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The Impact of Doing Business Regulations on Investments in ICT

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Abstract: Using industry-level data from 14 OECD countries and doing business indicators of the World Bank, we analyze how country-level regulations of business activities affect investments in information and communication technologies (ICT). We find that investments in ICT decrease with the costs of starting and operating a business and registering property. Investments increase with the strength of legal rights. We also find that higher minimum capital requirement reduces investments in software and the extent of director liability reduces investments in communication technologies.

JEL Codes: O38, O25, O43, L50.

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Introduction

There is a growing debate whether and how country-level regulations of doing business matter for aggregate performance (e.g., Klapper, Laeven, and Rajan, 2006; Djankov, McLiesh, and Ramalho, 2006; Barseghyan, 2008; Fisman and Allende, 2010; Branstetter, Lima, Taylor, and Venncio, 2013). In turn, empirical evidence suggests that one of the significant drivers behind recent improvements in aggregate performance are investments in information and communication technologies (ICT) (e.g., Röller and Waverman, 2001; Czernich, Falck, Kretschmer, and Woessmann, 2011; Jerbashian and Kochanova, 2012; Jorgenson, Ho, and Stiroh, 2005).

In this paper, we investigate how country-level regulations of business activities affect industry-level investments in ICT. In order to alleviate endogeneity concerns, we use a difference-in-differences framework in the spirit of Rajan and Zingales (1998). More specifically, we ask whether *ex ante* differences in country-level regulations affect investments in ICT differently in industries that depend more on these technologies compared to the industries that depend less. To establish our results, we use industry- and country-level data from 14 OECD countries and the World Bank's doing business indicators. In particular, we focus on indicators related to starting business, registering property, getting credit, protecting investors, and paying taxes.[1]

Our results suggest that investments in ICT decline with the number of procedures, time, and costs required for starting a business and time required for registering property. Investments in ICT also decline with the number of tax payments and time required for compiling tax payments. In turn, investments increase with the strength of legal rights. We fail to establish any systematic evidence that the monetary costs and number of procedures required for registering property affect investments in ICT. However, we find that they significantly reduce investments in information technologies (IT). Further, we fail to establish any systematic evidence that minimum (paid-in) capital requirement for starting a business and the extent of director liability for self-dealing affect investments in ICT. We find, however, that increasing the minimum required amount of (paid-in) capital reduces investments in software and the extent of director liability reduces investments in communication technologies (CT).

Djankov et al. (2006) and Barseghyan (2008), among others, show that the regulations of business activities matter for economic growth. In particular, they find that countries with less burdensome regulations grow faster. Given that investments in ICT contribute significantly to economic growth (see, for instance, Röller and Waverman, 2001; Jorgenson et al., 2005), our findings suggest a possible driver behind the results of such macro-level empirical studies. Moreover, they suggest possible policy instruments which can increase investments in ICT and, therefore, aid and compliment policy agendas such as the Digital

[1]These indicators are widely used in academia and by policymakers (see for further details Djankov, 2009).

Agenda in Europe and Europe 2020.

Primarily, this paper is related to studies which identify the impact of regulations on investments in ICT (e.g., Gruber and Verboven, 2001; Gust and Marquez, 2004; Heli and Kretschmer, 2005; Andonova, 2006; Andonova and Diaz-Serrano, 2009; Nardotto, Valletti, and Verboven, 2012; Bauer, Madden, and Morey, 2014). It is also related to studies which analyze the impact of policies on investments and, particularly, on investments in intangible assets (e.g., Barro, 1997; Carlin and Mayer, 2003; Claessens and Laeven, 2003). Typically, these studies focus on particular industries and policies and find that less red-tape and deregulation encourage investments. This paper contributes to these studies by assessing the impact country-level regulations of doing business on industry-level investments in ICT. There is also a growing number of studies which investigate the impact of institutions and various regulations on economic performance (e.g., Barone and Cingano, 2011; Caballero, Cowan, Engel, and Micco, 2013; Bena, Ondko, and Vourvachaki, 2011; Acemoglu, Johnson, and Robinson, 2001). This paper contributes to these studies to the extent that one of the pronounced drivers of recent surge in economic performance are the investments in ICT.

The next section offers a simple model to motivate the empirical test. The third section offers the empirical specification, and describes the data and its sources. The fourth section summarizes the results. The last section concludes.

Theoretical Model

A regulation, which is common to all industries, would penalize (or subsidize) investments in information and communication technologies more in industries which depend more on these technologies.[2] To show explicitly how such an inference can hold and set the stage for the empirical analysis, we develop a stylized deterministic model which follows the model of Alesina, Ardagna, Nicoletti, and Schiantarelli (2005).

We consider an industry where N infinitely lived firms produce horizontally differentiated goods x, indexed by j. For simplicity, let the production function of a good j ($\forall j = 1, ..., N$) be

$$x_j = A k_j^{\alpha} l_j^{1-\alpha}, \tag{1}$$

where $A > 0$ is an exogenous productivity level, k is the amount of ICT capital input, l summarizes all other inputs (e.g., labor), and $\alpha \in (0, 1)$ is output elasticity of ICT capital. In this respect, α measures the dependence on that capital since higher α means higher output elasticity of ICT capital.

The firms can invest and accumulate capital with a technology

$$\dot{k} = \iota - \delta k, \tag{2}$$

[2]This statement is essentially an analogue of the Rybczynski theorem.

where ι is the amount of investment and the initial value of k is given and is the same for all firms. We further assume that firms incur adjustment costs for installing the newly created capital. Adjustment costs are in terms of the firms' output and have the standard quadratic form $\frac{b}{2}\left(\frac{\iota}{k}\right)^2 k$, where $b > 0$ is adjustment cost parameter.

To capture the effect of business regulations on firms' profits in a reduced form, we assume that these regulations affect the revenues and the costs of the firms so that the profits of firm j net of investment costs are

$$\pi_j = (1-\tau_x)\, p_{x_j} x_j - w l_j - (1+\tau_\iota)\, p_\iota \iota_j - (1+\tau_b)\, p_{x_j} \frac{b}{2}\left(\frac{\iota_j}{k_j}\right)^2 k_j, \tag{3}$$

where p_{x_j} and p_ι are the prices of x_j and ι_j, and w is the price of l. In turn, τ_x, τ_ι, and τ_b are the effects of regulations. For example, $\tau_x > 0$ can represent business taxes, and $\tau_\iota < 0$ and $\tau_b < 0$ can represent regulations which subsidize investments or increase their efficiency (returns on investments).

Suppose that firms in this industry are price setters so that they could coup their investments in ICT. Moreover, A grows at a constant rate g_A. Denoting interest rate by r and the policy affecting it by τ_r, the problem of the firm j is

$$\begin{aligned} &\max_{p_{x_j}, l_j, \iota_j} \left\{ V_j = \int_0^{+\infty} \pi_j(t)\, e^{-[(1+\tau_r)r - g_A]t} dt \right\} \\ &s.t. \\ &(1), (2), (3), \end{aligned}$$

where the initial value of A is normalized to 1. For example, $\tau_r < 0$ can represent policies which facilitate lending and reduce borrowing costs.

Using q to denote the shadow value of investments and focusing on symmetric equilibrium, the necessary conditions for optimality are given by

$$w = (1-\alpha)(1-\tau_x)\left(1-\frac{1}{e}\right)\frac{x}{l}, \tag{4}$$

$$q = (1+\tau_\iota)\, p_\iota + (1+\tau_b)\, b\frac{\iota}{k}, \tag{5}$$

$$\dot{q} = q(1+\tau_r)\, r - \left[\alpha(1-\tau_x)\left(1-\frac{1}{e}\right)\frac{x}{k} + (1+\tau_b)\frac{b}{2}\left(\frac{\iota}{k}\right)^2 - q\delta\right], \tag{6}$$

where e is the perceived elasticity of substitution, $\frac{1}{e}$ is the Lerner index, and the price of x goods is normalized to 1. We assume that the demand for x goods is given by a standard CES function with an elasticity of substitution ε. In such a case, it can be shown that $e = e(\varepsilon, N)$, and $e(\varepsilon, N)$ increases with ε and the number of firms N (see, for further details, Jerbashian, 2014).

