The impact of intangible capital on the productivity of small firms

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Abstract

In spite of mounting evidence in support of the role of intangible capital on firm performance some research gaps remain. This paper focuses on the link between intangible capital and firm performance with a particular focus on the effect firm size has on the relationship by studying the population of Slovene enterprises between 2007 and 2020. We find that while intangible assets are positively associated with productivity, but the link is by no means linear. Furthermore, micro firms appear to benefit most from investing in intangible assets, while the effect is less robust for SMEs and large firms. Amongst different types of intangible assets, the strongest effect on productivity was found for investment in property rights and good will, while long-term deferred development costs had a weaker effect on firm productivity.

Keywords: intangible capital, productivity, firm size

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Introduction

Intangible capital has long been recognized as the key to strong economic performance. Over a century ago Veblen (Veblen, 1908) defined intangible assets as »immaterial items of wealth, immaterial facts owned, valued, and capitalized on an appraisement of the gain to be derived from their possession.« However, measuring the intangible has been a challenge, which contributed to the delayed empirical evidence on the role of intangibles for productivity. Literature on the role of intangible assets in economic development and their contribution to economic growth, sectoral dynamics and firm performance began emering in 1960s and 1970s, stressing that a notable proportion of productivity growth cannot be completely explained by standard productivity growth elements (capital and labour), instead other elements, such as education, skills, R&D could explain it (Griliches, 1980, 1981; Kendrick, 1972) could play an important role. The intangible capital literature continued to develop steadily also in the 1980s and 1990s, studying for example the role of advertising, internationalization, market entry, firm valuation, goodwill, market strategy, firm competencies, firm performance and profitability (Barrett, 1986; Barwise et al., 1990; Harvey & Lusch, 1997; Hirschey, 1982; Hula, 1989; Kumar, 1987; Lefcbvre et al., 1996; Patterson & Hayenga, 1995). But the literature gained momentum with the research of Lev (2001) and Nakamura (1999) and primarily the seminal definition of intangible capital by (Corrado et al., 2006, 2009a) which divided intangible capital into three broader categories, which are: (1) computerized information, (2) innovative property, and (3) economic competencies. The literature has since been developing fast, both methodologically, investigating sources of data, measurement approaches and definitions (Awano et al., 2010; European Commission, 2014; Globalinto, 2021; Perani & Guerrazzi, 2012; Piekkola, 2011b) as well as providing evidence of the size of the investment into intangibles as wel as their contribution to growth at national and sectoral (Corrado et al., 2009b, 2016; Fukao et al., 2009; Piekkola, 2011a; Roth & Thum, 2013; Tsakanikas et al., 2020) as well as firm level (Bontempi & Mairesse, 2015; Chappell & Jaffe, 2018; Crass et al., 2015; Drenkovska & Redek, 2015; Kaus et al., 2020; Prasnikar et al., 2017; Rico & Cabrer-Borrás, 2020).

While evidence on the impact of intangible capital on economic performance and productivity is already abundant, there is very scarce evidence on the role of intangible assets and intangible investments in primarily small and medium firms. Data shows that the distribution of intangible

investments and assets is heavily right skewed, primarily to the benefit of large firms, while the vast majority of firms invests little or even nothing (Kaus et al., 2020). Evidence also suggests that in small and medium firms, the investment in intangible assets is very often »minor because they tend to consider intangible investment as an inefficient cost and concentrate on investments in tangible assets« (Seo & Kim, 2020), although also in smaller firms the intangible assets do contribute to productivity. But the research on the role of intangibles in micro, small and medium firms (in continuing MSMEs) is still scarce, especially in the literature for the emerging economies.

This paper further investigates the nature of intangible assets and investments in micro, small and medium companies in Slovenia with the focus to determine the differences in the intensity of intangible investments by firm size class as well as its contribution to firm productivity, while not focusing only on the aggregate intangible assets but looking into more detail also the contribution of intangible capital components. Methodologically, the analysis relies on the population data of Slovenian companies in the period between 2007 and 2020, using their detailed financial statements data.

The paper makes several contributions to the literature. First, it adds to the understanding of the importance of intangible investments for productivity growth also in micro firms, which is from managerial and policy perspective especially important in view of the knowledge economy and knowledge-intense services, where micro and small firms are more prevalent. Second, it is to the best of our knowledge the first such regional study, focusing on the CEE or SEE economy. Given the importance of the small business sector in the region, the results again make important implications also for the process of catching up with the most developed in the EU and firms maintaining their competitive positions in global value chains. Third, it is the first such study that investigates both the total intangibles as well as components of intangible capital. The analysis also uniquely relies on a population-wide dataset, which contributes to the validity and possibility to generalize the results.

In continuing, first the theoretical background is provided and research hypotheses developed. This is followed by the explanation of the empirical methodology. The results are discussed in the third section. The paper ends with a discussion and conclusions.

Theoretical background

Defining intangible capital. While the contribution of intangible capital to aggregate, sectoral and firm performance has been long aknowledged (Budworth, 1989; Chudnovsky, 1979; Cox, 1977; Eisner, 1978; Kendrick, 1972; Veblen, 1908), the empirical analysis gained momentum primarily with rise of the knowledge economy (Farrell, 2003; Guthrie et al., 2001) and the seminal works of Nakamura (1999) who argued that spending on intangibles should be capitalized since they generate future value and as such are in fact investments, and Lev (2001) that provides the first economic framework to analyze managerial and investment issues regarding intangible assets and their impact on corporate performance and market values. The literature at the time, despite struggling to provide a unified definition, predominnatly focused on the contributions of R&D, brand value and economic competences (Ballot et al., 2001; Bobillo et al., 2006; Johnson et al., 2002; Leliaert et al., 2003; Lev, 2004; Lev & Sougiannis, 1996a, 1996b). Despite the literature usually being focused on a specific component of intangible capital, these elements established themselves as the »core« of intangibles also in the now wide-spread definition of intangibles (Corrado et al., 2006). According to Corrado et al. (2006) intangible capital comprises: 1) computerized information (computer software, computerized databases), 2) innovative capital (primarily R&D, but also other innovative expenditure), 3) economic competencies (brand equity, firm-specific human capital and organizational structure).

Impact of intangibles on firm performance. To provide empirical evidence on the role of intangible capital to firm productivity and performance, measuring intangible capital was the first obstacle. Several options were available to comprise measures of intangible investment (1) industry level data with input-output approach (Corrado, Hulten, et al., 2005; Corrado, Haltiwanger, et al., 2005; Roth, 2010, 2020), (2) firm-level survey data (Awano et al., 2010; European Commission, 2014; Globalinto, 2021; Perani & Guerrazzi, 2012; Prašnikar, 2010) and (3) measures of intangible capital based on population administrative dataset (Ilmakunnas &

Piekkola, 2014a; Piekkola, 2011b). Various estimates of intangible investments have shown that the actual investment varies significantly between countries, ranging from 5 to even 13 % of GDP (see for example (Roth & Thum, 2013; Tsakanikas et al., 2020; van Ark et al., 2009)), however the contribution of intangible capital to economic performance, usually measured with productivity, is strong and positive. Initial estimates showed that intangible capital contributed around a quarter total productivity growth in the six investigated EU economies and US and UK in the period between 1995 to 2006. For example, on average in Germany, France, Italy, Spain, Denmark and Austria, productivity grew on average by 1.32% per year and the contribution of intangible capital deepening was 0.3 percentage points. In the US productivity grew on average by 2.96% per year and intangible capital contributed 0.83 percentage points (van Ark et al., 2009). Also Roth and Thum (2013) estimates show a positive as well as robust relationship between intangibles and labour productivity growth. In addition, authors stress that adding also the intangibles helps explain a large proportion of the unexplained variance – the latter decreases even 51%. Corrado et al. (Corrado et al., 2018) investigate the period between 2000 and 2013 and find that during the crisis, the intangible investments were relatively resilient, while tangible investment fell. Intangible investment also bounced back relatively fast. This is consistent with the estimates of Roth (2020) who investigated in detail the behaviour of intangible investment in the period between 2000 and 2014. The results first show that the tangible investment was significantly more affected by the 2009 crisis, especially in some countries, Greece, Spain, Italy, Portugal and Slovenia. On the other hand, intangible investments declined moderately and soon regained growth. In some countries (e.g. Ireland, Austria, Germany, France and Sweden, there was only a moderate decline in 2009, but then growth resumed. The estimates also confirm that intangibles had a strong and positive contribution to productivity growth.

