*** **	**-0.339*** **	**-0.389*** **	**-0.177*** **
	(0.003)	(0.004)	(0.007)	(0.020)	(0.016)	(0.010)
ln s(t-2)	-0.005	**-0.029*** **	**-0.240*** **	**-0.179*** **	**-0.211*** **	**0.033***
	(0.005)	(0.006)	(0.013)	(0.020)	(0.019)	(0.019)
cf/c	**0.003*** **	**0.002*** **	**0.002*** **	**0.002*** **	**0.001*** **	**0.001*** **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cf/c*Dnoex	**0.005*** **	**0.006*** **	**0.007*** **	**0.016*** **	**0.016*** **	**0.004** **
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
cf/c(t-1)	0.000	0.000	0.000	0.000	0.000	**-0.001*** **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cf/c(t-1)*Dnoex	**0.010*** **	**0.011*** **	**0.009*** **	0.000	0.000	**0.006** **
	(0.002)	(0.001)	(0.0024)	(0.003)	(0.002)	(0.002)
start(t+2)	0.026	0.0393316	**0.070** **			0.007
	(0.024)	(0.024)	(0.029)			(0.027)
end(t-2)	-0.049	-0.045	0.0024672	-0.053	-0.054	-0.051
	(0.034)	(0.034)	(0.043)	(0.051)	(0.04983)	(0.038)
end(t-1)	**-0.120*** **	**-0.121*** **	**-0.086** **	**-0.096** **	**-0.097** **	**-0.104*** **
	(0.030)	(0.030)	(0.043)	(0.042)	(0.04125)	(0.033)
end	**0.027*** **	**-0.207*** **	**-0.204*** **	**-0.145*** **	**-0.149*** **	**-0.173*** **
	(0.027)	(0.028)	(0.045)	(0.039)	(0.03783)	(0.030)
Dnoex	**-0.054*** **	**-0.061*** **		**-0.023*** **	**-0.025*** **	0.016
	(0.010)	(0.013)		(0.006)	(0.00542)	(0.027)
ln emp	**0.0269*** **	**0.056*** **	**0.105*** **	**0.065*** **	**0.073*** **	0.022
	(0.005)	(0.007)	(0.013)	(0.019)	(0.018)	(0.023)
N	24,193	24,193	24,193	18,694	18,694	23,408
R^2	0.1188	0.1113	0.2774			
Adj. R^2	0.1180					
m1				-33.11	-36.39	-56.19
m2				0.89	0.98	1.43
Sargan/Hansen: χ^2 (P)				107.50	426.63	1422.34
				(0.0000)	(0.0000)	(0.0000)

Notes:
1. ***, **, and * denote 1%, 5%, and 10% levels of statistical significance.
2. The one-step GMM-sys with heteroscedasticity-consistent standard errors, and the two-step estimations are available upon request.