It can be shown that this system is saddle-path stable. In the steady-state we obtain

$$\frac{k}{x} = \frac{\alpha\left(1-\tau_x\right)\left(1-\frac{1}{e}\right)}{\Gamma_1}, \tag{7}$$

and

$$\frac{\iota}{x} = \left(\delta + g_A\right)\frac{k}{x}, \tag{8}$$

where Γ_1 is given by

$$\Gamma_1 \;=\; \left(1+\tau_\iota\right)p_\iota\left[\left(1+\tau_r\right)r+\delta\right] + \left(1+\tau_b\right)b\left(\delta+g_A\right)\left[\left(1+\tau_r\right)r + \frac{1}{2}\left(\delta - g_A\right)\right].$$

To show the effect of the level of dependence α, we consider how the effects of changes in τ_x, τ_ι, τ_b, and τ_r on investments relative to output (value added) depend on α. It is straightforward to show that the partial derivatives of $\frac{\iota}{x}$ with respect to τ_x, τ_ι, τ_b, and τ_r are negative. In turn, the following holds for any of these regulations

$$\frac{\partial}{\partial\alpha}\left|\frac{\partial}{\partial\tau_m}\frac{\iota}{x}\right| = \frac{1}{\alpha}\left|\frac{\partial}{\partial\tau_m}\frac{\iota}{x}\right|,$$

where subscript $m = x, \iota, b, r$. This implies that investments in industries which have higher dependence (α) react more to changes in regulations than in industries which have lower dependence.

Regulations of entry costs could also affect the number of firms. If higher costs of entry reduce the number of firms, then these costs would reduce e. In this case, the effect of such policies can be summarized in terms of $\frac{\partial}{\partial(1/e)}\frac{\iota}{x}$, which is negative according to (7) and (8). From (7) and (8) it also follows that

$$\frac{\partial}{\partial\alpha}\left|\frac{\partial}{\partial\left(1/e\right)}\frac{\iota}{x}\right| = \frac{1}{\alpha}\left|\frac{\partial}{\partial\left(1/e\right)}\frac{\iota}{x}\right|,$$

which implies that the level of dependence can matter also for policies which affect costs of entry.

For a more rigorous analysis, which shows how entry costs can affect investment decisions for different values of α, we endogenize the perceived elasticity of substitution/number of firms. We suppose that all firms enter in the first period and entrants break even on a zero net-value condition, $V = T$, where T represents entry costs. We assume that T is proportional to k, so that $T = \bar{\tau}k$.

From the standard Hamilton-Jacobi-Belman equation, $\dot{V} = \left[\left(1+\tau_r\right)r - g_A\right]V - \pi$, it follows that in the steady-state capital gains are zero, $\dot{V} = 0$. Therefore, the zero net-value condition is equivalent to

$$\left(1-\tau_x\right)x - wl - \left(1+\tau_\iota\right)p_\iota\iota - \left(1+\tau_b\right)\frac{b}{2}\left(\frac{\iota}{k}\right)^2 k = \left[\left(1+\tau_r\right)r - g_A\right]\bar{\tau}k.$$

From this expression and (4), (8), it follows that

$$\left[1-(1-\alpha)\left(1-\frac{1}{e}\right)\right](1-\tau_x)\frac{x}{k}=\Gamma_2+\left[(1+\tau_r)\,r-g_A\right]\bar{\tau},$$

where we use Γ_2 to denote

$$\Gamma_2 \;=\; (1+\tau_\iota)\,p_\iota\,(\delta+g_A)+(1+\tau_b)\,\frac{b}{2}\,(\delta+g_A)^2\,.$$

Further, expressing $\left(1-\frac{1}{e}\right)$ in terms of $\frac{k}{x}$ from (7) and using the expression above gives

$$\frac{\iota}{x}=\frac{(\delta+g_A)\,(1-\tau_x)}{\left[(1+\tau_r)\,r-g_A\right]\bar{\tau}+\frac{1-\alpha}{\alpha}\Gamma_1+\Gamma_2}.$$

It can be shown that increasing the entry cost ($\bar{\tau}$) reduces investments ($\frac{\iota}{x}$), i.e., $\frac{\partial}{\partial\bar{\tau}}\frac{\iota}{x}<0$. In turn, the effect of higher dependence is given by

$$\frac{\partial}{\partial\alpha}\left|\frac{\partial}{\partial\bar{\tau}}\frac{\iota}{x}\right|=2\frac{1}{\alpha^2}\Gamma_1\frac{1}{\left[(1+\tau_r)\,r-g_A\right]\bar{\tau}+\frac{1-\alpha}{\alpha}\Gamma_1+\Gamma_2}\left|\frac{\partial}{\partial\bar{\tau}}\frac{\iota}{x}\right|,$$

which implies that investments react more to the entry cost, $\bar{\tau}$, for higher values of dependence on ICT, α.

In case entry cost is proportional to the level of output/value added then we would have that

$$\frac{\iota}{x}=\frac{(\delta+g_A)\left\{1-\tau_x-\left[(1+\tau_r)\,r-g_A\right]\bar{\tau}\right\}}{\frac{1-\alpha}{\alpha}\Gamma_1+\Gamma_2}.^{3}$$

In this case also it can be shown that higher entry cost reduces investments. Moreover, it can be shown that

$$\frac{\partial}{\partial\alpha}\left|\frac{\partial}{\partial\bar{\tau}}\frac{\iota}{x}\right|=\frac{1}{\frac{1-\alpha}{\alpha}\Gamma_1+\Gamma_2}\frac{1}{\alpha^2}\Gamma_1\left|\frac{\partial}{\partial\bar{\tau}}\frac{\iota}{x}\right|,$$

which implies, again, that investments react more to the regulation of entry, $\bar{\tau}$, for higher values of dependence on ICT, α.[4]

In our empirical specification we look exactly for such a disparity across industries for regulations of business activities. Admittedly, however, our reduced form analysis of the likely effects of regulations might not fully encompass the true effects, which might be economy wide and not different across industries. In such a case, our empirical exercise, which we present in the next section, can be also viewed as a test of whether industry-level differences exist.

[3] Clearly, we need to assume that $1-\tau_x-\left[(1+\tau_r)\,r-g_A\right]\bar{\tau}>0$ in order to have positive investments.

[4] In case when entry cost is proportional to labor force compensation similar inference holds for certain parameter values.

Empirical Methodology and Data

Our empirical specification tests whether *ex ante* differences in country-level regulations of business activities, *ex post*, affect differently ICT investment in industries which depend more on ICT compared to industries which depend less. Such a test has several advantages. It permits country and industry fixed effects, which can be important for capturing, for example, demand characteristics, as well as fixed costs of entry into industries. It does not depend on a particular country-level model of investments in ICT capital. Therefore, we can avoid using country-level variables. Moreover, in this respect, it does not depend on country-level drivers behind the implementation of regulations, which alleviates the concerns of endogeneity of the regulations.

The dependent variable in this empirical exercise is the level of investment in ICT capital relative to value added in industry i and country c in our sample. After controlling for industry and country fixed effects, we should find that the coefficient on the interaction between initial level of regulation implementation and industries' dependence on ICT capital is different from zero for regulations which affect investment decisions.

Our empirical specification is then

$$\begin{aligned} \text{Investment}_{i,c} \;=\; & \beta_1 \left(\text{Industry } i\text{'s Dependence} \times \text{Regulation in Country } c\right) \\ & + \beta_{2,i} + \beta_{3,c} + \gamma X_{i,c} + \varepsilon_{i,c}, \end{aligned} \tag{9}$$

where our focus is on the coefficient of the interaction term β_1. The coefficients β_2 and β_3 are industry and country fixed effects, and $\varepsilon_{i,c}$ is an error term. In line with the theoretical model, $X_{i,c}$ includes relative price of investments in ICT, interest rate (industry rate of return on capital), and a measure of expected growth of TFP. We also include in $X_{i,c}$ the initial level of ICT capital relative to value added, which can capture potential scale effects and path dependence. If a regulation has a positive (negative) effect on investments in ICT then we should find that the estimate of β_1 is positive (negative).

Our empirical specification does not include time dimension. Many studies of investments use time dimension and often base their inference on within-industry variation (e.g., Alesina et al., 2005). Given our research question, however, in terms of the methodology we follow another branch in the literature, which uses within-country and between-industry variation to assess investments and growth (e.g., Rajan and Zingales, 1998; Carlin and Mayer, 2003). In this sense our study can be thought to be complementary. Moreover, it helps us to focus on within-country and between-industry variation because of two reasons. First, we have very limited number of time observations. Second, our country-level business regulation variables have large variation across countries and industry-level dependence variables have large variation across industries. However, these variables tend to vary little over time. We describe our measures and data in detail in

the next section.

0.1 Data and Measures

We obtain the data for country-level regulations of business activities from the World Bank's Doing Business database. In turn, our source of industry-level data is the EU KLEMS database (March 2011 update of 2009 release). It provides us with data for 30 ISIC industries (ISIC rev. 3), which have aggregation level at 1- and 2-digits.[5] From these industries we exclude the industries that are expected to have a large state involvement (public administration and defence, and compulsory social security; education) and the telecommunications industry (64, 75, and 80 of ISIC code), limiting our sample to 27 industries. Moreover, the use of the EU KLEMS database limits our sample to 14 OECD countries.

Admittedly, the use of data from a rather homogenous set of countries involves trade-offs. It can eliminate the influence of various unobservable factors on our results, for example. However, at the same time it can weaken the results from cross-country comparisons.

