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## The relationship between slack resources and firms' exporting behavior

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# The relationship between slack resources and firms' exporting behavior



## Working Paper Research

by Ine Paeleman, Catherine Fuss and Tom Vanacker

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## **Abstract**

We use a unique longitudinal dataset that tracks the exporting behavior of Belgian manufacturing firms between 1997 and 2009. We ask how slack resources, including financial and human resource slack, influence firms' exporting behavior. Our findings suggest that both types of slack resources have an inverted U-shaped relationship with the decision to export. This implies that higher levels of slack resources positively influence the likelihood of firms exporting, but too much slack negatively influences this likelihood. After controlling for the decision to export, we find no significant relationship between slack resources and export intensity. Nevertheless, we do find an inverted U-shaped relationship between slack resources and export diversity. Overall, this study provides new insight into how different types of slack resources influence different aspects of firms' exporting behavior.

Key words: financial resources, human resources, slack and export.

JEL Classification : F10, L20, O15, O16.

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## TABLE OF CONTENTS

<b>Introduction</b> .....	<b>1</b>
<b>Data and statistical approach</b> .....	<b>7</b>
Data .....	7
Dependent variables .....	8
Independent variables .....	10
Control variables .....	11
Method of analysis .....	12
<b>Empirical results</b> .....	<b>14</b>
Descriptive statistics and correlations .....	14
Regression results .....	15
<b>Conclusion</b> .....	<b>18</b>
<b>References</b> .....	<b>22</b>
Tables .....	27
Figure .....	33
Appendix .....	34
National Bank of Belgium - Working papers series .....	37

## **INTRODUCTION**

Exporting is an important path to boost firm growth and performance (e.g., Autio, Sapienza and Almeida, 2000; Bloodgood, Sapienza and Almeida, 1996). Consequently, getting more domestic firms to sell across borders and to engage them in exporting activities is also a key policy concern (Bernard and Jensen, 2004). A significant body of academic research has argued and shown that organizational resources, including financial resources and human resources, play a critical role in influencing the direction of a firm's international expansion and in helping the firm to create a competitive advantage (e.g., Hitt, Bierman, Uhlenbruck and Shimizu, 2006; Westhead, Wright and Ucbasaran, 2001). Nevertheless, in classic resource-based theories, slack resources—rather than the absolute level of resources—are important determinants of firm expansion, growth and performance (Mishina, Pollock and Porac, 2004; Penrose, 1959; Pitelis, 2007).

Slack resources are defined as “potentially utilizable resources that can be diverted or redeployed for the achievement of organizational goals” (George, 2005: 661). Slack resources represent the difference between the resources available in a firm and those needed for the basic operations of a firm. Focusing on slack is important because two firms may possess the same level of resources, but can differ in the resources they need for their current business, which implies that they have different levels of resource slack and will thus differ in their growth potential (e.g., Mishina et al., 2004). How slack resources influence firms' exporting behavior remains subject to significant debate. On the one hand, slack resources may provide the means necessary to cross borders and allow firms to compete in international markets with less binding constraints (e.g., Tseng, Tansuhaj, Hallagan and McCullough, 2007). This is expected to stimulate firms' exporting activities. On the other hand, slack resources may shield firms from external pressures, which reduces firms' incentives to adapt to

environmental pressures and to engage in risky projects (e.g., Kim, Kim and Lee, 2008; Nohria and Gulati, 1996). This is expected to hamper firms' exporting activities.

To date, there is a dearth of research on the relationship between slack resources and firms' exporting behavior. To our knowledge, only two studies have focused on this relationship. Specifically, Tseng et al. (2007) find an inverted U-shaped relationship between financial slack and export intensity using a sample of publicly held US manufacturing firms. Lin, Cheng and Liu (2009), using a sample of publicly held Taiwanese high-tech firms, find a U-shaped relationship between high-discretionary financial slack and export intensity and a positive linear relationship between low-discretionary financial slack and export intensity. Although these studies have provided important insights, much remains unknown about the relationship between slack resources and firms' exporting behavior. First, existing research has only focused on one particular type of slack, namely financial slack. This is unfortunate because slack resources vary in type (Mishina et al., 2004) and other resources, including human resources, may also influence firms' exporting behaviour (Hitt et al., 2006). Second, research done so far has only focused on export intensity. Focusing on the intensive margin neglects important aspects of export performance related to the extensive margin, such as the decision to export and export diversity, which each have their own characteristics (e.g., Cumming, Sapienza, Siegel and Wright, 2009; Fernhaber, Gilbert and McDougall, 2008; Ganotakis and Love, 2012; Lockett et al., 2008; Preece, Miles and Baetz, 1998; Robson, Akuetteh, Westhead and Wright, 2012). Finally, existing research has only examined publicly traded firms and ignored privately held firms. This is unfortunate because the majority of firms in any developed economy are privately held firms, especially so in European countries.

Further, the literature on international trade has largely focused on the exporting behavior at firm level and the characteristics of exporters, with a strong focus on the relationship between trade and productivity (e.g., Greenaway, Guariglia and Kneller, 2007). More recently,

scholars have showed the importance of other critical determinants of trading decisions such as the financial situation of a firm, i.e. the credit constraints it faces (Amiti and Weinstein, 2011; Manova, 2013; Minetti and Zhu, 2011; Muûls, 2012). Considering Belgian firms as in this paper, Muûls (2012) demonstrated that firms are more likely to export, have a higher export value and will export to a larger number of export destinations if they have lower credit constraints. Our paper extends this literature in several ways. First, we focus on financial slack rather than credit constraints<sup>1</sup>. Second, we not only consider firms' financial situation but also how their available human resources influence their exporting behavior. Third, contrary to Muûls (2012) who focused on the linear effects of credit constraints, we examine both linear and non-linear effects of slack resources. Finally, we also control for potential sample selection problems.

In sum, the main purpose of this paper is to deepen our understanding of how different types of slack resources, including financial slack and human resource slack, influence firms' exporting behavior, including the decision to export, the export intensity and the export diversity. Specifically, we first ask how financial slack (i.e., the level of liquid assets, such as cash in hand, relative to total assets adjusted to industry norms) and human resource slack (i.e., the number of white-collar employees relative to the total number of employees adjusted to industry norms) influence the decision to export. Then, we ask how those two different types of slack resources influence the export intensity and export diversity across destination countries, after controlling for the decision of firms to export or not. For the purpose of our

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<sup>1</sup> Slack resources and credit constraints are two different concepts, which are not necessarily correlated. On the one hand, firms with little financial slack are not necessarily credit-constrained. Indeed, they may decide to keep lower buffers of cash resources because they know they have easy access to other sources of financing, such as debt financing. On the other hand, firms with higher levels of cash resources, i.e. financial slack, might keep these resources exactly because they are credit-constrained. Previous scholars demonstrated that when firms are constrained in their outside financing options, they will keep larger cash buffers as a response (e.g., Fazzari, Hubbard and Petersen, 2000). This indicates that there is no necessary link between financial slack and credit constraints.



study, we use a longitudinal dataset comprising detailed data on the exporting behavior of Belgian manufacturing firms between 1997 and 2009.