A number of papers at the firm level also confirm the existence of the link between intangible capital and firm productivity. For example, Kaus et al. (2020) find that firms that invest more in intangibles are more productive. They particularly stress the contribution of R&D, while software and patent investment are less important. They also identify big differences between industries and firms and stress that the impact of intangibles is more positive with firms with high focus on intangibles. Di Ubaldo and Siedschlag (2020) firm-level data from Ireland between 2006 and 2012. The restults show that the estimated average elasticity of productivity with respect to investment

in knowledge-based capital per employee is 0.3. Nakatani (2019) studies the case of New Zealand and shows that for example the impact of R&D became more pronounced after the crisis in 2009 and also find that research and development (R&D) tax incentive contributes to higher profitability performance.

Firm size and impact of intangibles.

The evidence of the impact of intangible capital on firms depending on their size is currently still scarce in the literature. For example, Piekkola and Rahko (2019) use administrative data to measure the impact of innovation inputs, which are defined by intangible capital components. They stress that the relationship between innovative input and profitability is not straightforward – while high-market share companies can derive more profit, those with low market shares derive less profit from new innovations. Kaus et al. (2020) finds that the distribution of intangible investment, is very right-skewed, with many firms investing nothing or very little in intangible investments. They add that firms that invest more in intangible capital are also more productive. Seo and Kim (2020) show that intangible capital (human capital, advertising, R&D) is very important also for SME that want to be very productive. They make a very important note on the perceived lesser importance of intangibles, claiming that managers in SME often »consider intangible investment as an inefficient cost and concentrate on investments in tangible assets«. However their results show that all three types of intangible capital (human capital, advertising, R&D) have a positive effect on firm profitability, with the most pronounced being the impact of advertising.

Based on the above discussion and the relevant literature at large, we will take advantage of the data on the population of Slovene enterprises to (i) explore the distribution of intangible assets across firms, (ii) see how investment intensity in intangible assets is related to firm size and (iii) explore the effect of intangible assets of performance of micro and SME firms. Given the findings of the literature we expect intangible capital to be highly concentrated even when compared to fixed assets. Moreover, given existing evidence, we expect a consierable proportion of firms will have no intangible capital at all. Given the size-treshold for investments in intangible capital, we expect micro, small and medium-sized firms to be less likely to invest in intangible capital. Those

micro and SME firms that do invest in intangible assets will experience a positive performance effect.

Research design

Data and methodology. The analysis relies on the population data of Slovenian companies in the period between 2007 and 2020 (AJPES, Agencija Republike Slovenije Za Javnopravne Evidence In Storitve, 2021a). The database comprises balance sheet and income statement data for the whole population of Slovenian limited liability and joint stock companies, which includes depending on a year around 50-60 thousand companies. The balance sheet and financial statements data comprise also data on intangible capital as captured by the International accounting standards.

To analyse the population of enterprises, several different approaches were used. First, descriptive statistics were prepared. To study the contribution of intangible investment and assets to the productivity of firms, several categories of intangible assets were considered: total intangible assets, property rights and long-term deferred development costs. The total intangible assets according to the International accounting standards, the category of Intangible assets incorporates: (a) Intelectual property rights, (b) Goodwill, (c) Active long-term deferred development costs and (d) Other intangible assets. The active long-term deferred development costs are often used to incorporate R&D into the assets or capitalize the assets. In the estimations, the total intangible assets, IP and deferred development costs will be used to estimate the contribution to productivity as these, as will be shown, represent the major parts of intangible assets.

To estimate the importance of intangible capital for firm productivity, regression analysis was used. The regressions followed the standard approach. In order to explore the impact intangible assets have on firm performance, we focus on exploring the correlation between firm productivity and intangible assets. We estimate a relatively parsimonious production function:

$$\ln (sales)_{it} = \alpha + \beta_1 \ln (capital)_{it} + \beta_2 \ln (material\_costs)_{it} + \beta_3 \ln (employ)_{it} + \beta_4 Int\_cap\_sh_{it} + \beta_5 exp_{it} + \gamma I + \delta T + \varepsilon_{it} \quad (1)$$

Where $sales_{it}$, $capital_{it}$, $material\_costs_{it}$ and $employ_{it}$ are sales revenue, fixed assets and expenditure on materials and services (all in EUR), respectively, while $employ_{it}$ is the average number of full-time employees. exp_{it} is the exporting status indicator (which takes on value "1" for firms with positive export sales and "0" for firms with no export sales). Depending on specification *Int_cap_sh* either captures the existence of different types of intangible assets at the firm level with an indicator variable for firms with positive (i) assets in long-term property rights, (ii) assets in good-will, and (iii) assets in long-term deferred development costs or the share of individual components (i)-(iii) in total fixed assets. We also control for time (T) and industry (I) fixed effects in all specifications. ε_{it} is the error term. Given the likely high correlation between components of intangible assets, we estimate (1) separately for each of the three regressions. While our benchmark estimates rely on the OLS estimator, we also control for (unmeasurable) time-invariant firm-specific factors by estimating a fixed-effects version of model (1).

Data. In total, the database contains roughly 850 thousand observations over the period of 14 years. The average observed company had 7.75 employees, while the median was much smaller with only 1 employee. Average sales was 1.3 million euros per company, but 50% of companies sold 70 thousand or less. On average over the entire period, the observed value added per employee was 34.5 thousand euros, but median company only had value added of around 23 thousand euros per employees. Table A1 provides further detail about the basic descriptive variables.

Results

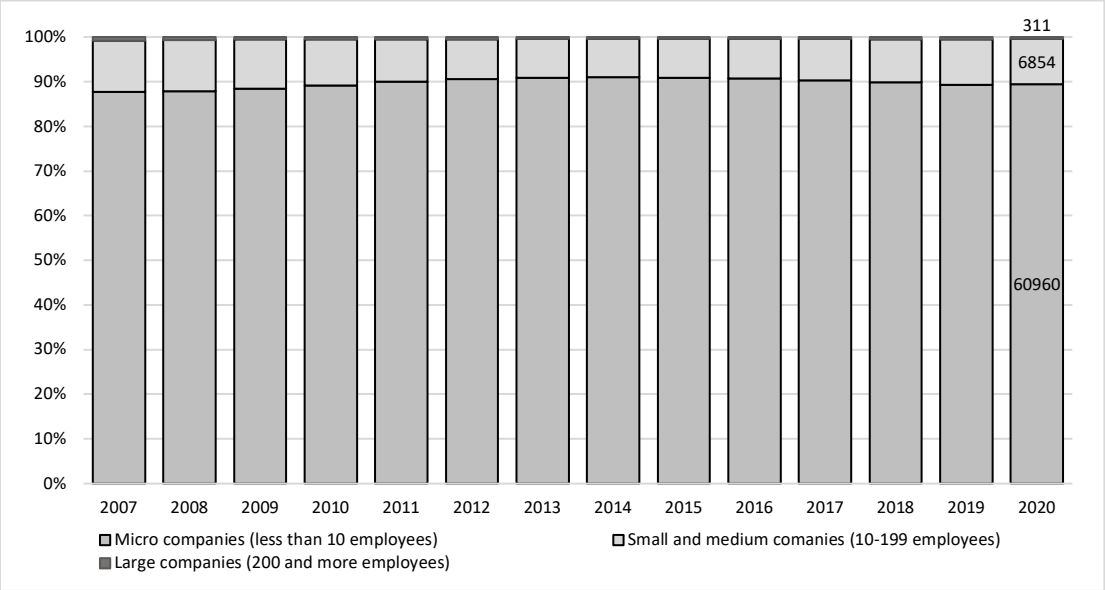
Characteristics of intangible investment in Slovenian firms

Size structure of the observed population. The analysis focuses on limited liability or joint stock companies (and excludes self-proprietors). These represent around 50% of total population of Slovenian companies.[3] The observed population of companies comprised predominantly micro

[3] While the number of self-proprietors is large (50 of 120 thousand in 2020), their relative economic importance is smaller. On average they have 0.7-0.8 employess, but 2/3 have no employees. In 2019, the largest companies, which represent around 0.2% of all companies (including self-properitors) contributed in total around 1/3 of total employment and 1/3 of total revenue in the economy. Medium companies contributed another third.

companies, which represented between 87 and 90 % of the observed population (Figure 1). Small and medium companies with 10-199 employees, represented around 10% of the population, while the 300 large companies represented only around 0.5 percent of the population. On average, the observed micro companies had in 2020 1.6 employees with average company sales of almost 300 thouand euros. Small and medium companies had on average 32.7 employess with average yearly sales of 5.95 million and the large companies on average had 602 employees and sales of 249 million (details provided in Table A2).