In this study, we focus on the period 2005–2007. We do so because most of the regulation indicators in the World Bank's Doing Business database are available from 2005 and EU KLEMS data end in 2007. Moreover, 2007 seems to be a convenient cut-off point since it allows us to avoid incorporating data from the recent financial crisis.[6]

Measuring Dependence on ICT

In a country, a naive measure of an industry's dependence on information and communication technologies (hereafter, ICT dependence) would be its share of compensation of ICT capital out of value added. The problems with this measure can be seen from our model assuming that firms hire ICT capital as they do labor. This measure reflects both the supply and the demand of ICT, and distortions thereof, when we need only the demand in order to identify technological differences. To alleviate this problem, as in the rest of the literature following Rajan and Zingales (1998), we try to identify ICT dependence from US data, where most likely distortions are the lowest and supply might be treated as perfectly elastic.

Clearly, using US data we assume that the rank ordering of the share of compensation of ICT in US industries corresponds to the rank ordering of the technological dependence of the industries. We also assume that that rank ordering carries over to the rest of the countries in our sample. An observation supporting the latter assumption is that the share of compensation of ICT capital is constant in a steady state equilibrium. Therefore, much

[5]To our knowledge, this is the only database which contains sufficiently detailed industry-level data.

[6]For example, Jerbashian and Kochanova (2012) observe that consumption of communication services exhibits strong differences between the period before financial crisis and the period of financial crisis.

of the variation within industries may arise from shocks that would change the relative demand for ICT capital. As long as, however, there is technological and regulatory convergence across countries and these shocks are worldwide, the measure constructed from US data would be a good proxy. From another perspective, if this measure is noisy, our findings may only suffer from attenuation bias.

Our (industry-level) data for ICT capital compensation and value added have a time span of 2005–2007. We take the ratio of these two and average the ratio over the period 2005–2007. We use this average as a measure for ICT dependence.[7]

Investments in ICT and Remaining Industry-level Variables

We construct the industry-level measure of ICT investment as the ratio of investments in ICT and value added averaged over 2005–2007 period. Further, for an industry, we use the average growth of TFP during this period to proxy for the expected TFP growth.

To measure the relative price of investments in ICT, we take the ratio of prices of industry-level value added and investments in ICT. In turn, to measure interest rate we use data for industry rate of return on capital. We also obtain data for ICT capital stock and use in our analysis the ratio of this stock and value added in an industry. All these variables are from 2005 and are predetermined from the perspective of the analysis. Table 1 summarizes these variables.

Table 1: *Description of Industry-level Variables*

Variable Name	Description
ICT Investment	ICT investment divided to value added and averaged over the period 2005–2007.
ICT Dependence	ICT capital compensation in US industries divided to value added and averaged over the period 2005–2007.
K_{ICT}	ICT capital divided to value added, in 2005.
$p_{\iota,ICT}$	Price of ICT investment relative to the price of value added, in 2005.
r	Industry rate of return on capital, in 2005.
g_A	TFP growth rate averaged over the period 2005–2007.

In order to carry out separate analyses for investments in information technologies, communication technologies, and software, we obtain data from the EU KLEMS database and compute variables in exact analogy to the variables for aggregate ICT. We use labels

[7]We perform a simple ANOVA exercise for the share of ICT capital compensation in US industries for an extended period of 2000–2007. This exercise suggests that industry-level variation accounts for 96.3 percent of the total variation.

IT, CT, and Software, to differentiate them. Table 2 offers summary statistics of all industry-level variables. Table 9 in Data Appendix offers correlations.

Table 2: *Summary Statistics – Industry-level Variables*

	N	Mean	SD	Min	Max
ICT Investment	352	0.023	0.018	0.001	0.138
ICT Dependence	350	0.045	0.026	0.005	0.099
K_{ICT}	352	0.263	1.074	0.002	20.090
$p_{\iota,ICT}$	352	0.413	0.300	0.036	3.891
IT Investment	352	0.007	0.007	0.000	0.050
IT Dependence	350	0.009	0.007	0.001	0.042
K_{IT}	352	0.131	0.181	0.000	2.314
$p_{\iota,IT}$	350	0.179	0.134	0.014	1.823
CT Investment	352	0.003	0.005	0.000	0.044
CT Dependence	350	0.008	0.010	0.002	0.062
K_{CT}	352	0.082	0.852	0.000	15.995
$p_{\iota,CT}$	348	0.646	0.237	0.086	2.245
Software Investment	352	0.012	0.012	0.000	0.109
Software Dependence	350	0.027	0.018	0.002	0.076
$K_{Software}$	352	0.044	0.099	0.000	1.781
$p_{\iota,Software}$	351	0.978	0.515	0.185	7.576
r	366	0.137	0.157	-0.650	1.195
g_A	366	0.026	0.063	-0.448	0.512

Note: This table shows the descriptive statistics of industry-level variables. The data are from the EU KLEMS database. See Table 1 and the main text for the descriptions of variables.

Doing Business Indicators

We use five broad categories of regulation of business activities: regulations of starting business, property registration, getting credit, protecting investors, and paying taxes. The data for these regulations are from the World Bank's Doing Business database. These data are based on studies of legal system and regulations, and surveys of lawyers. The variables which we use, together with their descriptions, are presented in Table 3.

Table 3: *Description of the Variables from the Doing Business Database*

Variable Name	Description
Regulations of Starting Business	
Entry Procedures	Number of procedures that are officially required for starting a business (out of 100).
Entry Time	Number of months (31 calendar days) necessary to complete all procedures that are officially required for starting a business.
Entry Cost	Cost of completing all procedures that are officially required for starting a business (percentage of per capita income).
Minimum Capital	Measures the amount that entrepreneurs need to deposit in a bank (or with a notary) before registration and up to 3 months following incorporation (percentage of per capita income).

Table 3 – (Continued)

Variable Name	Description
Regulations of Property Registration	
Property Procedures	Number of procedures that are legally required for registering property transfers (out of 100).
Property Time	Number of months (31 calendar days) necessary for completing all procedures that are legally required for registering property transfers.
Property Cost	Cost of completing all procedures that are legally required for registering property (percentage of the property value).
Regulations of Getting Credit	
Legal Rights	Measures whether laws of collateral and bankruptcy provide for features that facilitate lending (0 to 1 index).
Credit Info	Measures rules affecting the access and quality of credit information available through public and/or private credit registries (0 to 1 index).
Regulations of Investor Protection	
Business Disclosure	Measures whether laws provide for ways of enhancing transparency of related-party transactions (0 to 1 index).
Director Liability	Measures the extent director liability for self-dealing (0 to 1 index).
Ease of Suits	Measures the ability of shareholders to sue directors and officers for misconduct (0 to 1 index).
Tax System	
Tax Number	Measures the total number of taxes and contributions paid (out of 100).
Tax Time	Number of months (31 calendar days) taken to compile and pay 3 major types of taxes and contributions: the corporate income tax, value added/sales tax, and labor taxes.
Tax Rate	Measures the amount of taxes and mandatory contributions borne by the business (percentage of commercial profit).

According to Djankov et al. (2006), these variables are better proxies for regulation of business activities than other usually available perceptions-based measures. In this regard, using a sample of OECD countries, arguably, allows us to limit the possibility of disconnect between existence and implementation of regulations.

We use observations of these variables from 2005, where available. Variables related to regulation of investor protection and paying taxes are available from 2006. We use values from 2006 for them.[8] The use of values from 2006 may exacerbate reverse causality concerns. However, since these variables display little variation over short periods of

[8]Variables related to starting business are available from 2004.

time, most likely this is not a significant issue.[9] Table 4 offers summary statistics of these variables. In turn, Table 10 in Data Appendix offers correlations.

Table 4: *Summary Statistics - Country-level Variables*

	Mean	SD	Min	Max
Entry Procedures	0.071	0.028	0.030	0.110
Entry Time	0.912	0.962	0.097	3.677
Entry Cost	0.074	0.070	0.000	0.214
Minimum Capital	0.329	0.258	0.000	0.749
Property Procedures	0.046	0.013	0.020	0.060
Property Time	1.810	3.252	0.177	12.613
Property Cost	0.039	0.021	0.005	0.087
Legal Rights	0.700	0.184	0.300	1
Credit Info	0.833	0.173	0.500	1
Business Disclosure	0.550	0.238	0.200	1
Director Liability	0.529	0.182	0.200	0.900
Ease of Suits	0.679	0.137	0.400	0.900
Tax Number	0.139	0.064	0.040	0.270
Tax Time	8.806	6.672	3.387	30
Tax Rate	0.502	0.111	0.333	0.768

Note: This table shows the descriptive statistics of county-level variables. The number of observations is 14, and the data are from the Word Bank's Doing Business database. Variables related to investor protection and paying taxes are from 2006. The remaining variables are from 2005. See Table 3 and the main text for the descriptions of variables.