In answering our first question, we find that the relationship between financial slack and the decision to export is inverse U-shaped. Similarly, we find that the relationship between human resource slack and the decision to export is inverse U-shaped. This means slack will first increase the likelihood that firms export. Because entry into foreign markets involves large sunk costs (e.g., Bellone, Musso, Nesta and Schiavo, 2010; Wagner, 2007) and higher entry costs than selling in the domestic market (Minetti and Zhu, 2011), slack resources may alleviate these costs and increase the probability that firms export. Nevertheless, when firms have too much slack, it may lead to complacent and overly optimistic behavior (Kim et al., 2008; Nohria and Gulati, 1997), which may dampen the incentives to export. Slack resources then negatively impact the probability that firms export. This explains the inverse U-shaped relationships we found between slack resources and the decision to export.

As a second question, we ask whether slack resources have an impact on the export intensity and export diversity after controlling for the decision of firms to engage in exporting. Contrary to prior research (Lin et al., 2009; Tseng et al., 2007), we find no significant relationship between financial slack and export intensity. Similarly, we find no significant relationship between human resource slack and export intensity. However, we do find a significant inverse U-shaped relationship between financial slack and export diversity. We also find such an inverse U-shaped relationship between human resource slack and export diversity. Scholars have suggested that there is a qualitative difference between a firm which is operating “internationally” and a firm which is operating “globally” (Hout, Porter and Rudden, 1982; Preece et al., 1998). An international firm maintains a certain level of export intensity which means some degree of foreign market presence but might be relatively limited in its geographic scope (Preece et al., 1998). A global firm, however, maintains a significant

dispersion of its foreign activities and may tap into multiple international markets simultaneously. Its goal is to achieve world reach. Such diversity is potentially very difficult to achieve; due to the complexity of global operations and the confrontation with different cultural environments, coordination and governance costs will increase (Galbraith and Kazanjian, 1986; Gomes and Ramaswamy, 1999). Having some levels of slack resources at that moment might alleviate the transaction and coordination costs associated with the diversity of firms' exporting activities. However, too much slack may increase complacent and overly optimistic firm behavior, which is expected to reduce firms' incentives to diversify their exporting activities. This explains the inverse U-shaped relationships we found between slack resources and export diversity.

This paper makes at least three contributions. First, existing research examining the relationship between slack resources and firms' exporting behavior focused primarily on export intensity (Lin et al., 2009; Tseng et al., 2007). However, we need more insight into what is probably the first critical decision of firms, namely if they will export or not. Researchers suggest that there may be econometric biases with studying the intensity or diversity of internationalization without first considering the decision of whether or not to export through a two-step process (Cumming et al., 2009). We therefore used a Heckman two-stage test to first account for the decision of a firm to engage in exporting or not (Greene, 2000; Lockett et al., 2008; Robson et al., 2012). Furthermore, there are other dimensions related to the exporting behavior of firms besides export intensity which have not received much attention in the literature to date, such as export diversity. There is a need to take into account the separate decisions of exporting, more specifically, the decision to start exporting (propensity), the decision of how much to export (intensity) and the decision of how many countries to export to (diversity) because each dimension has its own dynamics and antecedents (Cumming et al., 2009; Fernhaber et al., 2008; Ganotakis and Love, 2012; Hashai,

2011; Lockett et al., 2008; Preece et al., 1998; Robson et al., 2012). In this study, we examined the impact of slack resources on these different dimensions of exporting and demonstrate that slack resources have a distinct impact on the different dimensions of exporting.

Second, to our knowledge, no study has examined how different types of slack resources may impact different dimensions of exporting. Prior scholars investigating the relationship between slack resources and firms' exporting behaviors solely focused on financial slack (Lin et al., 2009; Tseng et al., 2007). However, besides financial slack, human resources also provide a base for internationalization (Hitt et al., 2006). The question whether and how human resource slack affects a firm's exporting behavior is still an open issue.

Third, the importance of privately held firms calls for more research on the relationship between slack resources and firms' exporting behavior in samples of private firms as opposed to public firms. In Belgium, for instance, small and medium-sized enterprises (SMEs) account for 99.8 % of the total number of firms, 66.9 % of total employment, and 57.7 % of total value added (European Commission, 2009). The majority of these SMEs (but also the majority of large firms) are privately held firms—they do not qualify to become publicly held firms and have no ambition to become publicly held even if they would qualify. Belgium is not unique in this case; actually similar figures can be reported for other continental European countries and even for Anglo-Saxon countries. Moreover, the ability of firms to raise additional financial resources (Brav, 2009) and human resources (Cardon and Stevens, 2004) is fundamentally different between publicly held firms and privately held firms. This implies that privately held firms are not only more prevalent but may also use their slack resources differently as compared to publicly held firms.

The rest of the paper is structured as follows. In the next section, we describe our data and statistical approach. Thereafter, we present the empirical results. Finally, we offer a conclusion, directions for future research and practical implications.

## **DATA AND STATISTICAL APPROACH**

### **Data**

For the purpose of this study, we constructed a unique, longitudinal data set by merging two separate databases. First, we used a highly confidential database in the National Bank of Belgium that contains detailed information on the exporting behavior (decision, intensity, diversity) of all Belgian firms. Second, we used a database that contains detailed annual accounts data for nearly all firms in Belgium from the Central Balance Sheet Office at the National Bank of Belgium. Belgian law requires all firms registered in Belgium and operating with limited liabilities of shareholders to file their annual accounts.

These unique databases explain our focus on Belgian firms. Belgium has a small open economy which is export-intensive. Today, international trade accounts for more than 70% of Belgium's annual GDP (Eurostat 2011). Last, focusing on firms operating in one particular country also reduces the unobserved heterogeneity resulting from variance in environmental and regulatory conditions.

We select firms operating in the manufacturing sector (NACE Rev. 2-codes from 10 to 33). The manufacturing industry is the main goods-exporting sector (for example, it accounted for nearly 70% of total Belgian exports in 2004). Next, we only consider firms that report at least once over the entire period positive employment, capital stock and total assets and excluded firms filing consolidated balance sheets and firms which may not be considered as profit-maximizing firms according to their legal form (e.g., non-profit associations, public administrations). We use data from 1997 until.