Table 2

Dep. var.: inv >1 employed:	(1) OLS	(2) RE	(3) FE	(4) GMM-DIF 1-step	(5) GMM-DIF 1-step	(6) GMM-SYS 1-step
inv(t-1)	**-0.039*** **	**-0.125*** **	**-0.410*** **	**-0.205*** **	**-0.248*** **	**-0.099*** **
	(0.009)	(0.009)	(0.010)	(0.027)	(0.021)	(0.012)
dls	**0.350*** **	**0.338*** **	**0.310*** **	**0.279*** **	**0.284*** **	**0.352*** **
	(0.013)	(0.013)	(0.017)	(0.022)	(0.021)	(0.018)
dls(t-1)	**0.183*** **	**0.197*** **	**0.255*** **	**0.186*** **	**0.212*** **	**0.230*** **
	(0.013)	(0.014)	(0.020)	(0.028)	(0.027)	(0.024)
ln c/s(t-2)	**-0.101*** **	**-0.152*** **	**-0.509*** **	**-0.276*** **	**-0.316*** **	**-0.188*** **
	(0.004)	(0.005)	(0.009)	(0.027)	(0.021)	(0.012)
ln s(t-2)	-0.003	**-0.018** **	**-0.196*** **	**-0.088*** **	**-0.104*** **	0.008
	(0.006)	(0.008)	(0.019)	(0.030)	(0.028)	(0.026)
cf/c	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cf/c*Dnoex	**0.009*** **	**0.010*** **	**0.051*** **	**0.062*** **	**0.065*** **	**0.017*** **
	(0.002)	(0.002)	(0.006)	(0.007)	(0.006)	(0.003)
cf/c(t-1)	**-0.001** **	**-0.001*** **	**-0.002*** **	**-0.001*** **	**-0.001*** **	**-0.001*** **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cf/c(t-1)*Dnoex	**0.012*** **	**0.014*** **	0.007	-0.003	-0.001	**0.0237*** **
	(0.003)	(0.003)	(0.006)	(0.007)	(0.006)	(0.004)
start(t+2)	0.015	0.031	**0.077** **			0.007
	(0.029)	(0.029)	(0.034)			(0.033)
end(t-2)	-0.040	-0.029	0.014	-0.044	-0.047	-0.0274
	(0.038)	(0.039)	(0.048)	(0.056)	(0.055)	(0.043)
end(t-1)	**-0.091*** **	**-0.092*** **	-0.073	**-0.081***	**-0.080***	**-0.0795** **
	(0.032)	(0.033)	(0.047)	(0.046)	(0.045)	(0.036)
end	**-0.220*** **	**-0.231*** **	**-0.260*** **	**-0.173*** **	**-0.175*** **	**-0.205*** **
	(0.028)	(0.029)	(0.049)	(0.040)	(0.039)	(0.031)
Dnoex	**-0.049*** **	**-0.056*** **		0.001	-0.009	**-0.063** **
	(0.013)	(0.017)		(0.008)	(0.007)	(0.026)
ln emp	**0.017** **	**0.039*** **	**0.101*** **	0.020	0.022	0.013
	(0.007)	(0.008)	(0.020)	(0.029)	(0.028)	(0.031)
N	14,064	14,064	14,064	10,632	10,632	13,051
R^2	0.1314	0.1232	0.2752			
Adj. R^2	0.1301					
m1				-25.25	-28.91	-38.59
m2				1.34	1.33	1.41
Sargan/Hansen: χ^2 (P)				63.10	321.71	1033.61
				(0.0003)	(0.0000)	(0.0000)

Notes:
1. ***, **, and * denote 1%, 5%, and 10% levels of statistical significance.
2. The two-step estimations are available upon request.