Results

The first column of Table 5 offers our main results ($\hat{\beta}_1$) from estimation of the specification (9). The dependent variable is ICT investment, and the interaction terms consist of the measure of dependence on ICT and regulatory variables. Given that the dependent variable is from the interval $[0, 1]$, we use censored Tobit estimation method, with robust (clustered) standard errors. Moreover, in all regressions we exclude the top and the bottom percentiles of the dependent variable as outliers.

The results suggest that investments in ICT are lower in industries that depend more on ICT in countries with greater number of procedures, time, and monetary cost required for starting a business and time required for registering property. Moreover, investments in ICT are lower in countries with greater number of tax payments and time required to pay taxes. Investments are higher, however, in countries with legal rights systems which facilitate lending. For the remaining regulatory variables, although the coefficients on interaction term are not statistically significant, they tend to have plausible signs. All in all, this evidence suggests that the costs of starting business, registering property, and paying taxes reduce ICT investment and better legal rights systems increase it.

Since we have a difference-in-differences estimator, one way to compute the magnitude of our results is as follows. We take the countries that rank the lowest and the top in terms of the regulatory variables and compute the difference between the levels of these

[9] A simple ANOVA exercise performed on these variables suggests that country-level variation explains 82.8–99.0 percent of the total variation. In turn, time variation explains only 0–2.9 percent.

Table 5: *Regression Results for ICT Investment*

Regulation	ICT Dependence× Regulation		K_{ICT}		$p_{\iota,ICT}$		r		g_A		Max. Effect
Entry Procedures	-3.449***	(1.203)	0.001	(0.001)	0.004	(0.005)	-0.011**	(0.005)	-0.013	(0.013)	-0.026
Entry Time	-0.068**	(0.033)	0.001	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.017	(0.014)	-0.023
Entry Cost	-1.395***	(0.447)	0.001	(0.001)	0.005	(0.005)	-0.013**	(0.005)	-0.015	(0.013)	-0.028
Minimum Capital	-0.012	(0.109)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.015)	-0.001
Property Procedures	-4.654	(2.955)	0.001	(0.001)	0.005	(0.005)	-0.011**	(0.006)	-0.019	(0.014)	-0.018
Property Time	-0.022***	(0.005)	0.001*	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.018	(0.014)	-0.025
Property Cost	-2.050	(1.674)	0.000	(0.001)	0.005	(0.005)	-0.012**	(0.006)	-0.019	(0.015)	-0.016
Legal Rights	0.277*	(0.148)	0.001	(0.001)	0.006	(0.005)	-0.011**	(0.006)	-0.018	(0.014)	0.018
Credit Info	-0.067	(0.194)	0.001	(0.001)	0.005	(0.005)	-0.012**	(0.006)	-0.020	(0.015)	-0.003
Business Disclosure	0.014	(0.142)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.015)	0.001
Director Liability	0.040	(0.181)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.015)	0.003
Ease of Suits	0.219	(0.216)	0.001	(0.001)	0.006	(0.005)	-0.012*	(0.006)	-0.019	(0.015)	0.010
Tax Number	-1.308***	(0.430)	0.001	(0.001)	0.005	(0.005)	-0.010*	(0.006)	-0.017	(0.014)	-0.028
Tax Time	-0.008***	(0.003)	0.001	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.018	(0.014)	-0.021
Tax Rate	-0.394	(0.271)	0.000	(0.001)	0.006	(0.005)	-0.012**	(0.006)	-0.019	(0.015)	-0.016

Note: This table reports the results from estimation of the specification (9), where the dependent variable is ICT investment. The last column reports the maximum effects of regulations. The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 350, and F-statistics vary from 13.24 to 16.51. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

variables for them. Further, we take the industries that rank the lowest and the highest in terms of the level of dependence on ICT and compute the difference between dependence levels. In our sample, these industries are Real Estate Activities (lowest dependence) and Financial Intermediation (highest dependence). Finally, we compute

$$\hat{\beta}_1 \times \Delta\text{Regulation} \times \Delta\text{ICT Dependence},$$

where Δ stands for the difference operator between the lowest and the highest levels. The last column of Table 5 reports these effects for each regression. Focusing on statistically significant estimates of β_1, the computed effects are in-between 0.018–0.028. These numbers correspond to the effect of moving from the top country to the bottom in terms of the doing business regulations on ICT investment (relative to value added) in highest dependence industry relative to the lowest dependence industry. All these numbers suggest that regulations of doing business have economically large and significant effects at least relative to the mean of ICT investment which is 0.023. Admittedly, these are the largest effects of regulations according to our estimations.

In an attempt of ruling out other explanations for our results, we perform various robustness checks and offer the results in Appendix - Robustness Checks. Table 13 presents estimates from estimation of the specification (9) using least squares method. In Table 14 we subtract the contribution of ICT to TFP growth from our measure of expected growth of TFP, g_A. In Table 15 we exclude the US from our estimation sample. In Table 16, we exclude in each country the industries which have relatively high levels of initial ICT capital. Finally, our theoretical model suggests that the level of competition in industries can affect investment decisions. Moreover, the level of competition, in

particular, in US industries can matter and confound our measure of ICT dependence. We use price-cost margin (PCM) to measure the level of competition. Price-cost margin is the empirical analogue of the Lerner index, and we define it as the ratio of total capital compensation to output in each industry in countries of our sample. In Table 17 we include in the specification (9) the value of price-cost margin and its square measured in 2005. In Table 18 we include the interaction of regulatory variables with price-cost margin in US industries averaged over the period of 2005–2007 to take into account the possible confounding effect of competition level in US industries. In turn, in Table 19 we include the ratio of ICT capital compensation to ICT capital stock as an additional measure of interest rate. The data for all these additional measures we obtain from the EU KLEMS database. Our results remain virtually intact.[10]

Results for the Components of ICT

Jorgenson and Stiroh (2000) in a growth accounting exercise show that the investments in the components of ICT, information technologies (IT), communication technologies (CT), and software, have varying effects on aggregate performance. In the light of this evidence, we test whether regulations of doing business have different effects on investments in information technologies, communication technologies, and software.

Table 6: *Regression Results for IT Investment*

Regulation	IT Dependence× Regulation		K_{IT}		$p_{\iota,IT}$		r		g_A		Max. Effect
Entry Procedures	-3.410***	(0.882)	0.013**	(0.006)	0.005	(0.005)	-0.001	(0.001)	0.006	(0.009)	-0.011
Entry Time	-0.068***	(0.026)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.007	(0.009)	-0.010
Entry Cost	-1.832***	(0.460)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.007	(0.009)	-0.016
Minimum Capital	-0.057	(0.113)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.009)	-0.002
Property Procedures	-4.158*	(2.406)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.009)	-0.007
Property Time	-0.033**	(0.015)	0.014**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.007	(0.009)	-0.017
Property Cost	-2.793**	(1.164)	0.013**	(0.006)	0.005	(0.005)	-0.002*	(0.001)	0.006	(0.010)	-0.009
Legal Rights	0.384**	(0.191)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.009)	0.011
Credit Info	-0.116	(0.190)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.010)	-0.002
Business Disclosure	0.046	(0.171)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.009)	0.001
Director Liability	-0.186	(0.172)	0.013**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.009)	-0.005
Ease of Suits	0.243	(0.165)	0.013**	(0.006)	0.005	(0.005)	-0.002*	(0.001)	0.006	(0.010)	0.005
Tax Number	-1.871***	(0.656)	0.014**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.009)	-0.018
Tax Time	-0.015***	(0.006)	0.014**	(0.006)	0.005	(0.005)	-0.002	(0.001)	0.006	(0.009)	-0.017
Tax Rate	-0.374	(0.265)	0.013**	(0.006)	0.005	(0.005)	-0.002*	(0.001)	0.006	(0.010)	-0.007

Note: This table reports the results from estimation of the specification (9), where the dependent variable is IT (computing equipment) investment. The last column reports the maximum effects of regulations. The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 348, and F-statistics vary from 18.54 to 21.90. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Tables 6–8 report our results from the estimations of the specification (9), where the dependent variables are investments in information technologies (IT), communication technologies (CT), and software, relative to value added. The interaction terms consist

[10] As a robustness check, we have also included in the specification (9) the share of an industry in a country in total industrial value added.

of business regulation variables and measures of dependence on IT, CT, and software. Similarly to ICT dependence, we use the shares of compensation of computing equipment, communications equipment, and software capital in value added in US industries to measure dependence levels. Estimation method is Tobit with $[0, 1]$ censoring and robust (clustered) standard errors.