Figure 1. Number of observed companies by size

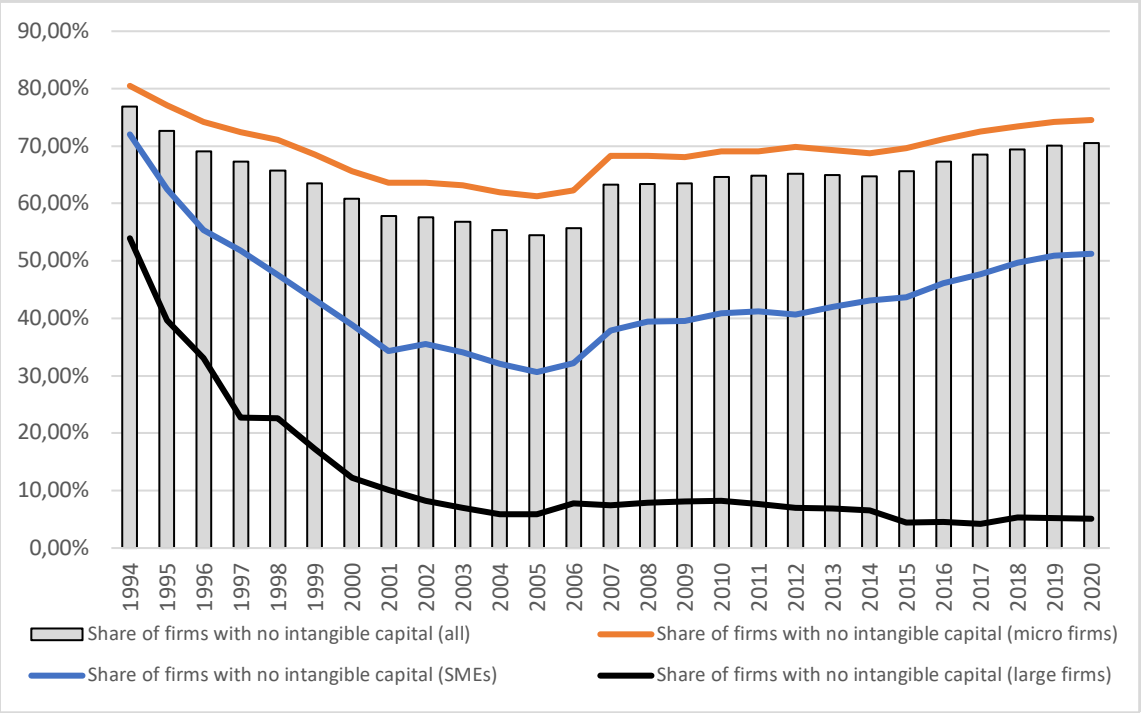


Source: AJPES data and own calculations

Intangible assets by firm size. On average, in 2020 around 70 % of all companies reported no intangible assets. The share and their absolute number has been increasing since 2006. If in 2007 the share of firms with no intangible capital was 55.6 %, the share rose to 70.5% by 2020. This can be explained by the increase in the share of MSMEs in the total number of firms (Figure 1) and the fact that MSMEs are less likely to invest in intangible assets, in particular micro companies (Figure 2). Even 74.5 % of micro firms had no intangible assets in 2020. As companies grow, they also invest into intangibles – as the share of the SMEs with no intangibles is »only« 54%. Intangible investment in Slovenia is comparatively most important in large firms. Since 2001 the share of large firms with no reported intangible assets declined from 10 to 5 %. Knowing that

there are around 300 large firms, this implies around 15 large companies with no reported intelectual property rights, goodwill, active long-term deferred development costs or other intangible assets. For example, in 2020, there were 5 such companies in manufacturing and 3 in retail (NACE G) and 3 in NACE N, in total 16 such companies.

Figure 2. Share of firms with no intangible capital by firm size

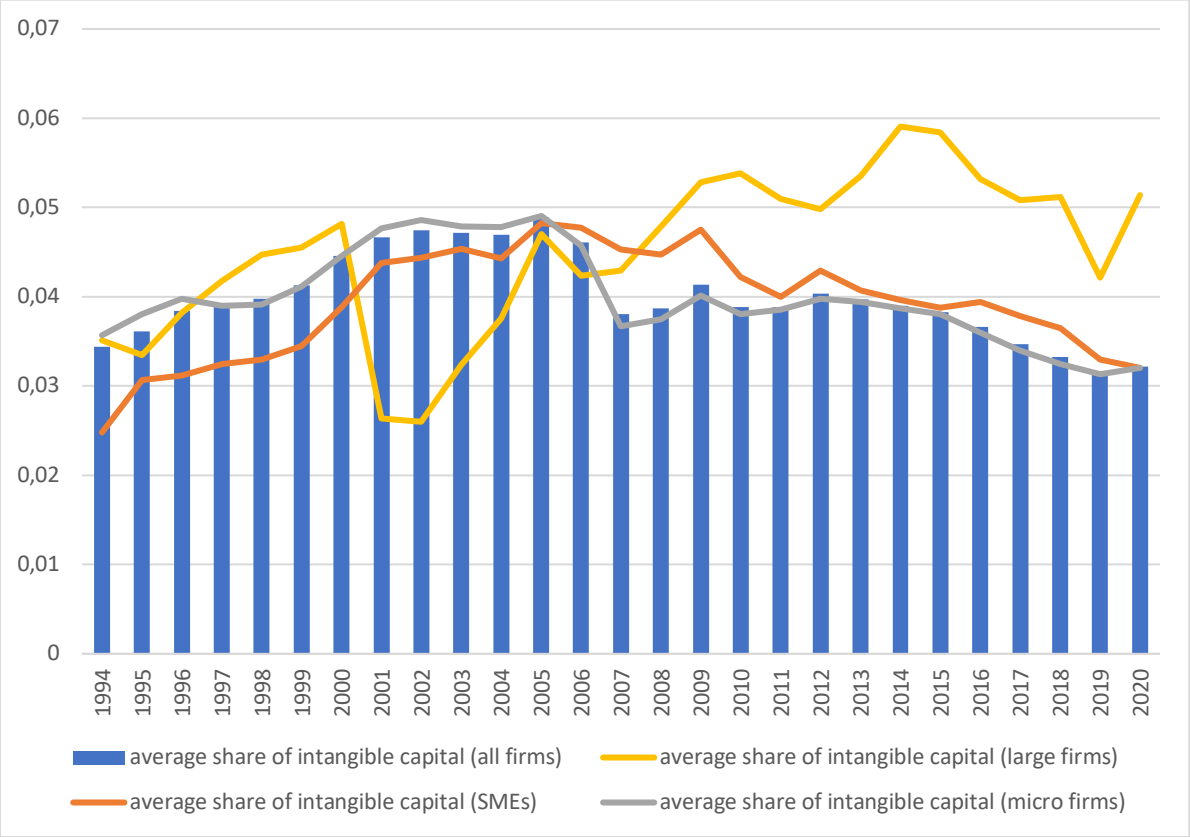


Source: AJPES data and own calculations

The share of intangible capital in total assets in Slovenia has been increasing rapidly between 1994 and 2005. In 1994, the share of intangible capital represented about 3.4% of all firm assets. By 2005 it reached 4.8%. This was a period of fast growth in Slovenia, economic transformation and accession to the EU (2004). Between 2006 and 2007 economic growth as well as investments accelerated, but due to the focus on tangible investment, primarily investments into »core« activities (Griliches, 1980; Griliches & Mairesse, 1991; Kendrick, 1972), the share of intangible assets in total firm assets declined. The period during and after the 2009 crisis was marked with a general decline in investment rate. The share of investments in GDP declined from even 29.4% in 2008 to around 19% on average (Statistični urad Republike Slovenije, 2021). While the tangible investments declined significantly, which was particularly evident in Slovenia, the share of