Table 3

Dep. var.: inv W/out micro f.:	(1) OLS	(2) RE	(3) FE	(4) GMM-DIF 1-step	(5) GMM-DIF 1-step	(6) GMM-SYS 1-step
inv(t-1)	**-0.049*** **	**-0.175*** **	**-0.458*** **	**-0.304*** **	**-0.308*** **	**-0.114*** **
	(0.011)	(0.011)	(0.012)	(0.026)	(0.021)	(0.016)
dls	**0.311*** **	**0.293*** **	**0.217*** **	**0.138*** **	**0.140*** **	**0.283*** **
	(0.014)	(0.015)	(0.019)	(0.023)	(0.023)	(0.022)
dls(t-1)	**0.161*** **	**0.187*** **	**0.184*** **	**0.095*** **	**0.103*** **	**0.193*** **
	(0.014)	(0.015)	(0.021)	(0.029)	(0.028)	(0.026)
ln c/s(t-2)	**-0.116*** **	**-0.191*** **	**-0.536*** **	**-0.369*** **	**-0.372*** **	**-0.195*** **
	(0.005)	(0.006)	(0.011)	(0.024)	(0.020)	(0.013)
ln s(t-2)	-0.0040471	**-0.026*** **	**-0.300*** **	**-0.248*** **	**-0.254*** **	-0.006
	(0.007)	(0.010)	(0.021)	(0.031)	(0.029)	(0.028)
cf/c	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cf/c*Dnoex	**0.025*** **	**0.028*** **	**0.019** **	**0.037*** **	**0.040*** **	**0.032*** **
	(0.007)	(0.007)	(0.009)	(0.010)	(0.009)	(0.007)
cf/c(t-1)	**-0.001*** **	**-0.001*** **	**-0.002*** **	**-0.001*** **	**-0.001*** **	**-0.001*** **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cf/c(t-1)*Dnoex	0.003	0.005	-0.012	**-0.025* **	**-0.025** **	-0.013
	(0.011)	(0.011)	(0.013)	(0.013)	(0.012)	(0.012)
start(t+2)	**0.062* **	**0.096*** **	**0.126*** **			0.032
	(0.034)	(0.034)	(0.037)			(0.038)
end(t-2)	-0.038	-0.030	0.032	0.052	-0.013	-0.040
	(0.038)	(0.038)	(0.046)	(0.889)	(0.052)	(0.042)
end(t-1)	**-0.114*** **	**-0.113*** **	-0.066	**0.042*** **	**-0.132** **	**-0.124*** **
	(0.033)	(0.033)	(0.046)	(0.001)	(0.042)	(0.035)
end	**-0.187*** **	**-0.191*** **	**-0.191*** **	**-0.150*** **	**-0.150*** **	**-0.203*** **
	(0.029)	(0.030)	(0.047)	(0.037)	(0.037)	(0.031)
Dnoex	**-0.058*** **	**-0.085*** **		**0.025** **	**0.023** **	**-0.111*** **
	(0.012)	(0.028)		(0.011)	(0.010)	(0.026)
ln emp	0.002	**0.026** **	**0.090*** **	0.012	0.012	-0.022
	(0.008)	(0.011)	(0.019)	(0.027)	(0.026)	(0.029)
N	8,815	8,815	8,815	6,941	6,941	8,551
R^2	0.1648	0.1496	0.3202			
Adj. R^2	0.1628					
m1				-21.12	-23.38	-27.41
m2				0.01	-0.02	-0.10
Sargan/Hansen: χ^2 (P)				80.14	315.61	1023.91
				(0.0000)	(0.0000)	(0.0000)

Notes:
1. ***, **, and * denote 1%, 5%, and 10% levels of statistical significance.
2. The two-step estimations are available upon request.

Table 4

Dep. var.: inv All firms:	(1) OLS	(2) RE	(3) FE	(4) GMM-DIF 1-step	(5) GMM-DIF 1-step	(6) GMM-SYS 1-step
inv(t-1)	**-0.058*** **	**-0.133*** **	**-0.420*** **	**-0.235*** **	**-0.278*** **	**-0.100*** **
	(0.006)	(0.006)	(0.007)	(0.020)	(0.016)	(0.009)
dls	**0.259*** **	**0.259*** **	**0.251*** **	**0.175*** **	**0.178*** **	**0.281*** **
	(0.007)	(0.007)	(0.008)	(0.011)	(0.011)	(0.008)
dls(t-1)	0.193***	0.217***	0.283***	0.179***	0.194***	0.254***
	(0.007)	(0.007)	(0.010)	(0.015)	(0.013)	(0.011)
ln c/s(t-2)	**-0.100*** **	**-0.143*** **	**-0.500*** **	**-0.287*** **	**-0.328*** **	**-0.160*** **
	(0.003)	(0.004)	(0.007)	(0.020)	(0.016)	(0.009)
ln s(t-2)	**0.014*** **	**0.012*** **	**-0.199*** **	**-0.138*** **	**-0.163*** **	**0.055*** **
	(0.002)	(0.003)	(0.010)	(0.017)	(0.015)	(0.010)
cf/c	**0.001*** **	**0.001*** **	**0.001*** **	**0.001*** **	**0.001*** **	**0.0007*** **
	(0.000)	(0.000)	(0.000)	(0.0003)	(0.0002)	(0.0002)
cf/c*Dnoex	**0.006*** **	**0.005*** **	**0.015*** **	**0.023*** **	**0.023*** **	**0.009*** **
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
cf/c(t-1)	-0.0001	-0.0001	-0.0002	-0.0003	-0.0004	**-0.001*** **
	(0.0003)	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0003)
cf/c(t-1)*Dnoex	**0.003** **	**0.003** **	**0.009*** **	**0.004* **	**0.005** **	**0.009*** **
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
start(t+2)	0.014	0.028	0.045			-0.002
	(0.023)	(0.023)	(0.028)			(0.026)
end(t-2)	**-0.064** **	-0.052	-0.027	-0.073	-0.077	**-0.063* **
	(0.032)	(0.032)	(0.041)	(0.048)	(0.048)	(0.036)
end(t-1)	**-0.091*** **	**-0.085*** **	**-0.083** **	-0.053	-0.057	**-0.071** **
	(0.028)	(0.028)	(0.040)	(0.040)	(0.039)	(0.030)
end	**-0.176*** **	**-0.174*** **	**-0.219*** **	**-0.161*** **	**-0.164*** **	**-0.153*** **
	(0.025)	(0.025)	(0.041)	(0.036)	(0.035)	(0.027)
Dnoex	-0.040***	-0.044***		-0.014**	-0.018***	0.050**
	(0.009)	(0.012)		(0.006)	(0.005)	(0.023)
N	26,680	26,680	26,680	20,858	20,858	25,811
R^2	0.1150	0.1089	0.2643			
Adj. R^2	0.1144					
m1				-35.44	-39.54	-62.14
m2				1.45	1.46	1.38
Sargan/Hansen: χ^2 (P)				48.79	344.70	1260.82
				(0.0088)	(0.0000)	(0.0000)