Table 7: *Regression Results for CT Investment*

Regulation	CT Dependence× Regulation		K_{CT}		$p_{\iota,CT}$		r		g_A		Max. Effect
Entry Procedures	-1.884*	(0.989)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	-0.009
Entry Time	-0.077**	(0.030)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.006**	(0.003)	-0.017
Entry Cost	-0.867**	(0.418)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	-0.011
Minimum Capital	-0.069	(0.079)	0.000*	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007***	(0.003)	-0.003
Property Procedures	-2.323	(2.896)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	-0.006
Property Time	-0.009**	(0.004)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	-0.007
Property Cost	0.093	(1.548)	0.000*	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007***	(0.003)	0.000
Legal Rights	0.279*	(0.159)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	0.012
Credit Info	-0.014	(0.130)	0.000*	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007***	(0.003)	-0.000
Business Disclosure	0.097	(0.090)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	0.005
Director Liability	-0.261**	(0.117)	0.000	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	-0.011
Ease of Suits	0.053	(0.177)	0.000*	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007***	(0.003)	0.002
Tax Number	0.457	(0.434)	0.000*	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.008***	(0.003)	0.006
Tax Time	-0.001	(0.002)	0.000*	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	-0.002
Tax Rate	0.125	(0.240)	0.000*	(0.000)	0.001	(0.001)	-0.004***	(0.001)	-0.007**	(0.003)	0.003

Note: This table reports the results from estimation of the specification (9), where the dependent variable is CT investment. The last column reports the maximum effects of regulations. The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 346, and F-statistics vary from 6.40 to 7.65. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 8: *Regression Results for Software Investment*

Regulation	Soft. Dependence× Regulation		$K_{Software}$		$p_{\iota,Software}$		r		g_A		Max. Effect
Entry Procedures	-1.120*	(0.612)	0.285***	(0.026)	0.005*	(0.003)	-0.001	(0.002)	0.033**	(0.016)	-0.007
Entry Time	-0.014	(0.011)	0.287***	(0.027)	0.005*	(0.003)	-0.000	(0.002)	0.033**	(0.016)	-0.004
Entry Cost	-0.301	(0.222)	0.286***	(0.026)	0.005*	(0.003)	-0.001	(0.003)	0.033**	(0.016)	-0.005
Minimum Capital	-0.128**	(0.057)	0.289***	(0.027)	0.005**	(0.003)	0.000	(0.002)	0.035**	(0.016)	-0.007
Property Procedures	-0.578	(1.595)	0.288***	(0.027)	0.005*	(0.003)	-0.000	(0.003)	0.033**	(0.016)	-0.002
Property Time	-0.001	(0.003)	0.288***	(0.027)	0.005**	(0.003)	-0.000	(0.002)	0.033**	(0.016)	-0.001
Property Cost	0.083	(0.822)	0.289***	(0.027)	0.005**	(0.003)	-0.000	(0.003)	0.033**	(0.016)	0.001
Legal Rights	0.054	(0.082)	0.288***	(0.027)	0.005**	(0.003)	-0.000	(0.002)	0.033**	(0.016)	0.003
Credit Info	-0.000	(0.102)	0.289***	(0.026)	0.005**	(0.003)	-0.000	(0.002)	0.033**	(0.016)	-0.000
Business Disclosure	0.052	(0.076)	0.289***	(0.027)	0.006**	(0.003)	-0.000	(0.003)	0.033**	(0.016)	0.003
Director Liability	0.090	(0.106)	0.288***	(0.027)	0.005**	(0.003)	-0.000	(0.002)	0.033**	(0.016)	0.005
Ease of Suits	0.148	(0.108)	0.287***	(0.027)	0.005*	(0.003)	-0.000	(0.003)	0.033**	(0.016)	0.005
Tax Number	-0.528**	(0.237)	0.287***	(0.026)	0.005*	(0.003)	0.000	(0.002)	0.033**	(0.015)	-0.009
Tax Time	-0.004**	(0.002)	0.288***	(0.026)	0.005*	(0.003)	-0.000	(0.002)	0.033**	(0.016)	-0.009
Tax Rate	-0.101	(0.144)	0.287***	(0.027)	0.005**	(0.003)	-0.001	(0.002)	0.033**	(0.016)	-0.003

Note: This table reports the results from estimation of the specification (9), where the dependent variable is software investment. The last column reports the maximum effects of regulations. The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 349, and F-statistics vary from 42.89 to 47.15. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

The results for investments in information technologies (IT), communication technologies (CT), and software, are quite similar to our results for aggregate ICT, with few notable exceptions. Greater monetary costs and number of procedures for registering property significantly reduce investments in information technologies. Greater liability

of directors for self-dealing reduces investments in communication technologies. However, we fail to establish any systematic evidence that the number of tax payments and the time required to compile taxes affect investments in communication technologies. In turn, higher (paid-in) minimum capital requirement reduces investments in software. However, we fail to establish any systematic evidence that the strength of legal rights affects investments in software.[11]

A seemingly plausible explanation why minimum capital requirements might significantly reduce investments in software is that entrants in more software dependent industries might be smaller in size, therefore, more affected by minimum capital requirements. In turn, a potential explanation why director liability can reduce investments in communication technologies can be that investments in these technologies, in industries that depend more on them, are relatively large scale projects and might require risk taking. Therefore, higher liability might scare investments. We neither have data nor intend to test these conjectures in this paper. Admittedly, further research in this direction might be valuable.

Conclusions

Recent empirical evidence seems to suggest that the regulations of business activities matter for aggregate performance. Moreover, it suggests that investments in ICT significantly contribute to aggregate performance. In the light of this evidence, in this paper we investigate how the regulations of business activities affect investments in ICT.

All in all, our results suggest that these regulations have significant and economically sizable effects on investments in ICT. We find that reducing the number of procedures, time, and costs required for starting business and time required for registering property increases investments in ICT. We also find that reducing the number of tax payments, time required for compiling tax payments, and strengthening legal rights, increases investments in ICT. Moreover, according to our results, lower monetary costs and number of procedures required for registering property imply higher investments in information technologies. In turn, lesser extent of director liability implies higher investments in communication technologies, and lower minimum capital requirements imply higher investments in software.

[11] Similarly to the analysis of investments in ICT, we implement a range of robustness checks. These results are available upon request from the authors.

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Appendix

Data Appendix

Table 9: *Correlations - Industry-level Variables*

	Information and Communication Technologies					
	Variable	1	2	3	4	5
1	ICT Investment					
2	ICT Dependence	0.45***				
3	K_{ICT}	0.10*	0.12**			
4	$p_{\iota,ICT}$	0.10*	0.06	-0.11**		
5	r	0.10*	0.27***	-0.04	-0.05	
6	g_A	0.09*	0.19***	0.05	0.15***	0.02
	Information Technologies					
	Variable	1	2	3	4	5
1	IT Investment					
2	IT Dependence	0.37***				
3	K_{IT}	0.60***	0.24***			
4	$p_{\iota,IT}$	0.05	-0.01	-0.24***		
5	r	-0.05	0.39***	-0.04	-0.10*	
6	g_A	0.11**	0.16***	-0.10*	0.19***	0.06
	Communication Technologies					
	Variable	1	2	3	4	5
1	CT Investment					
2	CT Dependence	0.15***				
3	K_{CT}	0.07	-0.01			
4	$p_{\iota,CT}$	-0.05	-0.06	-0.13**		
5	r	-0.05	0.04	-0.06	-0.15***	
6	g_A	-0.04	0.06	0.07	0.33***	-0.01
	Software					
	Variable	1	2	3	4	5
1	Software Investment					
2	Software Dependence	0.33***				
3	$K_{Software}$	0.82***	0.34***			
4	$p_{\iota,Software}$	0.20***	0.14***	-0.16***		
5	r	0.05	0.20***	0.07	-0.09*	
6	g_A	0.23***	0.17***	-0.02	0.33***	-0.02

Note: This table shows the pairwise correlations between industry-level variables. The data are from the EU KLEMS database. See Table 1 for the descriptions of variables. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 10: *Correlations - Country-level Variables*

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Entry Procedures														
2	Entry Time	0.60**													
3	Entry Cost	0.74***	0.53*												
4	Minimum Capital	0.33	0.00	0.10											
5	Property Procedures	0.35	-0.01	0.21	-0.04										
6	Property Time	0.30	0.35	0.27	-0.12	0.31									
7	Property Cost	0.27	0.50*	0.50*	0.05	-0.09	-0.30								
8	Legal Rights	-0.48*	-0.31	-0.83***	-0.24	0.03	-0.28	-0.22							
9	Credit Info	0.27	-0.16	0.06	0.00	0.12	-0.60**	0.29	0.16						
10	Business Disclosure	-0.19	-0.33	-0.29	-0.43	0.45	-0.38	-0.00	0.47*	0.56**					
11	Director Liability	0.38	0.29	0.00	-0.21	0.25	0.44	-0.33	0.12	0.08	0.09				
12	Ease of Suits	-0.16	-0.50*	-0.24	-0.23	0.21	0.28	-0.74***	0.09	-0.22	0.11	0.34			
13	Tax Number	0.29	-0.01	0.36	0.22	0.16	0.48*	-0.10	-0.24	-0.39	-0.39	-0.07	0.31		
14	Tax Time	0.50*	0.23	0.39	0.13	-0.10	0.21	-0.07	-0.22	-0.19	-0.43	0.10	0.30	0.67***	
15	Tax Rate	0.27	0.19	0.61**	-0.02	-0.40	-0.32	0.48*	-0.64**	0.34	-0.11	-0.38	-0.32	-0.06	0.15