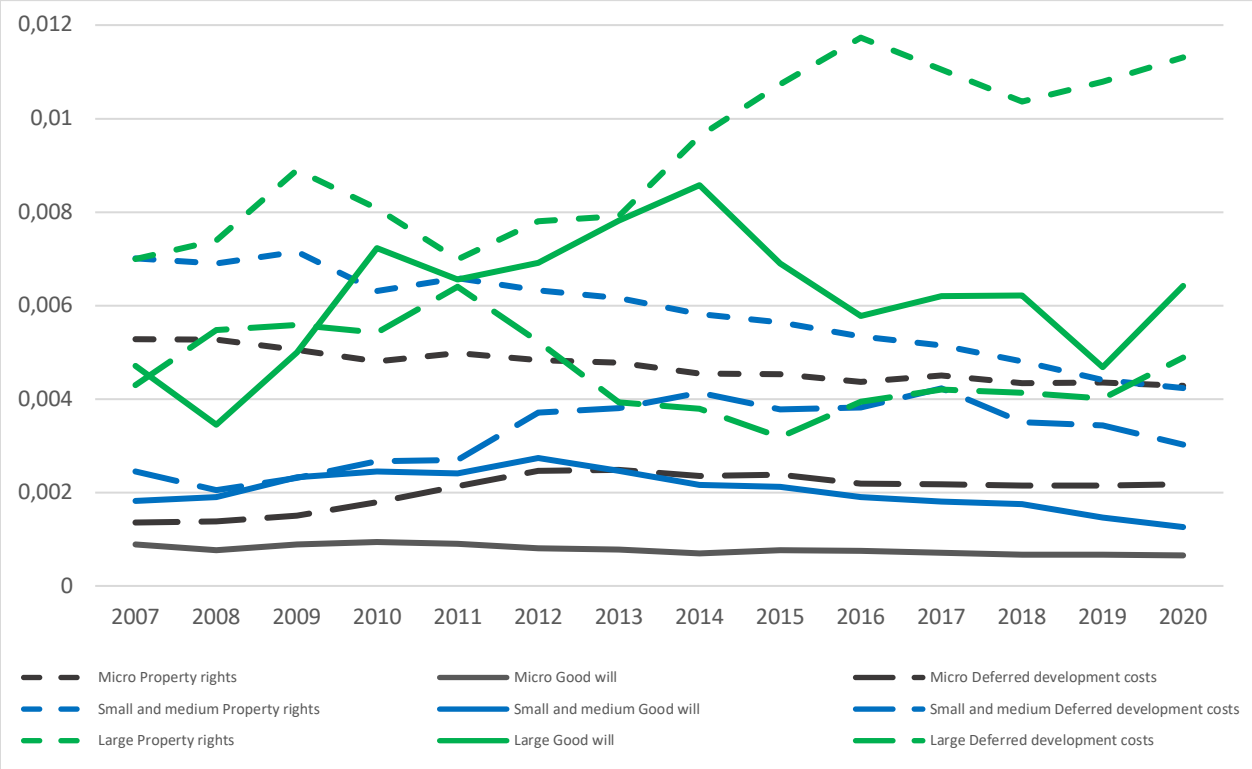
intangible investments remained relatively stable (Roth, 2020). The investment cycle in Slovenia, especially in terms of tangible investments was determined primarily by the investment dynamics in large firms (Prašnikar, 2010, 2012), the granularity seems to be a major factor driving also intangible investments, also the relationship is not as straightforward as in case of tangible investments, where the investment was significantly more pronounced in large companies. Intangible assets in large firms represented around 5 % of assets on average after 2008, and the share has been increasing. In small and medium companies and in micro companies the share of intangible assets has been declining. If in 2005 the share was around 5 %, it declined to only 3.2 % by 2020 (Figure 3). Especially in micro companies, the decline is sharp in the period between 2005-2007, which marks the process of strong investment cycle in tangible capital (Bole et al., 2018). In addition, the decline could be perceived by the bias of micro, small and medium companies towards tangible investments, as the intangible is perceived as less efficient (H. Seo & Kim, 2020).

Figure 3. The share of intangible capital as percent of fixed assets, 1994-2020



Source: AJPES data and own calculations

Figure 4. The share of intangible capital as percent of fixed assets by type of intangibles, 2007-2020



Source: AJPES data and own calculations

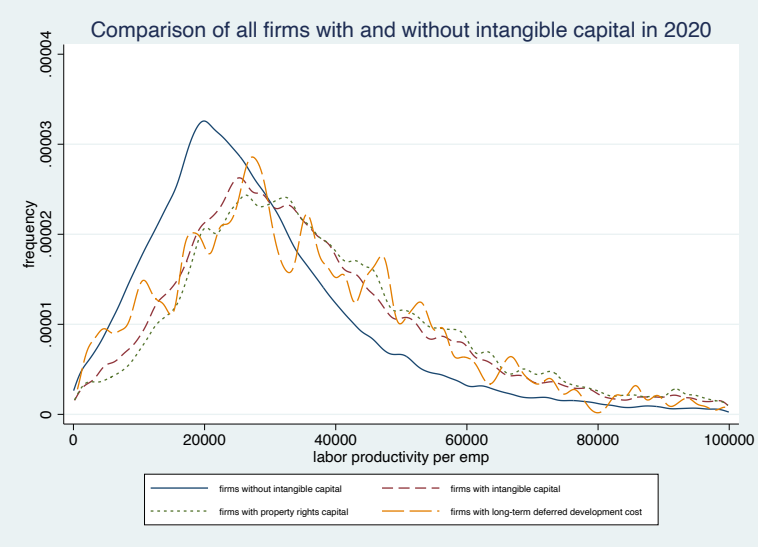
A closer look into the structure of intangible assets (Figure 4) reveals that micro firms invested least on average in all three categories of intangible assets: good-will, property rights and deferred development costs. For example, in terms of development costs, micro companies on average had about 3 times lower share of development costs as share of assets in comparison to small and medium companies in the entire observed period between 2007 and 2020: 0.21% of all assets in micro companies in comparison to 0.32% in small and medium and about 0.46% in large companies. Property rights in the observed period on average represented about 0.47% in micro companies, 0.57% in small and medium and 0.92% in large. The difference is most striking in the case of good-will, which in micro companies represented just 0.076% of assets, 0.2% in small and medium companies and 0.61% in large companies. Figure 3 also reveals the trends. The share of intangible assets in the case of all three investigated categories is relatively stable since 2011 for micro companies. In case of small and medium companies, the share of good-will has been declining slightly, the share of propery rights has also been declining steadily, while the

development costs increased significantly between 2007 and 2011, but then remained around the new higher level. In the case of large companies, the most notable trend is the fast increase in the share of property rights. The differences in the intangible capital by type as share of all assets are highly statistically significant in all cases (p<.000), only the significance of the differences in the development costs between small and medium and large companies are significant at 0.0032.

Intangible assets and firm productivity

Generally, intangible capital has been shown to positively impact productivity of firms as well as drive productivity growth at industry and national level (Corrado et al., 2018, 2019; Ilmakunnas & Piekkola, 2014b; Piekkola, 2011a; Tsakanikas et al., 2020). The literature on intangible assets and their contribution to productivity suggests also that intangible assets although often neglected in MSMEs, also significantly contribute to firm performance (Rico & Cabrer-Borrás, 2020; H. Seo & Kim, 2020). The distribution of value added by firms depending on intangible capital and type of intangible capital (Figure 5) shows that in general in 2020 value added per employee was lowest in companies with no intangible capital (median value for companies with intangible capital statistically significantly higher). Similarly is true also if firms have either property right, or long-term development costs. These are investigated in more detail in continuing.

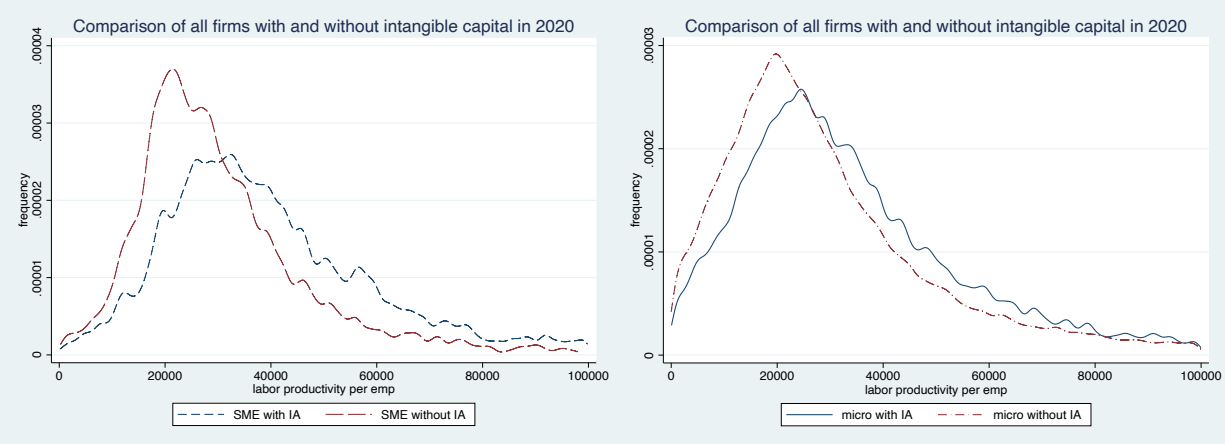
Figure 5. Value added per employee in firms with and without intangible capital



Source: AJPES data and own calculations

Intangible assets were a characteristic of firms with higher value added also if firm size is controlled for (Figure 6). The distribution of value added per employee in small and medium companies with intangible assets had larger median than in firms with no intangible assets (left panel, Figure 4, p=.000). Similarly is true also for micro firms (right panel, p=.000). The distribution for large firms is not depicted due to the small number of firms (16) with no intangible assets.