We perform a small set of corrections of date and year or apparently erroneous number of months of annual accounts<sup>2</sup>. Then, annual account information has been annualised to guarantee consistency with other firm-level datasets such as the trade data, ensure relevant cross-section comparisons, and use appropriate yearly deflators<sup>3</sup>. We use the 2-digits NACE-Rev2 deflators published in the National Accounts to obtain real values of the nominal variables. We mostly rely on value added deflators, but deflate investment and physical capital by investment prices. The sector of activity is determined on the basis of the last NACE codes available for each firm over 1996-2009, converted into NACE-Rev2 classification where necessary.

We restrict the sample to observations with relevant data for the construction of the variables described below. This results in a large-scale dataset comprising 3,391 firms and 30,074 firm-year observations.

### **Dependent variables**

***Decision to export.*** The dependent variable, *the decision to export*, is measured as a dummy variable equal to 1 when a firm has foreign sales, 0 otherwise.

***Export intensity.*** The degree to which firms sell their products to customers outside the domestic market can vary tremendously. Some firms derive little or none of their sales from international markets, while others derive a high percentage of their sales from international markets. Therefore, firms with a greater dependence on sales from international markets have

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<sup>2</sup> For example, when the ending date was 2 January 2005, we change the date into 31 December 2004. By doing this, we attribute the values reported in the annual account to the year 2004 instead of 2005.

<sup>3</sup> Flows are adjusted by taking a weighted average of  $t$  and  $t+1$  flows. Stocks are adjusted by adding to the current year stock the weighted stock variation between current and next year. The procedure attributes a missing value when there is not enough information to recover the entire year, for example when information about the first months or the last months of a given year are missing. This does not apply for the last year the firm is observed or for flows of the first year the firm is covered.

a higher *export intensity* than other firms (Fernhaber et al., 2008). Similar to other studies, we operationalize the level of export intensity as export sales divided by total sales (e.g., Autio et al., 2000; Grant, 1987; Habib and Victor, 1991; McDougall and Oviatt, 1996; Preece et al., 1998; Reuber and Fischer, 1997; Tallman and Li, 1996).

***Export diversity.*** Contrary to export intensity, export diversity examines the extent to which a firm enters foreign markets outside their home country (Fernhaber et al., 2008). We calculate an entropy measure of export diversity with the following formula  $\text{Export Diversity} = \sum P_j * \ln(1/P_j)$ , where  $P_j$  is defined as the percentage of firm sales in a given market  $j$  and  $\ln(1/P_j)$  is the weight given to each market, defined by the natural logarithm of the inverse of their percentage of its firm sales in market  $j$  (e.g., Palepu, 1985; Ahuja and Katila, 2001). Following De Clercq et al. (2005), we classify foreign markets into four segments representing the geographic and cultural distance from the firm's domestic market: the five countries bordering Belgium (including the United Kingdom), other countries within the European Union, other European countries and North America, and other countries. As a robustness test, we also conducted our analyses with as dependent variable the number of countries from which a firm generates foreign sales (e.g., Fernhaber et al., 2008, Zahra et al., 2000; Tallman and Li, 1996). Our results remain the same. Models are not reported, but are available from the authors upon request.

## **Independent variables**

The key independent variables measure financial slack and human resource slack. We use one-year lagged measures for the independent and control variables to minimize concerns of reverse causality. Furthermore, we winsorized all our independent variables at the 1st and 99th percentiles to reduce the influence of outliers.

We measure *financial slack* as the amount of cash and cash equivalents available within a firm scaled by total assets (e.g., Greve, 2003; Kim et al., 2008; Voss et al., 2008). Slack is generally measured relative to a target level rather than an absolute level of resources (Bromiley, 1991) and scholars have typically defined financial slack as excess cash resources held by firms compared to industry norms (George, 2005). Therefore, we calculate financial slack as the deviation from the median cash to total assets ratio for each of the respective three-digit NACE industries in which a particular firm operates (e.g., George, 2005)<sup>4</sup>. Cash and cash equivalents are the most easily (re)deployed resources and provide entrepreneurs with the greatest degree of freedom in allocating it to other uses (George, 2005; Kim et al., 2008). We further calculate financial slack squared to capture any curvilinear effect as suggested by prior theoretical and empirical work (Bourgeois, 1981; George, 2005; Sharfman, Wolf, Chase and Tansik, 1988).

We measure *human resource slack* as the number of skilled employees (in FTE) relative to the total number of employees. We also take into account the industry-level differences in the requirement and utilization of skilled human resources. Therefore, the measure is adjusted for industry norms by subtracting the median ratio of skilled employment to total employees for all firms in the same three-digit NACE industry in which the focal firm operates (Mellahi and

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<sup>4</sup> As a robustness check, we also used the industry-adjusted current ratio as an alternative measure for financial slack (e.g., Bromiley, 1991; Lin et al., 2009). This measure produced similar results to those reported below. Results are not reported, but available from the authors upon request.

Wilkinson 2010; Mishina et al., 2004)<sup>5</sup>. We additionally calculate human resource slack squared to capture any curvilinear effect in the relationship between human resource slack and firms' exporting behavior.

### **Control variables**

We included several control variables in our models. First, productivity has been shown as an important determinant of trade patterns (e.g., Bernard and Jensen, 2004; Muûls, 2012). Therefore, we include *total factor productivity* measured as in Levinsohn and Petrin (2003). The data used to estimate TFP is based on annual accounts data on firms' value added, capital stock at the beginning of the year, and average number of workers over the year in full-time equivalents and intermediate input consumption over the period 1997-2009. We restrict the sample to observations where value added, intermediate inputs, number of workers are positive, and the capital stock exceeds €100. We trim the data for outliers by restricting the sample to observations where apparent labour productivity (value added over employment), the investment-capital ratio, and capital intensity (the capital-labour ratio) lie within the range given by the median minus 3 times the interquartile range and the median plus 3 times the interquartile range. Further, in order to estimate production function coefficients, the sample is restricted to firms that are observed over at least two consecutive years, and in case of breaks over the firm spell, only the last consecutive observations are considered. Table A.1 in the Appendix reports the estimated production function coefficients together with their standard errors. In order to maintain a sufficiently large number of observations to obtain precise and reliable production coefficients, we estimate these at the broad (31) branch level. This includes

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<sup>5</sup> Following previous research (Mellahi and Wilkinson, 2010; Mishina et al., 2004; Voss et al., 2008), we also measure human resource slack as the industry adjusted ratio of the number of skilled employees (in FTE) relative to sales. Further, we also measure human resource slack once as the employment cost on total assets compared to the industry median (Vanacker et al., 2013). Results (not reported, but available on request) show that our findings remain robust.



