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Culture, Law, and Contractual Relations

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CULTURE, LAW, AND CONTRACTUAL RELATIONS*

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Abstract

This paper explores the role of culture in firm organization and its interplay with legal enforcement in determining the organization and longevity of buyer-supplier relationships. We provide theory and evidence, showing how individualism and legal enforcement interact and affect firm behavior in industries with different technological characteristics. A higher level of individualism in source countries encourages integration (outsourcing) in high-(low-) technology industries. Legal institutions could increase the duration of contractual relationships by encouraging customization effort by individualistic suppliers with a sense of pride, while preventing infringement of sensitive technologies by those less concerned about self-achievement. Enforcement could however adversely affect the continuity of trade relations in more individualistic societies.

JEL codes:L24, O32, Z10, K42, F14, F23, D23

Keywords: Individualism; Supplier relation longevity; Legal institutions; Firm organization; Technology; Infringement; Knowledge absorption; Contract enforcement; Customization; Pride

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1 Introduction

In times of high global uncertainty, the stability of buyer-supplier relationships becomes a key factor in the resilience of global value chains (Besedes & Prusa 2006a, Hess & Persson 2011). The longevity of trade relationship has been associated with standard firm-specific characteristics such as firm productivity and financial stability (Békés & Muraközy 2012), gravity factors such as GDP and distance (Albornoz, Fanelli & Hallak 2016), and product-specific determinants such as product differentiation and product sophistication (Besedes & Prusa 2006b, Córcoles et al. 2014, Kostevc & Zajc Kejžar 2020). Trade duration has recently also been linked to institutional quality (Engemann, Jafari & Heckelei 2023). A question that remains unsettled is how cultural disposition such as individualism combined with formal institutions affect the longevity of supplier relationships. Contracts often rely on legal enforcement to prevent deviations that can occur for example in the form of underperformance or technology infringement. It is not straightforward, however, whether strong enforcement can be beneficial to a relationship when its obligations are automatically fulfilled based on the cultural traits of a society.

This paper investigates how legal institutions interact with culture, the former affecting formal and the latter informal enforcement, to impact the organization and durability of commercial buyer-supplier relationships. Culture is introduced in a model of asymmetric information framed within the empirically relevant property rights theory of the firm, where organizational form can be used to generate incentives to invest (Grossman & Hart 1986, Hart & Moore 1990).[1] We use the framework to first study firms' organizational choice in societies with different cultural traits, distinguishing between decisions in sectors where customization effort rather than technology is relevant, and those where valuable intangible assets play a central role and are at risk of infringement. We then examine the role of legal enforcement of contracts as a tool to resolve information asymmetry between the two parties and explore the circumstances in which it could be beneficial or disruptive to supplier relations. Whether or not the use of law consolidates relationships under different organizational modes depends on the culture present in the society.

Culture enters the model through a sense of forgone pride that individualistic suppliers

[1] See e.g. Antràs (2016) for an overview on the empirical evidence and Eppinger & Kukharskyy (2021) for a recent worldwide application.

feel when they misappropriate someone else's technology. Individualistic societies can be associated with a higher proportion of pride-oriented agents, as individualism places a high value personal achievement and awards social status to individual accomplishments such as entrepreneurial discoveries and innovations (Gorodnichenko & Roland 2017). Previous studies in psychology have shown that pride has a stronger effect on behavior in individualistic cultures (Lee et al. 2000, Markus & Kitayama 1991), where attitudes have a stronger effect on self-conscious emotions focused on the self and living up to one's own standards (Onwezen et al. 2014). Kanatas & Stefanadis (2014) interpret the feeling of foregone pride as a perfect substitute for guilt from breaching a contract, creating an informal enforcement mechanism. Cline & Williamson (2017) for instance confirm that contract enforcement costs are significantly lower for countries with more individualistic cultures.

The model investigates firms' organizational decision and the impact of contract enforcement in a setting of imperfect information, where firms must transfer knowledge to agents with different cultural backgrounds to complete and launch their product into the market. Suppliers must invest in the elaboration and absorption of the provided knowledge, which is positively related to their share of the surplus. In accordance with the property rights theory, organizational form can therefore be used to fuel supplier incentives.[2] In such framework, typically trust allows the headquarter (HQ) firm to integrate while guaranteeing supplier investment, particularly for relation-specific (non-contractible) inputs (Cingano & Pinotti 2016). In our model, in high technology sectors, pride considerations deter knowledge misappropriation by the supplier and allow the HQ to integrate and retain a higher share of the rents. In low technology sectors, infringement is not relevant but tangible property rights matter and supplier investment for customization tasks predominate. Here, it is more productive suppliers that require incentives, and these are the pride-oriented ones who want to be distinguished from their less productive counterparts for their larger investment. Consequently, individualistic societies transfer a higher share of the surplus that translates into outsourcing in these sectors.[3]

Contract enforcement can be used to prevent technology misappropriation and assure ap-

[2] See e.g. Antràs & Helpman (2008) on the analogy between outsourcing and the supplier's share of surplus.