*Figure 6. Value added per employee in firms with and without intangible capital by firm size for micro and small and medium companies**



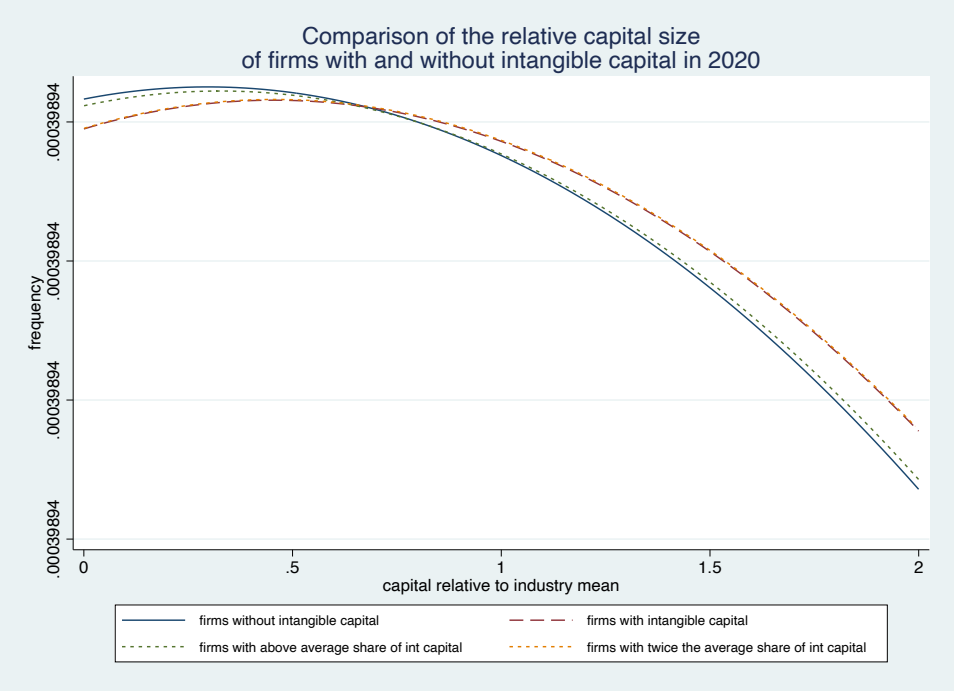
*Distributions for large companies are not shown as there are only 16 large companies with no intangibles in 2020.

Source: AJPES data and own calculations

Besides value added per employee (i.e. productivity), intangible capital also has a positive correlation with employment and relative size of capital (in comparison to industry average) (Figures 4 and 5). Figure 7 depicts the distribution of the relative size of firm capital (relative to the respective annual industry average) for (i) firms with no intangible capital, (ii) firms with intangible capital, (iii) firms with an above average share of intangible capital (in the respective industry) and (iv) firms with at least twice the average share of intangible capital. As expected, the distribution relative capital of firms with intangible capital stochastically dominates that of firms with no intangible capital. On the other hand, firms with above average share of intangible capital appear to be relatively smaller (compared to the average firm with intangible capital), while relative capital of firms with twice the average share of intangible capital only marginally exceeds

that of all firms with intangible capital. This confirms our finding that a critical size of firm capital is key for effective use of intangible capital and that the effect of the share of intangible capital on firm performance is likely not linear.

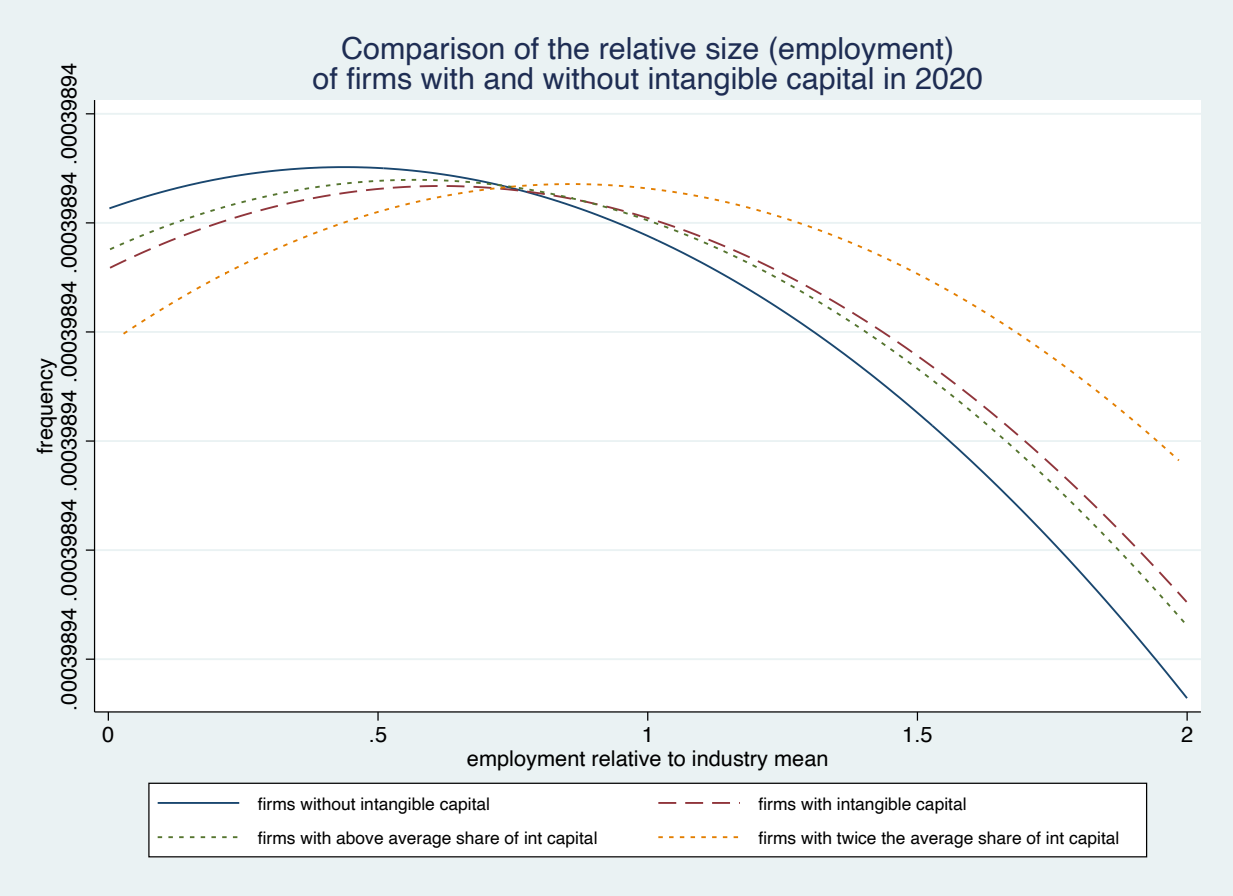
Figure 7. Relative size of capital of firms with and without intangible capital in comparison to industry average in 2020



Source: AJPES data and own calculations

Figure 8 looks at the relative size of firms with respect to employment by focussing on the same for cohorts as above. As was the case with relative size of capital, firms with intangible capital tend to employ more than those without intangible capital. There is a substantial difference in terms of the size of firms with at least twice the average share of intangible capital compared to the average firm with intangible capital, while firms with above average shares of intangible capital perform slightly worse than firms with intangible capital. Again, it is obvious that the effect of intangible capital on employment is not linear.

Figure 8. Relative size of firms with and without intangible capital in terms of employment in comparison to industry average in 2020



Source: AJPES data and own calculations

The association between intangible capital and firm performance indicators (size and productivity) is clearly strong, but it is likely to be non-linear. While firms with intangible capital tend to also be larger and more productive than those without it, the share of intangible capital does not (linearly) predict either size or productivity. A closer look at the correlation between firm performance and availability of intangible capital is needed with a special focus on the effect firm size has on the relationship. In order to gain further insight into the differential effect of firm size on the link between intangible capital and firm performance, we focus on regression analysis next.