13 manufacturing branches, from which we exclude branches CD (coke and refined petroleum products; code NACE-Rev2 19) and CF (basic pharmaceutical products and pharmaceutical preparations; code NACE-Rev2 21) owing to a lack of observations. Further, firm size may influence the ability of firms to access international markets and to accumulate slack resources (George, 2005). We therefore control for *firm size*, measured as the natural logarithm of total assets. Because slack is time-dependent in its accumulation, we also control for firm age. *Firm age* is measured as the years since legal incorporation. The *intangible assets ratio*, defined as the ratio of intangible assets to total assets, is used as a measure of the growth potential of firms (Villalonga, 2004). Firm performance may also influence firms' exporting behavior (Hitt et al., 2006) and their ability to accumulate slack (Sharfman et al., 1988). We therefore include *lagged performance* as a control which is operationalized as Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) on total assets. We also control for the *debt ratio* defined as the firm's ratio of debt to total assets (Hitt et al., 2006; Lu and Beamish, 2004). A *one-period-lagged dependent variable* was also included in all specifications as a control for firm heterogeneity (e.g., Heckman and Borjas, 1980; Katila and Ahuja, 2002). We further include *industry* dummy variables to capture more subtle sub-industry-level effects within the manufacturing sector. Finally, we include *year* dummy variables to control for the effects of any general economic trend.

### **Method of analysis**

We used a Heckman two-step procedure that first predicts the decision to export via a linear probability model (Bernard and Jensen, 2004; Muûls, 2012) and then control for that decision in second-stage regressions. The Heckman procedure accounts for potential selection problems between exporters and non-exporters (e.g., Greene, 2000; Lockett et al., 2008; Robson et al., 2012). Specifically, selection problems arise because export intensity and

diversity for non-exporting firms is zero. Simply omitting such observations can lead to biased estimates. Modeling export intensity and diversity needs to take into account the possibility that exporters are not a random subset of all firms but may have certain characteristics that are also linked with the export intensity or diversity (Ganotakis and Love, 2012). It ascertains whether the unobserved variables associated with the propensity to export are associated with the unobserved variables associated with the export intensity or diversity. The first stage includes all variables from the second stage and other variables not included in the second stage that are likely to drive the decision to export (i.e., the lagged dependent variable “decision to export”) but not the export intensity or export diversity. We then used the results from the first-stage models to create the inverse Mills ratio, which was included as a control in the second stage (Hamilton and Nickerson, 2003).

Generalized estimating equations were used to conduct the second-stage regression analyses. GEE models are appropriate for longitudinal data and allow one to specify the nature of the dependent variable while controlling for potential autocorrelation and heteroskedasticity in the data (Liang and Zeger, 1986; Lipsitz, Fitzmaurice, Orav and Laird, 1994). For GEE models, we must specify a distribution from which the dependent variable is drawn, a link function, and a correlation structure. We choose an identity link function to connect export intensity to specified covariates and a first-order autoregressive correlation structure for all GEE models presented below. Further, we dealt with the heteroskedasticity issue by applying the Huber-White sandwich estimator of variance instead of the traditional variance calculation (White, 1982). The combination of the autoregressive correlation correction and robust variance estimators provides a very conservative test (Henderson, Miller and Hambrick, 2006; Liang and Zeger, 1986; Lipsitz et al., 1994).

We have chosen to report the GEE models as the primary analyses, relative to fixed- and random-effects models<sup>6</sup>, for several reasons. First, this method generalizes quasi-likelihood estimation to the panel data context and provides a better way to deal with the problems of pooling multiple observations over time for each firm (Lu and Ma, 2008). Our dataset has such a structure. Second, GEE is less computationally intensive than either fixed or random effects, so it often proves less subject to instability and convergence problems (Schneper and Guillén, 2004). Third, GEE is more robust than other panel data methodologies because it offers multiple correlation matrix structures to best match the data (Liang and Zeger, 1986). Further, GEE account for correlations between records within the same cluster, which result in improved standard error estimates (e.g. Liang and Zeger, 1986, Schneper and Guillén, 2004). GEE therefore produces more accurate standard errors and more efficient parameter estimators than fixed- and random-effects models (Burton, Gurin and Sly, 1998; Ndofor, Sirmon and He, 2011).

Variance inflation factors (VIFs) in all models are well below 10 and hence do not indicate that multicollinearity may be unduly influencing our results (Kutner et al., 2005).

## **EMPIRICAL RESULTS**

### **Descriptive statistics and correlations**

Table 1 provides the descriptive statistics for the entire dataset and for exporters and non-exporters separately. Exporters are firms that report positive foreign sales in a specific year. Non-exporters are firms that have no foreign sales in a specific year. Note that firms can change from non-exporters to exporters and vice versa over time. In our dataset, 80% of firm-year observations relate to exporters. Their mean level of export intensity is 0.35 which

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<sup>6</sup> As a robustness check, Table A.2 in the Appendix reports the fixed-effects models. We report results with fixed effects as this is the specification retained by the Hausman test.

implies that on average 35% of total sales are foreign sales. Firms are on average 25.90 years old and have a median total assets level of 9.76 million euro (in Table 1 we report the log transformed variables used in the subsequent regressions). Firms that export have a higher total factor productivity than those that do not. Further, exporters are typically larger and older as well. Table 2 gives some information on the industry distribution of the sample firms. It shows that our sample covers a broad range of sub-industries within manufacturing. Table 3 presents the correlations for the entire dataset.

### **Regression results**

Table 4 shows the linear probability models for a firm's decision to export. Four different models are specified. Model 1 includes only the control variables. Model 2 adds the main and squared effect of financial slack. Model 3 tests the linear and squared effect of human resource slack. Model 4 is the fully specified model that includes all linear and squared effects. Given the stability of our results across specifications, our discussion focuses on Model 4.

Consistent with previous literature on the export behavior of firms (e.g., Bernard and Jensen, 2004; Bernard, Jensen, Redding and Schott, 2007; Greenaway and Kneller, 2007; Muûls, 2008, 2012; Muûls and Pisu, 2009 for Belgium; Wagner, 2007; Westhead, 1995), the control variables indicate that firms with a higher total factor productivity, larger firms and firms with a higher debt ratio have a higher probability to export. Furthermore, firms that were exporting in the previous year are also more likely to export again.

We start by asking how financial slack influence the decision to export. The results of Model 4 show that the coefficient for financial slack is positive and significant while the coefficient for financial slack squared is negative and significant. This indicates that the effect of financial slack on the decision to export is non-monotonic. Higher levels of financial slack increase the decision to export, but after a certain critical level they reduce the decision to

export. Further, we ask how human resource slack influences the decision to export. In Model 4, the coefficient for human resource slack is positive and significant, and that for its squared term is negative and significant which also lead to a non-monotonic effect of human resource slack. This means that higher levels of human resource slack increase the decision to export, but after some critical level it reduces the decision to export.