Note: This table shows the pairwise correlations between county-level variables. The data are from the Word Bank's Doing Business database. See Table 3 for the descriptions of variables. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 11: *ICT Dependence, ICT Investment and Investment Shares of its Components*

ISIC Code	Industry Name	ICT	ICT Investment		Share of IT Investment		Share of CT Investment		Share of Software Investment	
		Dependence	Mean	SD	Mean	SD	Mean	SD	Mean	SD
15t16	Food, Beverages and Tobacco	0.05	0.02	0.01	0.29	0.15	0.11	0.15	0.59	0.19
17t19	Textiles, Leather and Footwear	0.02	0.02	0.01	0.28	0.17	0.07	0.08	0.65	0.22
20	Wood and of Wood and Cork	0.02	0.01	0.01	0.33	0.18	0.13	0.16	0.55	0.22
21t22	Pulp, Paper, Printing and Publishing	0.07	0.04	0.01	0.34	0.19	0.12	0.12	0.55	0.17
23	Coke, Refined Petroleum and Nuclear Fuel	0.08	0.06	0.12	0.35	0.23	0.17	0.24	0.48	0.29
24	Chemicals and Chemical Products	-	0.02	0.01	0.44	0.22	0.10	0.03	0.46	0.25
25	Rubber and Plastics	0.03	0.02	0.01	0.28	0.19	0.10	0.16	0.62	0.25
26	Other Non-metallic Mineral	0.04	0.02	0.02	0.31	0.16	0.13	0.18	0.56	0.22
27t28	Basic Metals, and Fabricated Metal	0.04	0.02	0.01	0.30	0.18	0.12	0.16	0.57	0.22
29	Machinery, NEC	0.10	0.02	0.01	0.31	0.14	0.11	0.14	0.58	0.19
30t33	Electrical and Optical Equipment	0.07	0.04	0.03	0.26	0.15	0.15	0.16	0.59	0.20
34t35	Transport Equipment	0.06	0.03	0.02	0.26	0.16	0.15	0.19	0.59	0.22
36t37	Manufacturing NEC; Recycling	0.04	0.02	0.01	0.34	0.16	0.13	0.14	0.53	0.20
50	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0.04	0.02	0.01	0.31	0.19	0.13	0.12	0.56	0.19
51	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	0.07	0.03	0.01	0.39	0.19	0.12	0.09	0.49	0.17
52	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	0.03	0.03	0.01	0.41	0.19	0.13	0.10	0.46	0.16
60t63	Transport and Storage	0.10	0.04	0.03	0.27	0.20	0.33	0.25	0.39	0.13
70	Real Estate Activities	0.005	0.01	0.01	0.38	0.25	0.14	0.17	0.48	0.27
71t74	Renting of Machinery, Equipment and Other business Activities	0.06	0.05	0.03	0.39	0.17	0.14	0.12	0.47	0.12
AtB	Agriculture, Hunting, Forestry and Fishing	0.01	0.01	0.01	0.32	0.21	0.19	0.23	0.49	0.23
C	Mining and Quarrying	0.03	0.01	0.01	0.34	0.25	0.19	0.23	0.47	0.24
E	Electricity, Gas and Water Supply	0.05	0.03	0.02	0.25	0.18	0.17	0.15	0.59	0.21
F	Construction	0.03	0.01	0.00	0.33	0.25	0.14	0.20	0.53	0.26
H	Hotels and Restaurants	0.02	0.01	0.01	0.38	0.22	0.24	0.17	0.38	0.22
J	Financial Intermediation	0.10	0.08	0.04	0.27	0.12	0.04	0.04	0.68	0.13
N	Health and Social Work	0.02	0.01	0.01	0.40	0.22	0.13	0.09	0.48	0.20
O	Other Community, Social and Personal Services	0.02	0.04	0.02	0.32	0.16	0.33	0.13	0.35	0.13

Note: This table offers for all industries the values of ICT dependence measure, and summaries of investments in ICT and shares of investments in IT, CT, and software in investments in ICT. The data are from the EU KLEMS database. See Table 1 for the descriptions of variables.

Table 12: *Regulations of Doing Business*

Country	Entry Procedures	Entry Time	Entry Cost	Minimum Capital	Property Procedures	Property Time	Property Cost	Legal Rights	Credit Info	Business Disclosure	Director Liability	Ease of Suits	Tax Number	Tax Time	Tax Rate	GDP
Australia	0.03	0.10	0.02	0.00	0.05	0.23	0.05	0.90	0.83	0.80	0.20	0.70	0.13	3.45	0.52	10.39
Austria	0.08	0.81	0.06	0.64	0.03	1.02	0.05	0.70	1.00	0.50	0.50	0.50	0.12	5.48	0.58	10.42
The Czech Republic	0.10	1.29	0.11	0.44	0.04	3.97	0.03	0.70	0.67	0.20	0.50	0.80	0.27	30.00	0.49	9.96
Denmark	0.05	0.23	0.00	0.49	0.06	1.35	0.01	0.80	0.67	0.70	0.50	0.70	0.10	4.35	0.33	10.41
Finland	0.03	0.45	0.01	0.29	0.03	0.45	0.04	0.80	0.67	0.60	0.40	0.70	0.20	8.68	0.50	10.33
Germany	0.09	1.45	0.06	0.49	0.05	1.29	0.04	0.80	1.00	0.50	0.50	0.50	0.12	6.32	0.48	10.35
Italy	0.09	0.42	0.21	0.11	0.05	0.81	0.05	0.30	1.00	0.70	0.40	0.70	0.15	10.97	0.77	10.25
Japan	0.11	1.00	0.11	0.75	0.06	0.42	0.04	0.60	1.00	0.70	0.60	0.80	0.14	10.16	0.52	10.32
Slovenia	0.09	1.94	0.14	0.19	0.06	12.61	0.02	0.50	0.50	0.30	0.80	0.80	0.22	8.39	0.39	10.06
Spain	0.10	3.68	0.17	0.17	0.04	0.81	0.09	0.60	0.83	0.50	0.60	0.40	0.07	9.61	0.62	10.22
Sweden	0.03	0.52	0.01	0.37	0.02	0.48	0.03	0.60	0.67	0.20	0.40	0.70	0.04	3.94	0.54	10.40
The Netherlands	0.07	0.29	0.13	0.66	0.05	0.18	0.06	0.60	0.83	0.30	0.40	0.60	0.20	8.06	0.48	10.47
The UK	0.06	0.42	0.01	0.00	0.06	1.34	0.05	1.00	1.00	1.00	0.70	0.70	0.08	3.39	0.35	10.40
The US	0.06	0.19	0.01	0.00	0.04	0.39	0.00	0.90	1.00	0.70	0.90	0.90	0.10	10.48	0.46	10.66

Note: This table shows the values of all regulation variables for all counties from our sample. The data are from the Word Bank's Doing Business database. Variables related to investor protection and paying taxes are from 2006. The remaining variables are from 2005. See Table 3 for the descriptions of variables.

Appendix - Robustness Checks

In this appendix we present results from robustness check exercises.