Regression analysis

To determine the impact of intangible investment of firm performance, a standard productivity approach was used, as described by equation (1). To measure intangible capital and its impact, the components of intangible capital were used: (a) Intelectual property rights, (b) Goodwill, (c) long-term deferred development costs and (d) their totals (property rights and long term deferred development costs, property right, good will and long term deferred development costs).[4]

The estimates presented in Table 1 show that, in addition to the standard production-function determinants of firm output (capital, material costs and employment), intangible assets also positively effect firm sales. While the effect of intangible assets on sales is generally positive, it is only significantly different from zero in case of total intangible assets share (column 5), the share of property rights (column 1) and the share of property rights and long-term deferred development costs (column 4). Ownership of property rights on intelectual property in particular appears to be highly correlated with firm productivity[5], while long-term deferred development costs and good will, while positive, are not significantly correlated with firm productivity. This may be an indication of the fact that good will mainly reflects the difference between the market value of the firm and its book value, which may not have an immediate effect on firm productivity, while long-term deferred development costs may serve as an accounting catch-all category for development projects of longer duration, which, again, may cause a lack of correlation with current productivity. In addition, we find a strong negative correlation between the squarred term of intangible asset shares and firm productivity in all specifications. This indicates that the impact of intangible capital on firms productivity display decreasing marginal productivity after a treshold level of intangible capital has been exceeded.

[4] The category »Other intangible assets« was excluded from the regression analysis due to concerns with the quality of data – only around 5000 companies in total reported the »other« category, with high volatility. In addition, the »other« category is much less clearly defined, includes for example also emmission coupons, value corrections (Agencija Republike Slovenije Za Javnopravne Evidence In Storitve, 2021b) and does as such not represent the intangible capital this analysis is interested in.

[5] After controlling for the impact of production-function determinants in the regression of firm sales, the remaining determinants effectively explain firm productivity.

Table 1. Regression results on the contribution of intangible capital to firm performance (fixed-effects estimates)

	All companies					Small and medium companies					Micro companies				
VARIABLES	$Ln(sales)_{it}$ (1)	$Ln(sales)_{it}$ (2)	$Ln(sales)_{it}$ (3)	$Ln(sales)_{it}$ (4)	$Ln(sales)_{it}$ (5)	$Ln(sales)_{it}$ (6)	$Ln(sales)_{it}$ (7)	$Ln(sales)_{it}$ (8)	$Ln(sales)_{it}$ (9)	$Ln(sales)_{it}$ (10)	$Ln(sales)_{it}$ (11)	$Ln(sales)_{it}$ (12)	$Ln(sales)_{it}$ (13)	$Ln(sales)_{it}$ (14)	$Ln(sales)_{it}$ (15)
$Ln(material\ costs)_{it}$	0.698***	0.697***	0.698***	0.697***	0.697***	0.648***	0.648***	0.648***	0.648***	0.648***	0.708***	0.708***	0.707***	0.708***	0.707***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Ln(capital)_{it}$	0.017***	0.017***	0.017***	0.017***	0.017***	0.017***	0.017***	0.017***	0.017***	0.017***	0.016***	0.016***	0.017***	0.016***	0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Ln(employment)_{it}$	0.295***	0.295***	0.295***	0.295***	0.295***	0.348***	0.348***	0.348***	0.349***	0.349***	0.280***	0.280***	0.280***	0.280***	0.280***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Share of property rights $_{it}$	0.042**						0.014					0.049**			
	(0.019)						(0.030)					(0.024)			
$(Share\ of\ property\ rights)_{it}^2$	-0.062**						-0.027					-0.060**			
	(0.024)						(0.041)					(0.029)			
Long-term deferred dev. cost share		0.001						-0.086*					0.002		
		(0.039)						(0.045)					(0.054)		
(Long-term deferred dev. cost share)2		-0.103**						0.001					-0.077		
		(0.048)						(0.062)					(0.064)		
Share of good will			0.044						-0.098					0.283***	
			(0.061)						(0.062)					(0.098)	
(Share of good will)2			-0.142*						0.107					-0.431***	
			(0.075)						(0.084)					(0.113)	
Share of property rights and long-term deferred dev.cost				0.035**		-0.033					0.045**				
				(0.018)		(0.026)					(0.022)				
(Share of property rights and long-term deferred dev.cost)2				-0.078***		-0.001					-0.073***				
				(0.022)		(0.035)					(0.027)				
Share of property rights, good-will and long-term deferred dev.cost					0.031*					-0.048**					0.053**
					(0.017)					(0.024)					(0.022)
(Share of property rights, good-will and long-term deferred dev.cost)2					-0.077***					0.021					-0.088***
					(0.021)					(0.032)					(0.026)
Export-status	0.033***	0.033***	0.033***	0.033***	0.033***	0.003	0.003	0.003	0.003	0.003	0.040***	0.040***	0.040***	0.040***	0.040***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Small and medium size (micro is base)	-0.002	-0.002	-0.002	-0.002	-0.002										
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)										
Large companies (micro is base)	0.022**	0.022**	0.022**	0.022**	0.022**										
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)										
Constant	3.495***	3.495***	3.495***	3.496***	3.496***	4.147***	4.145***	4.146***	4.145***	4.147***	3.446***	3.445***	3.446***	3.445***	3.446***
	(0.258)	(0.258)	(0.258)	(0.258)	(0.258)	(0.047)	(0.047)	(0.047)	(0.047)	(0.047)	(0.272)	(0.272)	(0.272)	(0.272)	(0.272)
Observations	352,319	352,319	352,319	352,319	352,319	80,996	80,996	80,996	80,996	80,996	267,044	267,044	267,044	267,044	267,044
R-squared	0.790	0.790	0.790	0.790	0.790	0.816	0.816	0.816	0.816	0.816	0.752	0.752	0.752	0.752	0.752
Number of enterprises	54,447	54,447	54,447	54,447	54,447	12,858	12,858	12,858	12,858	12,858	48,852	48,852	48,852	48,852	48,852
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

If we split the sample by firm size into micro firms (less than 10 employees) and SME's (between 10 and 200 employees), we get a clearer picture of the differential impact of firm size on the respective elasticity of intangible assets. As before, due to the very small population of large firms with no intangible assets, we do not show the estimates for the subsample of large firms. Micro firms are revealed to have the strongest association between the share of intangible assets and firm productivity. Both property rights and good will are revealed to have a strong positive effect on productivity, with the effect being decidedly non-linear. Given the relative share of micro firms in the population of Slovene enterprises, it is clear that the full sample correlations are primarily driven by micro firms. SME's (columns 6-10) generally exhibit weaker correlations, which are in most cases insignifcant. The only exception is the long-term deferred development costs which show a weakly significant negative correlation with firm productivity.

In summary, the impact of intangible capital on firm productivity appears to be very heterogeneous both across firm size, share of intangible capital as well as the amount of capital a firm has[6]. While smaller firms appear to experience a bigger boost to productivity by investing in intangible capital, the effect tends to dissipate somewhat as the share of intangible capital exceeds a treshold value. On the other hand, firms with more capital tend to experience a stronger association between share of intangible capital and productivity.

Discussion and conclusion

Intangible capital in its many incarnations has long been seen as the key factor in a firm's ability to generate value added, improve its market power and provide long-term profitability. While there is ample empirical evidence in support of the positive long-term impact of intangible capital on firm productivity and efficiency, the evidence is mainly focused on medium-sized and large firms and firms in mature Western markets.

[6] Regressions results where the sample was split between the top and bottom quartiles of capital distribution indicate that firms with more capital (top quartile) are likely to experience a positive effect of intangible capital on productivity, while firms in the bottom quartile show no significant correlation. These results were omitted from the paper for the sake of brevity and are available from the authors upon request.

This paper aims to fill the empirical gap in the literature by focusing on a hitherto underexplored data for a former transition country and focus on the effect of firm size on the link between intangible capital and firm performance. Our findings indicate that micro firms with at most nine employees experience the strongest positive association between intangible capital and firm performance, while the effect is less robust for SMEs or large firms. The effect itself is highly nonlinear as its marginal impact tends to weaken after a certain threshold intensity of intangible assets has been passed. Furthermore, not all forms of intangible assets have proven equally effective. Property rights, in particular, and good will to a lesser extent have been shown to have a positive correlation with firm performance, while long-term deferred development costs have been revealed to be less effective.

Our findings lead to some potential policy implications. Firstly, In choice industries small and capital intensive firms were found to benefit most from investing in intangible assets. Stimulating investment in intangible assets would enable firms on the margin to bridge the financing gap and, by making the investment in intangible assets, provide themselves long-term growth potential. Secondly, policies stimulating investment in (intellectual) property rights in particular would seem to be most beneficial. Investment in long-term deferred development costs are found to be the least effective as short-term productivity determinant. Potentially, given a long enough horizon, long-term deferred development costs may impact productivity long term. Lastly, policies stimulating investment in intangible assets should take account of the fact that they display decreasing marginal effectiveness once a threshold level of investment has been exceeded.