It is important to determine whether the effect of financial slack and human resource slack is truly non-monotonic within the sample's range of financial slack and human resource slack respectively. We determined that the critical point where the relationship between financial slack and the decision to export switches from positive to negative (henceforth, the turning point) is about the 95<sup>th</sup> percentile of financial slack. The turning point for the relationship between human resource slack and the decision to export is about the 84<sup>th</sup> percentile of human resource slack. Thus, the effect of financial slack and human resource slack is non-monotonic and inverse U-shaped. Figure 1, Panel A, also shows that the relationship between financial slack and the decision to export is inverse U-shaped. However, due to the available sample range, the relationship is generally positive but turns negative at high levels of financial slack. Figure 1, Panel B, displays that the relationship between human resource slack and the decision to export is inverse U-shaped.

In order to test if slack resources still play a role in firms' export intensity and export diversity after controlling for the decision to export, we followed Heckman's two-step procedure (1979). This procedure corrects for possible sample selection bias. We calculated the inverse Mills ratio from the selection equation predicting the decision to export and included this ratio in our estimation to test the relation between slack and the export intensity and export diversity respectively. Following the Heckman procedure, we enter the decision to export lagged by one year in the first-stage model (i.e. models concerning the decision to export) but not in the second-stage model. Table 5 presents the estimates for the second stage

concerning the export intensity analyses. Model 1 includes controls only, Model 2 adds the linear and squared effect of financial slack, and Model 3 includes the linear and squared effect of human resource slack. Finally, Model 4 includes main and squared effects of both financial and human resource slack. Table 6 shows the second stage results with export diversity as dependent variable. Model 1 is the base model with all controls. Model 2 adds the linear and squared effect of financial slack and Model 3 adds the linear and squared effect of human resource slack. Finally, Model 4 shows the results of the full model which includes the linear and squared effects of both financial and human resource slack. We will use the full model to discuss our results.

With respect to the control variables, the inverse Mills ratio is positive and significant which indicates that the correction for sample selection is necessary when modeling export intensity and diversity. Table 5, Model 4, also indicates that firms will reach a higher level of export intensity when they are more productive and have a higher export intensity in the previous year. Firm age has a negative and significant relationship with export intensity. Further, Model 4, Table 6, shows that total factor productivity, size, lagged performance, debt ratio and the export diversity in the previous year are strongly positively associated with export diversity.

First, we examine the relationship between financial slack, human resource slack and export intensity. The results in Model 4 in Table 5 reveal that the linear and squared effects of financial slack are not significant. Furthermore, the results show that the linear and squared effects of human resource slack are also not significant. We thus fail to find any relationship between financial slack or human resource slack and export intensity. Second, we examine the relationship between financial slack, human resource slack and export diversity. Model 4 in Table 6, which presents the results for export diversity, shows a positive significant coefficient of financial slack and a negative significant coefficient of financial slack squared. This

indicates that the effect of financial slack is non-monotonic. Higher levels of financial slack increase the export diversity, but after some critical level they reduce the export diversity. Further, Model 4 also presents a positive significant effect of human resource slack and a negative significant effect of human resource slack squared. This also leads to a nonmonotonic effect of human resource slack which means that higher human resource slack increases the export diversity, but after some critical level it reduces it.

We determined that the turning point where the relationship between financial slack and export diversity switches from positive to negative is about the 95<sup>th</sup> percentile of financial slack. The turning point for the relationship between human resource slack and export diversity is about the 85<sup>th</sup> percentile of human resource slack. Therefore, we conclude that there are inverted U-shaped relationships between financial slack and export diversity and between human resource slack and export diversity respectively. Figure 1, Panel E, also illustrates that the relationship between financial slack and export diversity is inverse U-shaped. However, due to the available sample range, the relationship is generally positive but turns negative at high levels of financial slack. Figure 1, Panel F, shows that the relationship between human resource slack and export diversity is inverse U-shaped.

## **CONCLUSION**

Resources play a key role in firms' exporting behavior, such as their decision to sell outside the domestic market and compete in international markets. Resource-based theories, however, indicate that slack resources rather than the absolute amount of resources drive firm expansion and performance. Unfortunately, there is a dearth of research on the relationship between slack resources and firms' exporting behavior. In this study, we therefore address the following research question: how do different types of slack resources, including financial and human

resource slack, influence different dimensions of exporting, including the decision to export, the export intensity and export diversity.

Three key findings emerged. First, we found for both financial and human resource slack an inverted U-shaped relationship with the decision to export. Second, we failed to find a significant relationship between financial slack and export intensity and human resource slack and export intensity respectively. Third, we found inverted U-shaped relationships between financial slack and export diversity and human resource slack and export diversity respectively. Taken together, our results suggest that there are no simple answers to questions, such as *whether, how* and *to what extent* slack resources affect firms' exporting behavior. Rather, our results underscore the importance of considering the different dimensions of exporting in answering these questions.

Our results indicate that the relationship between slack resources and the decision to export is inverse U-shaped. A possible explanation is that slack resources may cover sunk costs associated with the decision to export. Too much slack, however, may encourage managerial complacency and overly optimistic behavior which may negatively influence the decision to export. The relationship between slack resources and export diversity is also inverse U-shaped, but we fail to find any impact between slack resources and export intensity. A possible explanation is the following: Firms diversifying their export business are confronted with higher coordination and governance costs and more diverse cultural environments compared to firms which focus on intensifying their export activities. This means that export diversity is more complex and costly than export intensity. So, slack may help firms by alleviating the transaction costs related with the dispersion of their foreign activities. However, after an optimal level, slack resources may again harm firms' exporting diversity, potentially as a consequence of managerial complacency.



Although this study deepens our understanding of the relationship between slack resources and firms' exporting behavior, it is important to acknowledge several caveats and avenues for future research. First, our findings are limited in context, since our study focuses solely on Belgian manufacturing firms. Although this has the beneficial effect of reducing unobserved heterogeneity, future research would be well served to explore whether our results hold in different geographic and industrial contexts. Second, although this study addresses a number of dimensions to firms' exporting behavior, it does not look at which countries firms move into as they internationalize, when and in what sequence. Examining such internationalization patterns is an important area for future research where slack resources may also play a critical role. They may, for instance, push firms to export to more distant countries rather than simply exporting to neighboring countries.

This study provides policy-makers and practitioners with additional insight into the resource-based factors associated with the decision to export, export intensity and export diversity. Given the strategic importance of exporting and penetrating into foreign markets for firm growth and performance (e.g., Autio et al., 2000; Hitt, Hoskisson and Kim, 1997; Tan and Mahoney, 2005; Tseng et al., 2007), there is an intensive debate on how firms can be encouraged to expand beyond their domestic borders. This study has highlighted the importance of slack resources as antecedents of foreign expansion. Many contemporary researchers adopting a resource-based framework have ignored the importance of resource slack and have focused instead on the absolute amount of resources. More resources, including financial and human resources, will not necessarily help firms to become exporters, nor will it necessarily benefit their export diversity. On the contrary, there are optimal levels of financial and human resource slack which maximize the likelihood of firms becoming exporters and maximize their export diversity. Moreover, providing firms with more financial and human

resources is unlikely to influence their export intensity, once these firms have decided to export.