Table 13: *Robustness Check - Least Squares Estimation*

Regulation	ICT Dependence× Regulation		K_{ICT}		$p_{\iota,ICT}$		r		g_A	
Entry Procedures	-3.449***	(1.285)	0.001	(0.001)	0.004	(0.005)	-0.011**	(0.006)	-0.013	(0.014)
Entry Time	-0.068*	(0.035)	0.001	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.017	(0.015)
Entry Cost	-1.395***	(0.477)	0.001	(0.001)	0.005	(0.005)	-0.013**	(0.006)	-0.015	(0.014)
Minimum Capital	-0.012	(0.117)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.016)
Property Procedures	-4.654	(3.156)	0.001	(0.001)	0.005	(0.006)	-0.011*	(0.006)	-0.019	(0.015)
Property Time	-0.022***	(0.005)	0.001	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.018	(0.015)
Property Cost	-2.050	(1.788)	0.000	(0.001)	0.005	(0.005)	-0.012*	(0.006)	-0.019	(0.016)
Legal Rights	0.277*	(0.158)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.018	(0.015)
Credit Info	-0.067	(0.207)	0.001	(0.001)	0.005	(0.005)	-0.012*	(0.006)	-0.020	(0.015)
Business Disclosure	0.014	(0.151)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.016)
Director Liability	0.040	(0.194)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.016)
Ease of Suits	0.219	(0.231)	0.001	(0.001)	0.006	(0.005)	-0.012*	(0.006)	-0.019	(0.016)
Tax Number	-1.308***	(0.459)	0.001	(0.001)	0.005	(0.006)	-0.010	(0.006)	-0.017	(0.015)
Tax Time	-0.008***	(0.003)	0.001	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.018	(0.015)
Tax Rate	-0.394	(0.290)	0.000	(0.001)	0.006	(0.005)	-0.012**	(0.006)	-0.019	(0.016)

Note: This table reports the results from Least Squares estimation of the specification (9), where the dependent variable is ICT investment. All regressions include industry and country dummies. The number of observations is 350, R^2 varies from 0.55 to 0.57. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 14: *Robustness Check - Expected TFP Growth Without Contribution of ICT*

Regulation	ICT Dependence× Regulation		K_{ICT}		$p_{\iota,ICT}$		r		$\tilde{g}_A$	
Entry Procedures	-3.321***	(1.190)	0.001	(0.001)	0.004	(0.005)	-0.011**	(0.005)	-0.024*	(0.014)
Entry Time	-0.066**	(0.033)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.029*	(0.015)
Entry Cost	-1.357***	(0.442)	0.001	(0.001)	0.005	(0.005)	-0.013**	(0.005)	-0.027*	(0.014)
Minimum Capital	-0.001	(0.109)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.032**	(0.016)
Property Procedures	-4.569	(2.925)	0.001	(0.001)	0.005	(0.005)	-0.011**	(0.006)	-0.031**	(0.015)
Property Time	-0.021***	(0.005)	0.001*	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.030**	(0.015)
Property Cost	-1.982	(1.662)	0.001	(0.001)	0.006	(0.005)	-0.012**	(0.006)	-0.031*	(0.016)
Legal Rights	0.267*	(0.146)	0.001	(0.001)	0.006	(0.005)	-0.011**	(0.006)	-0.030*	(0.015)
Credit Info	-0.063	(0.192)	0.001	(0.001)	0.006	(0.005)	-0.012**	(0.006)	-0.032**	(0.016)
Business Disclosure	0.008	(0.141)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.032**	(0.016)
Director Liability	0.046	(0.179)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.032**	(0.016)
Ease of Suits	0.209	(0.216)	0.001	(0.001)	0.006	(0.005)	-0.012**	(0.006)	-0.031*	(0.016)
Tax Number	-1.281***	(0.428)	0.001	(0.001)	0.005	(0.005)	-0.010*	(0.006)	-0.029*	(0.015)
Tax Time	-0.008***	(0.003)	0.001	(0.001)	0.006	(0.005)	-0.011**	(0.006)	-0.029**	(0.015)
Tax Rate	-0.389	(0.267)	0.001	(0.001)	0.006	(0.005)	-0.012**	(0.006)	-0.031**	(0.016)

Note: This table reports the results from estimation of the specification (9), where the dependent variable is ICT investment. As a robustness check, expected TFP growth ($\tilde{g}_A$) does not include contribution of ICT. Estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. Number of observations is 350, and F-statistics vary from 13.31 to 16.41. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 15: *Robustness Check - Sample Selection: Without the US*

Regulation	ICT Dependence× Regulation		K_{ICT}		$p_{\iota,ICT}$		r		g_A	
Entry Procedures	-3.354***	(1.211)	0.001	(0.001)	0.003	(0.004)	-0.010*	(0.006)	-0.011	(0.014)
Entry Time	-0.059*	(0.031)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.006)	-0.015	(0.015)
Entry Cost	-1.298***	(0.466)	0.001	(0.001)	0.004	(0.005)	-0.011*	(0.006)	-0.014	(0.014)
Minimum Capital	0.051	(0.111)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.007)	-0.018	(0.016)
Property Procedures	-4.317	(2.901)	0.001	(0.001)	0.003	(0.005)	-0.009	(0.006)	-0.017	(0.014)
Property Time	-0.019***	(0.005)	0.001*	(0.001)	0.004	(0.005)	-0.009	(0.007)	-0.016	(0.015)
Property Cost	-1.214	(1.797)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.006)	-0.017	(0.016)
Legal Rights	0.215	(0.154)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.006)	-0.017	(0.015)
Credit Info	-0.183	(0.190)	0.000	(0.001)	0.004	(0.004)	-0.010	(0.006)	-0.017	(0.015)
Business Disclosure	-0.029	(0.139)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.007)	-0.018	(0.016)
Director Liability	-0.189	(0.176)	0.001	(0.001)	0.004	(0.005)	-0.009	(0.006)	-0.016	(0.015)
Ease of Suits	0.074	(0.216)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.006)	-0.017	(0.016)
Tax Number	-1.170***	(0.421)	0.001	(0.001)	0.003	(0.005)	-0.008	(0.006)	-0.016	(0.016)
Tax Time	-0.009***	(0.003)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.006)	-0.015	(0.015)
Tax Rate	-0.356	(0.274)	0.001	(0.001)	0.004	(0.004)	-0.011*	(0.006)	-0.017	(0.016)

Note: This table reports the results from estimation of the specification (9), where the US is excluded from the sample, and the dependent variable is ICT investment. The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 325, and F-statistics vary from 12.95 to 16.86. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 16: *Robustness Check - Sample Selection: Without High K_{ICT}*

Regulation	ICT Dependence× Regulation		K_{ICT}		$p_{\iota,ICT}$		r		g_A	
Entry Procedures	-3.773***	(1.255)	0.001	(0.001)	0.002	(0.004)	-0.003	(0.005)	-0.020	(0.013)
Entry Time	-0.065**	(0.030)	0.001	(0.001)	0.003	(0.004)	-0.001	(0.005)	-0.025*	(0.014)
Entry Cost	-1.350***	(0.443)	0.001	(0.001)	0.002	(0.004)	-0.003	(0.005)	-0.023*	(0.013)
Minimum Capital	-0.069	(0.122)	0.001	(0.001)	0.003	(0.004)	-0.000	(0.006)	-0.027*	(0.014)
Property Procedures	-5.123*	(2.973)	0.001	(0.000)	0.002	(0.004)	-0.002	(0.006)	-0.027**	(0.013)
Property Time	-0.021***	(0.005)	0.001*	(0.001)	0.003	(0.004)	0.000	(0.005)	-0.026*	(0.014)
Property Cost	-2.182	(1.596)	0.000	(0.001)	0.003	(0.004)	-0.001	(0.005)	-0.026*	(0.014)
Legal Rights	0.279*	(0.160)	0.001	(0.001)	0.003	(0.004)	-0.001	(0.005)	-0.026*	(0.014)
Credit Info	-0.005	(0.187)	0.001	(0.001)	0.003	(0.004)	-0.001	(0.005)	-0.028*	(0.014)
Business Disclosure	0.039	(0.137)	0.001	(0.001)	0.003	(0.004)	-0.000	(0.006)	-0.027*	(0.014)
Director Liability	0.144	(0.184)	0.000	(0.001)	0.003	(0.004)	-0.001	(0.006)	-0.028*	(0.014)
Ease of Suits	0.382	(0.234)	0.000	(0.001)	0.003	(0.004)	-0.001	(0.005)	-0.026*	(0.015)
Tax Number	-1.287***	(0.409)	0.001	(0.001)	0.002	(0.004)	0.001	(0.005)	-0.025*	(0.013)
Tax Time	-0.007***	(0.003)	0.001	(0.001)	0.003	(0.004)	-0.001	(0.006)	-0.026*	(0.013)
Tax Rate	-0.331	(0.269)	0.000	(0.001)	0.003	(0.004)	-0.002	(0.005)	-0.027*	(0.014)

Note: This table reports the results from estimation of the specification (9), where the dependent variable is ICT investment. As a robustness check, in each country we exclude the industries which have K_{ICT} higher than the 90th percentile of K_{ICT}. The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 317, and F-statistics vary from 18.36 to 25.51. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 17: *Robustness Check - Level of Competition*