[3] This is different from the mechanism of cultural "distance" in Gorodnichenko, Kukharskyy & Roland (2023), in which cultural frictions result in higher relative costs of integration, making outsourcing a more attractive option. Interestingly, they show that the negative effect of cultural distance on integration is mitigated for more productive HQs, who can more easily incur the costs of coordination across firm units through integration.

propriate investment in knowledge absorption aimed at customization. As a higher social value towards self-achievement could intrinsically prevent the infringement of others' properties or ideas, contract enforcement may prove superfluous and potentially counterproductive by reducing the commitment of pride-oriented suppliers to the relationship. Lack of legal institutions could, however, facilitate opportunistic misuse of an inventor's blueprint by suppliers who do not suffer from foregone pride. In industries with lower returns to investment, law can be complementary to informal enforcement influenced by culture, compelling the more productive individualistic suppliers to invest in knowledge absorption for a smaller share of the surplus. The results show that the introduction of contract enforcement can be beneficial by inducing agents concerned about pride to engage in customization effort in industries less reliant on valuable technologies, while preventing knowledge misappropriation by agents who do not prioritize personal achievement in more sensitive high technology sectors.

Our testable predictions are accompanied by evidence from comprehensive transaction level data on the population of Slovenian firms. The data is available for around 1.8 million import transactions from 63 different sourcing countries in the 2002-2010 period. Importantly, exploiting information on firms' annual import transactions allows us to estimate the length of product-market-specific import spells as a an indication of the survival rate of buyer-supplier relationships. We use this to show how the legal enforcement of contracts impacts the stability of relationship with suppliers from different cultural backgrounds, measured by Hofstede's cultural dimension of individualism, as a proxy for the degree to which a society values property rights. The relationship with a supplier is more durable in a legal environment that generates high returns. The organizing firm can choose whether to continue its partnership with a supplier or to terminate the relationship and seek alternative more profitable solutions. The data are also merged with detailed data on firms' foreign direct investments to study how the integration decision of firms varies with the level of individualism in the supplier country for inputs with different technological characteristics.

The remainder of the paper is organized as follows. Section 2 places our work in the relevant strands of research and highlights our contribution to the literature. Section 3 sets up the baseline model and Section 4 depicts the interrelation between culture and firm organization. Section 5 introduces contract enforcement and investigates its impact on supplier relations. Section 6 present the data and puts the predictions into test. Section 7 concludes.

2 Related Literature

Our work contributes to and unifies three bodies of literature on the interrelation of culture with law, firm organization, and the stability of buyer-supplier relationships. It is essentially based on two ideas. The first is the notion that in the presence of both formal and informal property rights institutions, the impact of formal constraints is greatly diminished and of the informal ones highly significant in securing property rights (Williamson & Kerekes 2011). At the same time, cultural origin influence opportunistic behavior in markets, but only in the absence of strong formal institutions (Cassar, d'Adda & Pauline 2014). Seen from a different perspective, control may backfire on the level of performance by limiting an individual's choice autonomy (Falk & Kosfeld 2006).

The building blocks of our theory relates primarily to Carlin, Dorobantu & Viswanathan (2009), in which a principal decides how much to invest based on the overall level of public trust and government protection. Trustworthy agents maximize the outcome of the investment opportunity, while opportunistic agents do only what is required by law. When social capital is important, public trust, and hence aggregate investment, declines with stricter legal enforcement because the latter makes it less rewarding for marginal agents to reveal that they are trustworthy. Instead in societies where social capital is less valuable, government regulation increases public trust and investment in the market. Drawing parallels with our work, a stringent legal system and individualistic traits can be considered as substitutes when stakes in a relationship are high and potentially complements when returns to investment are low. Formal enforcement of law can thus have different effects on the behavior of agents and durability of relationships.

Another related work is Bohnet, Frey & Huck (2001), whose theory highlights the principal's decision to offer a contract when faced with the risk of breach. They argue that enforcement is beneficial for intermediate costs of breach to maintain efficiency, as there are incentives to contract with selfish people, crowding out honesty in the long run. Similarly in our study, depending on technology characteristics, legal enforcement could be beneficial for intermediate levels of individualistic culture prevailing in the society. Along this line of reasoning, Bartling et al. (2021) argues that law and trust are complementary by showing that enforcement can only bring gains in trade relationships when trust levels are high. Their theory shows

a low-trust pooling equilibrium under weak or intermediate enforcement. A strong contracting environment could instead increase the ability of principals to exert high effort and distinguish trustworthy agents while screening out untrustworthy ones. In our model, law and culture can also be complementary in enhancing relationship stability considering both separating or pooling contracts, depending on the characteristics of the technology.