References

Agencija Republike Slovenije Za Javnopravne Evidence In Storitve. (2021a). *AJPES Podatkovna baza, zaključni računi podjetij*. https://www.ajpes.si/

Agencija Republike Slovenije Za Javnopravne Evidence In Storitve. (2021b). *Poročanje organizacij, ki računovodijo po SRS, Ajpesu za leto 2020*. https://revijaiks.si/2021/02/Racunovodstvo/clanek/5787034

Awano, G., Franklin, M., Haskel, J., & Kastrinaki, Z. (2010). Measuring investment in intangible assets in the UK: Results from a new survey. *Economic and Labour Market Review*, *4*(7), 66–71. https://doi.org/10.1057/elmr.2010.98

Ballot, G., Fakhfakh, F., & Taymaz, E. (2001). Firms' human capital, R&D and performance: A study on French and Swedish firms. *Labour Economics*, *8*(4), 443–462. https://doi.org/10.1016/S0927-5371(01)00038-0

Barrett, T. F. (1986). Why Not, Why, and How to Value Intangible Marketing Assets. *European Journal of Marketing*, *20*(1), 32–50. https://doi.org/10.1108/EUM0000000004627

Barwise, P., Higson, C., Likierman, A., & Marsh, P. (1990). Brands as "separable assets." *Business Strategy Review*, *1*(2), 43–59. https://doi.org/10.1111/j.1467-8616.1990.tb00010.x

Bobillo, A. M., Rodriguez Sanz, J. A., & Tejerina Gaite, F. (2006). Innovation investment, competitiveness, and performance in Industrial firms. *Thunderbird International Business Review*, *48*(6), 867–890. https://doi.org/10.1002/tie.20126

Bole, V., Oblak, A., Prašnikar, J., & Trobec, D. (2018). Financial frictions and indebtedness of Balkan firms: A comparison with Mediterranean and Central European countries. *Journal of Policy Modeling*, *40*(4), 790–809. https://doi.org/10.1016/j.jpolmod.2018.02.013

Bontempi, M. E., & Mairesse, J. (2015). Intangible capital and productivity at the firm level: A panel data assessment. *Economics of Innovation and New Technology*, *24*(1–2), 22–51. https://doi.org/10.1080/10438599.2014.897859

Budworth, D. W. (1989). Intangible Assets Evaluated. *Science and Public Policy*, *16*(6), 372–373. https://doi.org/10.1093/spp/16.6.372

Chappell, N., & Jaffe, A. (2018). Intangible Investment and Firm Performance. *Review of Industrial Organization*, *52*(4), 509–559. https://doi.org/10.1007/s11151-018-9629-9

Chudnovsky, D. (1979). Foreign trademarks in developing countries. *World Development*, *7*(7), 663–682. https://doi.org/10.1016/0305-750X(79)90080-9

Corrado, C., Haltiwanger, J., & Sichel, D. (2005). *Measuring Capital in the New Economy* (No. corr05-1). National Bureau of Economic Research. https://www.nber.org/books-and-chapters/measuring-capital-new-economy

Corrado, C., Haskel, J., jona lasinio, C., & Iommi, M. (2018). Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth. *Journal of Infrastructure, Policy and Development*, *2*. https://doi.org/10.24294/jipd.v2i1.205

Corrado, C., Haskel, J., & Jona-Lasinio, C. (2019). Productivity growth, capital reallocation and the financial crisis: Evidence from Europe and the US. *Journal of Macroeconomics*, *61*. https://doi.org/10.1016/j.jmacro.2019.04.006

Corrado, C., Haskel, J., Jona-Lasinio, C., & Iommi, M. (2016). *Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth* (No. 2016/08; EIB Working Papers). European Investment Bank (EIB). https://ideas.repec.org/p/zbw/eibwps/201608.html

Corrado, C., Hulten, C. R., & Sichel, D. (2006). *Intangible Capital and Economic Growth* (NBER Working Paper No. 11948). National Bureau of Economic Research, Inc. https://econpapers.repec.org/paper/nbrnberwo/11948.htm

Corrado, C., Hulten, C., & Sichel, D. (2005). *Measuring Capital and Technology: An Expanded Framework* (pp. 11–46) [NBER Chapters]. National Bureau of Economic Research, Inc. https://econpapers.repec.org/bookchap/nbrnberch/0202.htm

Corrado, C., Hulten, C., & Sichel, D. (2009a). Intangible capital and U.S. economic growth. *Review of Income and Wealth*, *55*(3), 661–685. https://doi.org/10.1111/j.1475-4991.2009.00343.x

Corrado, C., Hulten, C., & Sichel, D. (2009b). INTANGIBLE CAPITAL AND U.S. ECONOMIC GROWTH. *Review of Income and Wealth*, *55*(3), 661–685. https://doi.org/10.1111/j.1475-4991.2009.00343.x

Cox, J. G. (1977). Planning for technological innovation part I. Investment in technology. *Long Range Planning*, *10*(6), 40–44. https://doi.org/10.1016/0024-6301(77)90006-1

Crass, D., Licht, G., & Peters, B. (2015). *Intangible assets and investments at the sector level: Empirical evidence for Germany*. Springer International Publishing. https://doi.org/10.1007/978-3-319-07533-4_4

Di Ubaldo, M., & Siedschlag, I. (2020). Investment in Knowledge-Based Capital and Productivity: Firm-Level Evidence from a Small Open Economy. *Review of Income and Wealth*. Scopus. https://doi.org/10.1111/roiw.12464

Drenkovska, M., & Redek, T. (2015). Intangible Capital, Innovation and Export-Led Growth: Empirical Comparative Study of Slovenia and the Western Balkans. *Economic and Business Review*, *17*(1), 25–67.

Eisner, R. (1978). TOTAL INCOMES IN THE UNITED STATES, 1959 AND 1969. *Review of Income and Wealth*, *24*(1), 41–70. https://doi.org/10.1111/j.1475-4991.1978.tb00031.x

European Commission, B. (2014). *Flash Eurobarometer 369 (Investing in Intangibles: Economic Assets and Innovation Drivers for Growth)* (ZA5881). https://doi.org/10.4232/1.11908

Farrell, D. (2003, October 1). The Real New Economy. *Harvard Business Review*. https://hbr.org/2003/10/the-real-new-economy

Fukao, K., Miyagawa, T., Mukai, K., Shinoda, Y., & Tonogi, K. (2009). INTANGIBLE INVESTMENT IN JAPAN: MEASUREMENT AND CONTRIBUTION TO ECONOMIC GROWTH. *Review of Income and Wealth*, *55*(3), 717–736. https://doi.org/10.1111/j.1475-4991.2009.00345.x

Globalinto. (2021). Large scale pilot survey of intangible investments. *GLOBALINTO*. https://globalinto.eu/work-packages/large-scale-pilot-survey-of-intangible-investments/

Griliches, Z. (1980). R & D and the Productivity Slowdown. *The American Economic Review*, *70*(2), 343–348.

Griliches, Z. (1981). Market value, R&D, and patents. *Economics Letters*, *7*(2), 183–187. https://doi.org/10.1016/0165-1765(87)90114-5

Guthrie, J., Petty, R., & Johanson, U. (2001). Sunrise in the knowledge economy: Managing, measuring and reporting intellectual capital. *Accounting, Auditing & Accountability Journal*, *14*(4), 365–384. https://doi.org/10.1108/EUM0000000005869

Harvey, M., & Lusch, R. (1997). Protecting the core competencies of a company: Intangible asset security. *European Management Journal*, *15*(4), 370–380. https://doi.org/10.1016/S0263-2373(97)00017-0

Hirschey, M. (1982). Advertising and the profitability of leading and following firms. *Managerial and Decision Economics*, *3*(2), 79–84. https://doi.org/10.1002/mde.4090030205

Hula, D. G. (1989). Intangible capital, market share and corporate strategy. *Applied Economics*, *21*(11), 1535–1547. https://doi.org/10.1080/758516019

Ilmakunnas, P., & Piekkola, H. (2014a). Intangible investment in people and productivity. *Journal of Productivity Analysis*, *41*(3), 443–456. https://doi.org/10.1007/s11123-013-0348-9

Ilmakunnas, P., & Piekkola, H. (2014b). Intangible investment in people and productivity. *Journal of Productivity Analysis*, *41*(3), 443–456. https://doi.org/10.1007/s11123-013-0348-9

Johnson, L. D., Neave, E. H., & Pazderka, B. (2002). Knowledge, innovation and share value. *International Journal of Management Reviews*, *4*(2), 101–134. https://doi.org/10.1111/1468-2370.00080