Notes:
1. ***, **, and * denote 1%, 5%, and 10% levels of statistical significance.
2. The two-step estimations are available upon request.

Table 5

Dep. var.: inv >1 employed:	(1) OLS	(2) RE	(3) FE	(4) GMM-DIF 1-step	(5) GMM-DIF 1-step	(6) GMM-SYS 1-step
inv(t-1)	**-0.038*** **	**-0.121*** **	**-0.406*** **	**-0.193*** **	**-0.240*** **	**-0.095*** **
	(0.009)	(0.009)	(0.010)	(0.027)	(0.021)	(0.013)
dls	**0.357*** **	**0.356*** **	**0.349*** **	**0.287*** **	**0.292*** **	**0.359*** **
	(0.012)	(0.013)	(0.015)	(0.019)	(0.019)	(0.015)
dls(t-1)	**0.194*** **	**0.221*** **	**0.305*** **	**0.190*** **	**0.219*** **	**0.241*** **
	(0.012)	(0.013)	(0.017)	(0.025)	(0.02)	(0.017)
ln c/s(t-2)	**-0.098*** **	**-0.145*** **	**-0.503*** **	**-0.263*** **	**-0.306*** **	**-0.181*** **
	(0.004)	(0.005)	(0.009)	(0.027)	(0.020)	(0.0119)
ln s(t-2)	**0.012*** **	**0.015*** **	**-0.135*** **	**-0.076*** **	**-0.090*** **	**0.026***
	(0.003)	(0.004)	(0.015)	(0.024)	(0.021)	(0.014)
cf/c	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
cf/c*Dnoex	**0.009*** **	**0.010*** **	**0.051*** **	**0.063*** **	**0.066*** **	**0.017*** **
	(0.002)	(0.002)	(0.006)	(0.007)	(0.006)	(0.003)
cf/c(t-1)	**-0.001** **	**-0.001*** **	**-0.002*** **	**-0.001*** **	**-0.001*** **	**-0.001*** **
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
cf/c(t-1)*Dnoex	0.012***	0.014***	0.007	-0.004	-0.001	0.023***
	(0.003)	(0.003)	(0.006)	(0.007)	(0.006)	(0.004)
start(t+2)	0.020	0.040	0.080			0.012
	(0.029)	(0.029)	(0.034)			(0.032)
end(t-2)	-0.035	-0.018	0.014	-0.042	-0.046	-0.027
	(0.037)	(0.038)	(0.048)	(0.057)	(0.055)	(0.042)
end(t-1)	**-0.085*** **	**-0.081** **	-0.075	**-0.082***	**-0.081***	**-0.076** **
	(0.032)	(0.033)	(0.047)	(0.046)	(0.045)	(0.034)
end	**-0.214*** **	**-0.217*** **	**-0.265*** **	**-0.173*** **	**-0.175*** **	**-0.204*** **
	(0.028)	(0.029)	(0.049)	(0.04)	(0.039)	(0.030)
Dnoex	**-0.048*** **	**-0.055*** **		0.002	-0.008	**-0.050***
	(0.0126)	(0.016)		(0.008)	(0.007)	(0.027)
N	14,064	14,064	14,064	10,632	10,632	13,051
R^2	0.1310	0.1231	0.2735			
Adj. R^2	0.1297					
m1				-25.40	-29.03	-38.56
m2				1.27	1.27	1.31
Sargan/Hansen: χ^2 (P)				39.94	304.53	980.71
				(0.0670)	(0.0000)	(0.0000)