Today, governments all over the world have implemented policies to boost availability of financial resources. Our study confirms the importance of financial resources in the international expansion of firms, but also demonstrates the need for a broader range of policies. Human resource slack is important for the international expansion of firms as well. Policies which make it easier for firms to attract skilled labour are hence well-advised as they may increase the likelihood of domestic firms moving and competing in foreign markets.

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**Table 1: Descriptive Statistics**

Variables	Overall sample			Exporting sample			Non-exporting sample		
	N	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.
1 Decision to export	30,074	0.799	0.401	24,031	1.000	0.000	6,043	0.000	0.000
2 Export intensity	29,364	0.349	0.334	23,594	0.434	0.320	5,770	0.000	0.000
3 Export diversity (entropy)	30,074	0.830	0.483	24,031	1.039	0.274	6,043	0.000	0.000
4 Number of foreign countries	30,074	2.012	1.345	24,031	2.518	0.995	6,043	0.000	0.000
5 Financial slack <sup>a, b</sup>	30,074	0.012	0.085	24,031	0.011	0.080	6,043	0.017	0.103
6 Human resource slack <sup>a, b</sup>	30,074	0.106	0.225	24,031	0.105	0.211	6,043	0.106	0.274
7 Total factor productivity <sup>b, c</sup>	30,074	11.535	0.654	24,031	11.602	0.646	6,043	11.269	0.617
8 Size <sup>b, c</sup>	30,074	16.251	1.443	24,031	16.492	1.391	6,043	15.289	1.228
9 Age <sup>c</sup>	30,074	3.082	0.676	24,031	3.113	0.673	6,043	2.958	0.675
10 Intangible assets on total assets <sup>b</sup>	30,074	0.010	0.041	24,031	0.011	0.043	6,043	0.006	0.033
11 EBITDA on TA <sup>a, b</sup>	30,074	0.135	0.117	24,031	0.135	0.115	6,043	0.132	0.125
12 Debt ratio <sup>a, b</sup>	30,074	0.636	0.253	24,031	0.641	0.238	6,043	0.617	0.305

<sup>a</sup> Winsorized variable

<sup>b</sup> Lagged variable

<sup>c</sup> Logarithm

Note: Significance levels indicate test results from differences between exporting and non-exporting firms (Chi-square tests or Mann-Whitney tests)

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001



**Table 2: The Industry Distribution**

NACE code	Description	Number of firms	Percentage of firms
10	Manufacture of food products	4,625	15.38
11	Manufacture of beverages	495	1.65
12	Manufacture of tobacco products	167	0.56
13	Manufacture of textiles	2,085	6.93
14	Manufacture of wearing apparel	504	1.68
15	Manufacture of leather and related products	61	0.2
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	977	3.25
17	Manufacture of paper and paper products	932	3.1
18	Printing and reproduction of recorded media	1,395	4.64
19	Manufacture of coke and refined petroleum products	0	0.00
20	Manufacture of chemicals and chemical products	2,473	8.22
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	0	0.00
22	Manufacture of rubber and plastic products	2,077	6.91
23	Manufacture of other non-metallic mineral products	2,563	8.52
24	Manufacture of basic metals	869	2.89
25	Manufacture of fabricated metal products, except machinery and equipment	3,885	12.92
26	Manufacture of computer, electronic and optical products	777	2.58
27	Manufacture of electrical equipment	829	2.76
28	Manufacture of machinery and equipment	2,269	7.54
29	Manufacture of motor vehicles, trailers and semi-trailers	819	2.72
30	Manufacture of other transport equipment	239	0.79
31	Manufacture of furniture	1,027	3.41
32	Other manufacturing	488	1.62
33	Repair and installation of machinery and equipment	518	1.72
Total		30,074	100

**Table 3: Correlation Matrix**

Variables	N	Overall sample <sup>a</sup>															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
1 Decision to export	30,074	1															
2 Export intensity	29,364	<b>0.52</b>	1														
3 Number of foreign countries	30,074	<b>0.86</b>	<b>0.64</b>	1													
4 Export diversity (entropy)	30,074	<b>0.75</b>	<b>0.71</b>	<b>0.92</b>	1												
5 Financial slack <sup>b,c</sup>	30,074	<b>-0.03</b>	-0.01	<b>-0.04</b>	<b>-0.06</b>	1											
6 Financial slack squared <sup>b,c</sup>	30,074	<b>-0.06</b>	<b>-0.03</b>	<b>-0.06</b>	<b>-0.07</b>	<b>0.84</b>	1										
7 Human resource slack <sup>b,c</sup>	30,074	0.00	<b>-0.04</b>	0.01	0.00	<b>0.05</b>	<b>0.06</b>	1									
8 Human resource slack squared <sup>b,c</sup>	30,074	<b>-0.09</b>	<b>-0.08</b>	<b>-0.08</b>	<b>-0.09</b>	<b>0.07</b>	<b>0.08</b>	<b>0.82</b>	1								
9 Total factor productivity <sup>c,d</sup>	30,074	<b>0.20</b>	<b>0.13</b>	<b>0.26</b>	<b>0.31</b>	0.00	<b>0.02</b>	<b>0.08</b>	<b>0.05</b>	1							
10 Size <sup>c,d</sup>	30,074	<b>0.33</b>	<b>0.25</b>	<b>0.41</b>	<b>0.51</b>	<b>-0.18</b>	<b>-0.08</b>	<b>-0.03</b>	<b>-0.09</b>	<b>0.64</b>	1						
11 Age <sup>d</sup>	30,074	<b>0.09</b>	<b>0.05</b>	<b>0.10</b>	<b>0.13</b>	-0.01	-0.01	<b>0.02</b>	<b>-0.02</b>	<b>0.05</b>	<b>0.15</b>	1					
12 Intangible assets on total assets <sup>c</sup>	30,074	<b>0.05</b>	<b>0.03</b>	<b>0.07</b>	<b>0.08</b>	<b>-0.04</b>	<b>-0.02</b>	<b>0.05</b>	<b>0.03</b>	<b>0.10</b>	<b>0.11</b>	<b>-0.07</b>	1				
13 EBITDA on TA <sup>b,c</sup>	30,074	0.01	0.01	0.01	<b>0.01</b>	<b>0.15</b>	<b>0.08</b>	<b>-0.08</b>	<b>-0.06</b>	<b>0.35</b>	<b>-0.03</b>	<b>-0.03</b>	-0.01	1			
14 Debt ratio <sup>b,c</sup>	30,074	<b>0.04</b>	0.00	<b>0.02</b>	<b>0.01</b>	<b>-0.17</b>	<b>-0.13</b>	<b>0.01</b>	0.00	<b>-0.09</b>	-0.01	<b>-0.16</b>	<b>0.04</b>	<b>-0.25</b>	1		

<sup>a</sup> Number of observations overall sample = 30,074. Number of observations for correlations with export intensity = 29,364. Correlations significant at 0.05 level are in bold. Industry dummies and year dummies are not reported.