Regulation	ICT Dependence× Regulation		K_{ICT}		$p_{\iota,ICT}$		r		g_A		PCM		PCM^2	
Entry Procedures	-3.488***	(1.198)	0.001	(0.001)	0.004	(0.005)	-0.010	(0.008)	-0.014	(0.013)	0.009	(0.019)	-0.020	(0.018)
Entry Time	-0.067**	(0.033)	0.001	(0.001)	0.005	(0.005)	-0.011	(0.009)	-0.018	(0.014)	0.008	(0.021)	-0.017	(0.020)
Entry Cost	-1.422***	(0.451)	0.001	(0.001)	0.005	(0.005)	-0.013	(0.008)	-0.017	(0.013)	0.015	(0.019)	-0.025	(0.017)
Minimum Capital	-0.017	(0.109)	0.001	(0.001)	0.006	(0.005)	-0.011	(0.009)	-0.021	(0.015)	0.010	(0.021)	-0.018	(0.020)
Property Procedures	-4.933*	(2.903)	0.001	(0.001)	0.005	(0.005)	-0.009	(0.008)	-0.020	(0.014)	0.008	(0.019)	-0.021	(0.019)
Property Time	-0.022***	(0.005)	0.001	(0.001)	0.005	(0.005)	-0.010	(0.009)	-0.020	(0.014)	0.010	(0.021)	-0.020	(0.020)
Property Cost	-2.009	(1.668)	0.000	(0.001)	0.005	(0.005)	-0.011	(0.009)	-0.020	(0.015)	0.009	(0.020)	-0.016	(0.020)
Legal Rights	0.296**	(0.149)	0.001	(0.001)	0.006	(0.005)	-0.012	(0.008)	-0.020	(0.014)	0.016	(0.019)	-0.025	(0.019)
Credit Info	-0.067	(0.193)	0.001	(0.001)	0.006	(0.005)	-0.011	(0.009)	-0.021	(0.015)	0.009	(0.020)	-0.017	(0.020)
Business Disclosure	0.013	(0.137)	0.001	(0.001)	0.006	(0.005)	-0.011	(0.009)	-0.021	(0.015)	0.010	(0.020)	-0.018	(0.020)
Director Liability	0.038	(0.181)	0.001	(0.001)	0.006	(0.005)	-0.011	(0.009)	-0.021	(0.015)	0.010	(0.020)	-0.018	(0.020)
Ease of Suits	0.217	(0.215)	0.001	(0.001)	0.006	(0.005)	-0.011	(0.009)	-0.020	(0.015)	0.009	(0.020)	-0.017	(0.020)
Tax Number	-1.314***	(0.432)	0.001	(0.001)	0.005	(0.005)	-0.010	(0.008)	-0.019	(0.015)	0.011	(0.020)	-0.019	(0.019)
Tax Time	-0.008***	(0.003)	0.001	(0.001)	0.005	(0.005)	-0.012	(0.008)	-0.019	(0.014)	0.009	(0.020)	-0.015	(0.019)
Tax Rate	-0.399	(0.270)	0.000	(0.001)	0.006	(0.005)	-0.013	(0.008)	-0.021	(0.015)	0.012	(0.020)	-0.019	(0.019)

Note: This table reports the results from estimation of the specification (9), where the dependent variable is ICT investment. As a robustness check, we add price-cost margin PCM and its square PCM^2 to control variables $X_{i,c}$ in (9). The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 350, and F-statistics vary from 13.22 to 16.20. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 18: *Robustness Check - Competition Level in US Industries and Regulations*

Regulation	ICT Dependence× Regulation		PCM_{US}× Regulation		K_{ICT}		$p_{\iota,ICT}$		r		g_A	
Entry Procedures	-3.339***	(1.279)	0.093	(0.150)	0.001	(0.001)	0.004	(0.005)	-0.011**	(0.005)	-0.013	(0.013)
Entry Time	-0.066*	(0.034)	0.002	(0.004)	0.001	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.017	(0.014)
Entry Cost	-1.361***	(0.473)	0.028	(0.056)	0.001	(0.001)	0.005	(0.005)	-0.013**	(0.006)	-0.015	(0.013)
Minimum Capital	-0.016	(0.114)	-0.004	(0.014)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.015)
Property Procedures	-4.581	(3.143)	0.063	(0.365)	0.001	(0.001)	0.004	(0.005)	-0.011**	(0.006)	-0.019	(0.014)
Property Time	-0.021***	(0.005)	0.001	(0.001)	0.001*	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.018	(0.014)
Property Cost	-1.957	(1.775)	0.081	(0.201)	0.000	(0.001)	0.005	(0.005)	-0.012**	(0.006)	-0.019	(0.015)
Legal Rights	0.279*	(0.157)	0.002	(0.020)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.018	(0.014)
Credit Info	-0.069	(0.207)	-0.001	(0.024)	0.001	(0.001)	0.005	(0.005)	-0.012**	(0.006)	-0.020	(0.015)
Business Disclosure	0.004	(0.151)	-0.008	(0.019)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.015)
Director Liability	0.041	(0.192)	0.001	(0.021)	0.001	(0.001)	0.006	(0.005)	-0.011*	(0.006)	-0.020	(0.015)
Ease of Suits	0.220	(0.229)	0.001	(0.023)	0.001	(0.001)	0.006	(0.005)	-0.012*	(0.006)	-0.019	(0.015)
Tax Number	-1.262***	(0.461)	0.033	(0.056)	0.001	(0.001)	0.005	(0.005)	-0.010*	(0.006)	-0.018	(0.014)
Tax Time	-0.008***	(0.003)	0.000	(0.000)	0.001	(0.001)	0.005	(0.005)	-0.011*	(0.006)	-0.018	(0.014)
Tax Rate	-0.395	(0.287)	-0.000	(0.038)	0.000	(0.001)	0.006	(0.005)	-0.012**	(0.006)	-0.019	(0.015)

Note: This table reports the results from estimation of the specification (9), where the dependent variable is ICT investment. As a robustness check, we add interaction term between competition in US industries and regulations PCM_{US}×Regualtion to control variables $X_{i,c}$ in (9). The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 350, and F-statistics vary from 12.95 to 16.72. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 19: *Robustness Check - ICT Specific Interest Rate*

Regulation	ICT Dependence× Regulation		K_{ICT}		$p_{\iota,ICT}$		r_{ICT}		r		g_A	
Entry Procedures	-3.477***	(1.198)	0.001	(0.001)	0.003	(0.005)	0.012	(0.021)	-0.018	(0.012)	-0.012	(0.014)
Entry Time	-0.070**	(0.032)	0.001	(0.001)	0.004	(0.005)	0.014	(0.023)	-0.019	(0.013)	-0.016	(0.015)
Entry Cost	-1.435***	(0.446)	0.001	(0.001)	0.004	(0.005)	0.016	(0.022)	-0.021*	(0.012)	-0.014	(0.014)
Minimum Capital	-0.012	(0.108)	0.001	(0.001)	0.005	(0.005)	0.010	(0.022)	-0.017	(0.013)	-0.019	(0.015)
Property Procedures	-4.679	(2.937)	0.001	(0.001)	0.004	(0.006)	0.011	(0.021)	-0.017	(0.012)	-0.018	(0.014)
Property Time	-0.022***	(0.005)	0.001*	(0.001)	0.004	(0.005)	0.012	(0.022)	-0.017	(0.013)	-0.017	(0.015)
Property Cost	-2.126	(1.653)	0.001	(0.001)	0.004	(0.005)	0.012	(0.023)	-0.018	(0.013)	-0.018	(0.015)
Legal Rights	0.289**	(0.141)	0.001	(0.001)	0.005	(0.005)	0.013	(0.022)	-0.018	(0.013)	-0.017	(0.015)
Credit Info	-0.057	(0.187)	0.001	(0.001)	0.005	(0.005)	0.010	(0.022)	-0.017	(0.013)	-0.019	(0.015)
Business Disclosure	0.021	(0.134)	0.001	(0.001)	0.005	(0.005)	0.011	(0.022)	-0.017	(0.013)	-0.019	(0.015)
Director Liability	0.040	(0.177)	0.001	(0.001)	0.005	(0.005)	0.010	(0.022)	-0.017	(0.013)	-0.019	(0.015)
Ease of Suits	0.230	(0.213)	0.001	(0.001)	0.005	(0.005)	0.012	(0.023)	-0.018	(0.013)	-0.018	(0.016)
Tax Number	-1.310***	(0.426)	0.001	(0.001)	0.004	(0.005)	0.011	(0.021)	-0.015	(0.012)	-0.016	(0.015)
Tax Time	-0.008***	(0.003)	0.001	(0.001)	0.004	(0.005)	0.011	(0.022)	-0.017	(0.013)	-0.017	(0.015)
Tax Rate	-0.395	(0.270)	0.001	(0.001)	0.005	(0.005)	0.011	(0.022)	-0.018	(0.013)	-0.019	(0.016)

Note: This table reports the results from estimation of the specification (9), where the dependent variable is ICT investment. As a robustness check, we add ICT specific interest rate to control variables $X_{i,c}$ in (9). We define this interest rate as the ratio of ICT capital compensation and the stock of ICT capital. The estimation method is Tobit with $[0, 1]$ censoring. All regressions include industry and country dummies. The number of observations is 350, and F-statistics vary from 12.82 to 15.67. Robust (clustered) standard errors are in parentheses. *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.