Notes:
1. ***, **, and * denote 1%, 5%, and 10% levels of statistical significance.
2. The two-step estimations are available upon request.

Table 6

Dep. var.: inv W/out micro f.:	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	RE	FE	GMM-DIF 1-step	GMM-DIF 1-step	GMM-SYS 1-step
inv(t-1)	**-0.048*** **	**-0.175*** **	**-0.455*** **	**-0.306*** **	**-0.297*** **	**-0.131*** **
	(0.011)	(0.011)	(0.012)	(0.026)	(0.022)	(0.016)
dls	**0.310*** **	**0.305*** **	**0.269*** **	**0.136*** **	**0.137*** **	**0.280*** **
	(0.012)	(0.012)	(0.014)	(0.018)	(0.018)	(0.015)
dls(t-1)	0.166***	0.207***	0.247***	0.089***	0.090***	0.190***
	(0.013)	(0.013)	(0.017)	(0.024)	(0.022)	(0.017)
ln c/s(t-2)	-0.114***	-0.189***	-0.531***	-0.369***	-0.361***	-0.215***
	(0.005)	(0.006)	(0.011)	(0.024)	(0.020)	(0.013)
ln s(t-2)	-0.002	-0.007	**-0.232*** **	**-0.262*** **	**-0.259*** **	**-0.029** **
	(0.004)	(0.005)	(0.015)	(0.021)	(0.020)	(0.014)
cf/c	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **	**-0.002*** **
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
cf/c*Dnoex	**0.024*** **	**0.027*** **	**0.018** **	**0.038*** **	**0.042*** **	**0.033*** **
	(0.007)	(0.007)	(0.009)	(0.010)	(0.010)	(0.007)
cf/c(t-1)	**-0.001*** **	**-0.001*** **	**-0.002*** **	**-0.001*** **	**-0.001*** **	**-0.001*** **
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
cf/c(t-1)*Dnoex	0.003	0.006	-0.009	**-0.027** **	**-0.026** **	**-0.014**
	(0.011)	(0.011)	(0.013)	(0.014)	(0.013)	(0.012)
start(t+2)	0.067**	0.104***	0.127***			0.019
	(0.034)	(0.034)	(0.038)			(0.038)
end(t-2)	-0.053	-0.039	0.024	-0.041	-0.045	-0.060
	(0.038)	(0.038)	(0.046)	(0.052)	(0.052)	(0.042)
end(t-1)	**-0.117*** **	**-0.111*** **	-0.066	**-0.140*** **	**-0.137** **	**-0.138*** **
	(0.033)	(0.033)	(0.045)	(0.042)	(0.042)	(0.035)
end	-0.187***	-0.187***	-0.204***	-0.161***	-0.160***	-0.204***
	(0.029)	(0.030)	(0.047)	(0.037)	(0.037)	(0.031)
Dnoex	-0.058***	-0.085***		0.027**	0.024**	-0.125***
	(0.020)	(0.029)		(0.011)	(0.011)	(0.027)
N	8,862	8,862	8,862	6,983	6,983	8,592
R^2	0.1744	0.1579	0.3192			
Adj. R^2	0.1725					
m1				-20.57	-23.03	-26.49
m2				-0.46	-0.46	-0.41
Sargan/Hansen: χ^2 (P)				44.09	269.92	861.54
				(0.0272)	(0.0000)	(0.0000)

Notes:
1. ***, **, and * denote 1%, 5%, and 10% levels of statistical significance.
2. The two-step estimations are available upon request.

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