<sup>b</sup> Winsorized variable

<sup>c</sup> Lagged variable

<sup>d</sup> Logarithm

**Table 4: Results of Linear Probability Models for the Decision to Export**

Variable	Model 1		Model 2		Model 3		Model 4	
	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Financial slack			0.189	*** (0.033)			0.182	*** (0.033)
Financial slack <sup>2</sup>			-0.568	*** (0.095)			-0.541	*** (0.094)
Human resource slack					0.076	*** (0.013)	0.075	*** (0.012)
Human resource slack <sup>2</sup>					-0.141	*** (0.020)	-0.137	*** (0.020)
Total factor productivity	0.012	* (0.005)	0.011	* (0.005)	0.013	** (0.005)	0.012	* (0.005)
Size	0.018	*** (0.002)	0.020	*** (0.002)	0.017	*** (0.002)	0.019	*** (0.002)
Age	0.003	(0.002)	0.003	(0.002)	0.002	(0.002)	0.002	(0.002)
Intangible assets ratio	0.006	(0.031)	0.007	(0.031)	-0.001	(0.030)	0.000	(0.030)
Lagged performance	0.021	(0.016)	0.015	(0.016)	0.018	(0.017)	0.013	(0.017)
Debt ratio	0.018	** (0.007)	0.020	** (0.007)	0.017	* (0.007)	0.018	** (0.007)
Lagged dependent variable	0.785	*** (0.007)	0.782	*** (0.007)	0.781	*** (0.007)	0.779	*** (0.007)
Intercept	-0.287	*** (0.036)	-0.299	*** (0.036)	-0.277	*** (0.037)	-0.288	*** (0.036)
Year fixed effects?	Yes		Yes		Yes		Yes	
Industry fixed effects?	Yes		Yes		Yes		Yes	
N (Company-years)	30,074		30,074		30,074		30,074	
Number of companies	3,391		3,391		3,391		3,391	
Pseudo R <sup>2</sup>	0.6699***		0.6705***		0.6708***		0.6712***	

Where \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, conservative two-tailed tests. Unstandardized regression coefficients and robust standard errors are shown.

**Table 5: Results of GEE Regression Analysis for the Export Intensity**

Variable	Model 1		Model 2		Model 3		Model 4	
	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Financial slack			0.014	(0.020)			0.013	(0.020)
Financial slack <sup>2</sup>			-0.056	(0.071)			-0.047	(0.070)
Human resource slack					-0.001	(0.007)	-0.001	(0.007)
Human resource slack <sup>2</sup>					-0.024	(0.014)	-0.023	(0.014)
Total factor productivity	0.005	(0.003)	0.005	(0.003)	0.009	*	0.008	*
Size	0.003	**	0.003	**	0.002	(0.001)	0.002	(0.001)
Age	-0.005	***	-0.005	***	-0.005	***	-0.005	***
Lagged performance	0.016	(0.010)	0.015	(0.010)	0.008	(0.010)	0.008	(0.010)
Debt ratio	0.004	(0.004)	0.004	(0.004)	0.004	(0.004)	0.004	(0.004)
Lagged dependent variable	0.940	***	0.940	***	0.940	***	0.940	***
Inverse Mills ratio	0.063	***	0.062	***	0.064	***	0.063	***
Intercept	-0.066	*	-0.067	*	-0.084	**	-0.084	**
Year fixed effects?	Yes		Yes		Yes		Yes	
Industry fixed effects?	Yes		Yes		Yes		Yes	
N (Company-years)	18,994		18,994		18,994		18,994	
Number of companies	2,081		2,081		2,081		2,081	
Wald chi-square	164,555.49***		165,137.22***		167,352.10***		167,892.87***	

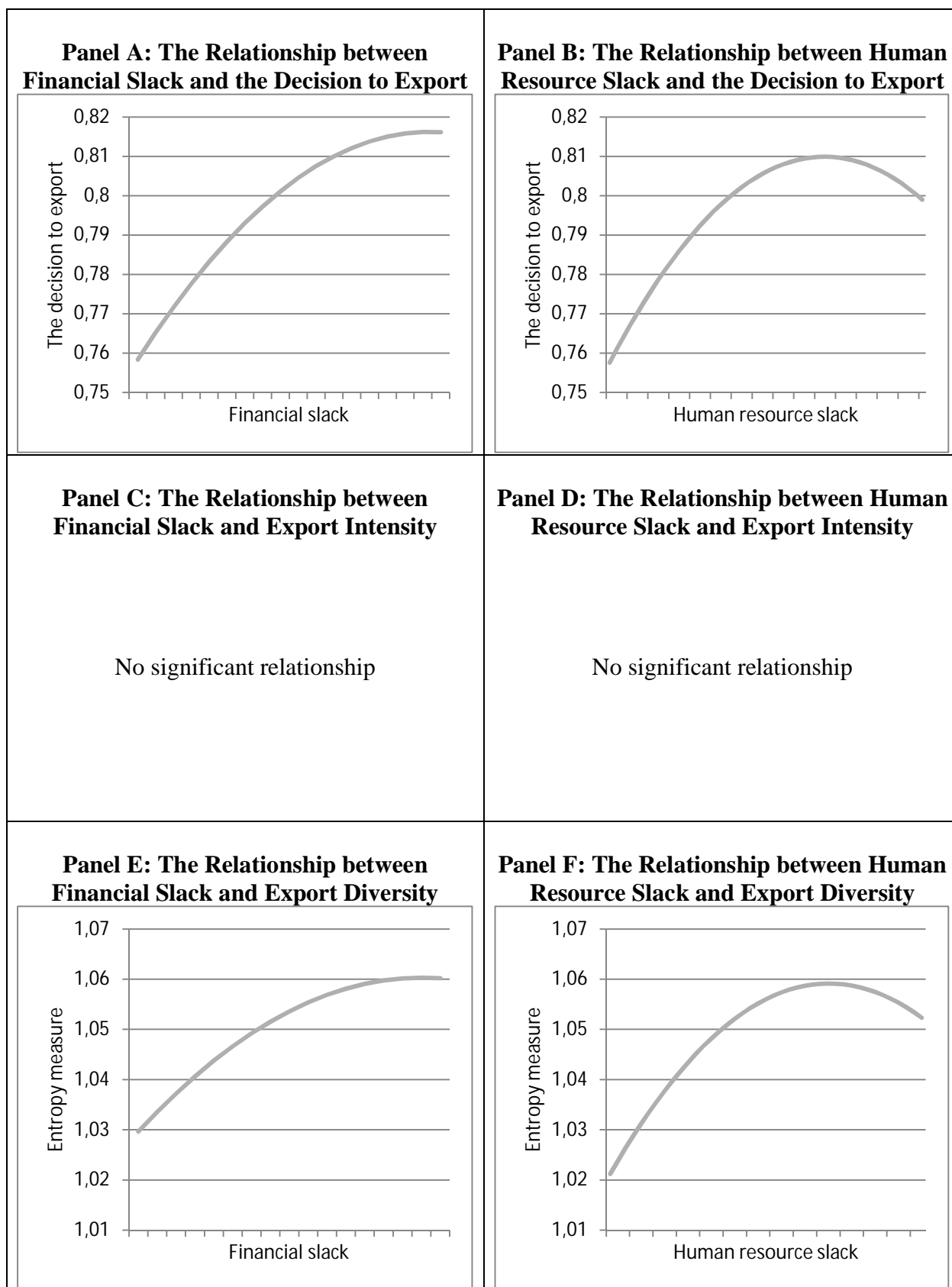
Where \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, conservative two-tailed tests. Unstandardized regression coefficients and robust standard errors are shown.