Kaus, W., Slavtchev, V., & Zimmermann, M. (2020). Intangible capital and productivity: Firm-level evidence from German manufacturing. In *IWH Discussion Papers* (No. 1/2020; IWH Discussion Papers). Halle Institute for Economic Research (IWH). https://ideas.repec.org/p/zbw/iwhdps/12020.html

Kendrick, J. W. (1972). THE TREATMENT OF INTANGIBLE RESOURCES AS CAPITAL. *Review of Income and Wealth*, *18*(1), 109–125. https://doi.org/10.1111/j.1475-4991.1972.tb00853.x

Kumar, N. (1987). Intangible assets, internalisation and foreign production: Direct investments and licensing in Indian manufacturing. *Weltwirtschaftliches Archiv*, *123*(2), 325–345. https://doi.org/10.1007/BF02706666

Lefcbvre, L. A., Lefcbvre, E., & Harvey, J. (1996). Intangible assets as determinants of advanced manufacturing technology adoption in sme's: Toward an evolutionary model. *IEEE Transactions on Engineering Management*, *43*(3), 307–322. https://doi.org/10.1109/17.511841

Leliaert, P. J. C., Candries, W., & Tilmans, R. (2003). Identifying and managing IC: A new classification. *Journal of Intellectual Capital*, *4*(2), 202–214. https://doi.org/10.1108/14691930310472820

Lev, B. (2001). *Intangibles: Management, Measurement, and Reporting*. Brookings Institution Press; JSTOR. https://www.jstor.org/stable/10.7864/j.ctvcj2rf2

Lev, B. (2004). Sharpening the intangibles edge. *Harvard Business Review*, *82*(6), 109-116+138.

Lev, B., & Sougiannis, T. (1996a). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics*, *21*(1), 107–138. https://doi.org/10.1016/0165-4101(95)00410-6

Lev, B., & Sougiannis, T. (1996b). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics*, *21*(1), 107–138.

Nakamura, L. (1999). Intangibles: What put the new in the new economy? *Business Review*, *Jul*, 3–16.

Nakatani, R. (2019). Firm performance and corporate finance in New Zealand. *Applied Economics Letters*, *26*(13), 1118–1124. https://doi.org/10.1080/13504851.2018.1539805

Patterson, M. D., & Hayenga, M. L. (1995). Valuing intangible assets: Newark and beyond. *Agribusiness*, *11*(4), 371–381. https://doi.org/10.1002/1520-6297(199507/08)11:4<371::AID-AGR2720110408>3.0.CO;2-W

Perani, G., & Guerrazzi, M. (2012). *The Statistical Measurement of Intangible Assets: Methodological Implications of the Results of the ISFOL 2011 Pilot Survey*. mimeo (available upon request from the authors).

Piekkola, H. (Ed.). (2011a). *Intangible Capital – Driver of Growth in Europe*. University of Vaasa. http://www.innodrive.org/attachments/File/Intangible_Capital_Driver_of_Growth_in_Europe_Piekkola(ed).pdf

Piekkola, H. (2011b). Intangible capital: The key to growth in Europe. *Intereconomics*, *46*(4), 222–228. https://doi.org/10.1007/s10272-011-0387-2

Piekkola, H., & Rahko, J. (2019). Innovative growth: The role of market power and negative selection. *Economics of Innovation and New Technology*. https://doi.org/10.1080/10438599.2019.1655878

Prašnikar, J. (Ed.). (2010). *The role of intangible assets in exiting the crisis*. Časnik Finance.

Prašnikar, J. (2012). *Comparing companies' success in dealing with external shocks: The case of the Western Balkans, Mediterranean countries and core European countries*. Časnik Finance.

Prasnikar, J., Redek, T., & Drenkovska, M. (2017). *Survival of the fittest: An evolutionary approach to an export-led model of growth* (Vol. 30). https://doi.org/10.1080/1331677X.2017.1305796

Rico, P., & Cabrer-Borrás, B. (2020). Intangible capital and business productivity. *Economic Research-Ekonomska Istrazivanja*, *33*(1), 3034–3048. https://doi.org/10.1080/1331677X.2019.1699139

Roth, F. (2010). Measuring innovation—Intangible capital investment in the EU. *Intereconomics*, *45*(5), 9–13. https://doi.org/10.1007/s10272-010-0346-3

Roth, F. (2020). *Revisiting Intangible Capital and Labour Productivity Growth, 2000-2015: Accounting for the Crisis and Economic Recovery in the EU* (No. 3; Hamburg Discussion Papers in International Economics). University of Hamburg, Chair of International Economics. https://ideas.repec.org/p/zbw/uhhhdp/3.html

Roth, F., & Thum, A.-E. (2013). Intangible capital and labor productivity growth: Panel evidence for the EU from 1998-2005. *Review of Income and Wealth*, *59*(3), 486–508. https://doi.org/10.1111/roiw.12009

Seo, H., & Kim, Y. (2020). Intangible assets investment and firms' performance: Evidence from small and medium-sized enterprises in Korea. *Journal of Business Economics and Management*, *21*, 421–445. https://doi.org/10.3846/jbem.2020.12022

Seo, H. S., & Kim, Y. (2020). Intangible assets investment and firms' performance: Evidence from small and medium-sized enterprises in Korea. *Journal of Business Economics and Management*, *21*(2), 423–445. https://doi.org/10.3846/jbem.2020.12022

Statistični urad Republike Slovenije. (2021). *SI-STAT podatkovni portal*. http://pxweb.stat.si/pxweb/Database/Ekonomsko/Ekonomsko.asp

Tsakanikas, A., Roth, F., Calio, S., Caloghirou, Y., & Dimas, P. (2020). *The contribution of intangible inputs and participation in global value chains to productivity performance:*

Evidence from the EU-28, 2000-2014' (No. 5; Hamburg Discussion Papers in International Economics). Hamburg University.

van Ark, B., Hao, J. X., Corrado, C., & Hulten, C. (2009). *Measuring intangible capital and its contribution to economic growth in Europe* (EIB Paper No. 3/2009). European Investment Bank, Economics Department. http://econpapers.repec.org/paper/riseibpap/2009_5f003.htm

Veblen, T. (1908). On the nature of capital: Investment, intangible assets, and the pecuniary magnate. *Quarterly Journal of Economics*, *23*(1), 104–136. https://doi.org/10.2307/1883967

Table A1: Descriptive statistics for sales, and number of employees for the studied companies by company size

	Micro					Small and medium					Large				
	Sales		Employment		Number of firms	Sales		Employment		Number of firms	Sales		Employment		Number of firms
	Mean	SD	Mean	SD	Count	Mean	SD	Mean	SD	Count	Mean	SD	Mean	SD	Count
2007	282423	1544435	1,72	2,18	42798	5373559	20300000	35,46	34,90	5612	82629458	180000000	611,61	967,34	371
2008	287823	1662963	1,70	2,18	45645	5800472	23800000	35,18	34,90	5998	88550199	207000000	610,82	985,20	354
2009	238587	1291864	1,66	2,15	47686	4993208	18600000	34,86	35,11	5895	85360030	188000000	617,49	999,38	316
2010	249073	1529414	1,59	2,10	49716	5376143	21800000	34,69	34,69	5717	85373909	158000000	611,26	949,19	301
2011	249129	1605428	1,53	2,08	51986	6117703	30000000	34,59	34,40	5512	94409649	219000000	597,38	853,65	300
2012	242748	1661560	1,40	2,06	54070	6500910	39600000	34,73	34,93	5370	96615010	236000000	604,21	834,59	286
2013	234678	1770631	1,39	2,03	55734	6469627	35300000	34,44	34,75	5305	98927396	243000000	607,31	859,78	273
2014	238485	1636268	1,42	2,02	57852	6378389	32600000	33,80	34,07	5465	102000000	248000000	608,87	864,99	273
2015	243094	1463876	1,46	2,04	59296	6360349	35500000	33,57	34,15	5649	104700000	241000000	619,91	862,73	269
2016	264514	2978791	1,52	2,07	59492	6232144	33000000	33,21	33,68	5825	102100000	240000000	611,19	836,75	286
2017	281826	2749487	1,56	2,10	60061	6291159	31200000	33,11	33,34	6106	116200000	301000000	610,66	814,01	303
2018	302747	3353227	1,60	2,13	59976	6406240	30200000	33,00	32,90	6454	118700000	317000000	609,75	800,39	319
2019	318832	4535272	1,63	2,15	60023	6349720	31700000	32,79	32,64	6832	116300000	288000000	611,55	804,90	323
2020	296746	3559891	1,62	2,13	60960	5949038	30400000	32,63	32,67	6854	111400000	249000000	602,97	795,68	311