**Table 6: Results of GEE Regression Analysis for the Export Diversity**

Variable	Model 1		Model 2		Model 3		Model 4	
	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Financial slack			0.109	*** (0.019)			0.104	*** (0.019)
Financial slack <sup>2</sup>			-0.364	*** (0.063)			-0.340	*** (0.063)
Human resource slack					0.064	*** (0.007)	0.062	*** (0.007)
Human resource slack <sup>2</sup>					-0.126	*** (0.012)	-0.120	*** (0.012)
Total factor productivity	0.012	*** (0.003)	0.012	*** (0.003)	0.013	*** (0.003)	0.013	*** (0.003)
Size	0.015	*** (0.001)	0.016	*** (0.001)	0.014	*** (0.001)	0.015	*** (0.001)
Age	0.001	(0.001)	0.001	(0.001)	0.000	(0.001)	0.000	(0.001)
Lagged performance	0.034	*** (0.009)	0.031	** (0.009)	0.030	** (0.009)	0.027	** (0.009)
Debt ratio	0.018	*** (0.003)	0.018	*** (0.003)	0.017	*** (0.003)	0.017	*** (0.003)
Lagged dependent variable	0.915	*** (0.004)	0.915	*** (0.004)	0.914	*** (0.004)	0.914	*** (0.004)
Inverse Mills ratio	0.464	*** (0.009)	0.461	*** (0.009)	0.464	*** (0.009)	0.461	*** (0.009)
Intercept	-0.341	*** (0.022)	-0.347	*** (0.022)	-0.339	*** (0.022)	-0.344	*** (0.022)
Year fixed effects?	Yes		Yes		Yes		Yes	
Industry fixed effects?	Yes		Yes		Yes		Yes	
N (Company-years)	19,007		19,007		19,007		19,007	
Number of companies	2,067		2,067		2,067		2,067	
Wald chi-square	127,340.82***		126,344.71***		127,265.68***		126,474.42***	

Where \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , conservative two-tailed tests. Unstandardized regression coefficients and robust standard errors are shown.

**Figure 1: The Relationship between Different Types of Slack Resources and Different Dimensions to Firms' Exporting Behavior**



Note: Two standard deviations from the means of financial and human resource slack were used.

## Appendix

**Table A.1: Estimates of production function coefficients - Akerberg et al. (2006)  
methodology**

	$\beta_K$	$\beta_L$	N
CA : food products, beverages and tobacco products	0.636 (0.006)	0.087 (0.010)	9,977
CB : textiles, wearing apparel and leather products	0.651 (0.008)	0.078 (0.016)	3,693
CC : wood and paper products, and printing	0.707 (0.007)	0.048 (0.010)	6,969
CD : coke and refined petroleum products	1.253 (0.414)	0.630 (0.237)	71
CE : chemicals and chemical products	0.663 (0.013)	0.092 (0.027)	2,640
CF : basic pharmaceutical products and pharmaceutical preparations	0.796 (0.039)	0.120 (0.014)	486
CG : rubber and plastics products, and other non-metallic mineral products	0.615 (0.007)	0.061 (0.012)	6,394
CH : basic metals and fabricated metal products, except machinery and equipment	0.736 (0.005)	0.058 (0.007)	9,931
CI : computer, electronic and optical products	0.818 (0.022)	0.010 (0.031)	972
CJ : electrical equipment	0.748 (0.016)	0.034 (0.020)	1,245
CK : machinery and equipment n.e.c.	0.743 (0.009)	0.038 (0.015)	3,322
CL : transport equipment	0.799 (0.016)	-0.030 (0.037)	1,149
CM : furniture; other manufacturing; repair and installation of machinery and equipment	0.732 (0.007)	0.060 (0.012)	4,671

Note: 51,520 observations and 7,698 firms over 1997-2009; standard errors in brackets.

**Table A.2: Results of Fixed-Effects Regression Analyses for the Export Intensity and the Export Diversity**

Variable	Export Intensity		Export Diversity	
	Coeff.	Robust S.E.	Coeff.	Robust S.E.
Financial slack	0.000	(0.028)	0.074 **	(0.026)
Financial slack <sup>2</sup>	0.019	(0.090)	-0.258 **	(0.080)
Human resource slack	-0.038	(0.032)	0.050 *	(0.020)
Human resource slack <sup>2</sup>	0.055	(0.060)	-0.135 ***	(0.028)
Total factor productivity	-0.007	(0.006)	0.004	(0.004)
Size	0.025 ***	(0.005)	0.031 ***	(0.004)
Age	-0.004	(0.011)	0.007	(0.010)
Lagged performance	0.004	(0.014)	0.014	(0.014)
Debt ratio	0.007	(0.009)	0.019 *	(0.008)
Lagged dependent variable	0.589 ***	(0.013)	0.422 ***	(0.012)
Inverse Mills ratio	0.024 ***	(0.005)	0.216 ***	(0.008)
Intercept	-0.149	(0.092)	-0.005	(0.070)
Year dummies		Yes		Yes
N (Company-years)		23,587		24,031
Number of companies		2,901		2,927
R <sup>2</sup>		0.841		0.752

Where \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , conservative two-tailed tests. Unstandardized regression coefficients and robust standard errors are shown.



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