On the organizational side, Boehm & Oberfield (2020) suggests in line with the transaction cost approach that when judicial institutions are poor, plants respond by performing a larger range of production steps within the plant, i.e. integrate. Acemoglu & Johnson (2005) argue that contracting institutions can be substituted by informal arrangements similar to Boehm (2021), who also views legal means as redundant in some sectors, namely where informal enforcement matters. If legal and informal enforcement are substitutes, then according to Boehm & Oberfield (2020) the lack of social value for personal achievement should also encourage vertical integration. Gorodnichenko, Kukharskyy & Roland (2023) study the effect of cultural distance (individualism) on multinational firms' organizational choice and show that this is not necessarily the case as cultural distance may reduce incidences of integration within the transaction cost theory. They assume that integration of a supplier within firm boundaries eliminates coordination inefficiencies, but at the expense of a governance cost that is increasing in cultural differences. If the latter dominates, the HQ will decide to engage in outsourcing.

Finally, on the longevity of buyer-supplier relationships, recent works like Monarch & Schmidt-Eisenlohr (2020) and Martin, Mejean & Parenti (2021) use foreign partner identifier for US and French firms, respectively. Specifically, in an interesting result relevant for our work, Monarch & Schmidt-Eisenlohr (2020) shows evidence for a positive relationship between rule of law and the length of relationships. We specify this finding to be the case in the presence of a strong individualistic culture for low technology sectors and in its absence for high technology sectors. Using Chinese export data, Defever, Fischere & Suedekume (2016) instead explore trust-based agreements and long-term collaboration (by measuring supplier turnover) as a tool to offset inefficiencies in global value chains when formal contracts are not enforceable. Similar to our framework, a buyer seeks suppliers who are capable of producing the desired input in appropriate quantity and quality at a low cost, but also do not behave opportunistically. We show whether regulation nurtures or disrupts these relationship given the level of individualism in a society.

There are several attributes in our framework that distinguish it from existing literature. First, it is our way of integrating culture that we associate with a sense of pride, - which is foregone when an individual's benefits are derived from the misappropriation of another person's achievement as opposed to their own. In more individualistic societies, there is a higher level of pride, i.e., a higher proportion of agents who value pride in our model. Individualistic agents are more likely to acknowledge property rights and feel accountable to respect personal accomplishments, leading to a form of informal enforcement. Second, while most existing studies focus on showing the complementarity between trust and regulation, our analysis assesses the pros and cons of legal enforcement on supplier incentives. We examine how this affects the organizational form in a contractual relationship in different industrial sectors based on their level of technology intensity. Finally, we relate the enforcement mechanism to the problem of asymmetric information and highlight its importance in the absence of, and redundancy in the presence of, pride.

3 The Model

3.1 Basics

Consider the question of intellectual property and culture in an incomplete contract model of firm organization. A headquarter (HQ) firm that owns a technology must engage in a contract with a specialized entrepreneur or supplier to procure an intermediate input and complete a production process. The HQ transfers the blueprint of its technology to a supplier, which must then make invest in absorbing the knowledge. Introducing the role of culture in business relationships we investigate how it influences contracts and supplier investment decisions.

We consider two types of suppliers: individualists (H for high pride), who prioritize self-achievement and suffer foregone pride if they misuse technology that does not belong to them in their own interest, and their counterparts (L for low pride), who are indifferent about the source of profits and do not experience any psychological setback from unauthorized use of the HQ's technology. The two types are independently distributed in their respective proportions λ and $(1-\lambda)$, where λ could be interpreted as the degree of individualism in a society.

The timeline of the model is as follows. We consider a relationship between a principal

(HQ) and an agent (supplier). The HQ draws on a large pool of suppliers, all of whom are, identical from the HQ's perspective.[4] The unique difference is the unobservable individualistic cultural trait of suppliers regarding pride, i.e. $i \in \{H, L\}$.

In $t = 1$, HQ transfer the blueprint to a supplier i and offers a share α of surplus to have the supplier invest in absorbing the knowledge and provide the required input for the relationship. At $t = 2$, supplier i invests in knowledge absorption ζ_i with cost $c(\zeta_i) > 0$, where $c(0) = 0$, observable by the HQ. The supplier will invest if its incentive constraints are satisfied. It will however deviate and breach the contract if its participation constraints are not met, using the HQ's blueprint to produce the final good as a competitor. After all decisions have been made, the transfer is made and parties' payoffs are realized at $t = 3$.

In equilibrium, the HQ offers a share of the profits that is just sufficient to guarantee supplier investment and/or participation in the contract, based on the level of culture λ in the society.

3.2 Investment in Knowledge Absorption

At the final stage, the supplier realizes a payoff $\pi_i^{ne} = \alpha x$ with probability $1 - p_0$ of continuing the relationship, where $\alpha \in [0, 1]$ is the share of revenue the supplier receives through the bargaining process and x is the total revenue. Alternatively, its payoff is $\pi_i^e = \tilde{x} - \chi\psi$ if it decides to violate the contract with probability p_0, where total revenue is $\tilde{x} > \alpha x$, $\forall \alpha \in [0, 1]$; χ is a dummy variable with $\chi = 1$ for the individualistic proportion of the population (λ), and $\chi = 0$ for others $(1 - \lambda)$ so that only the former experience disutility from foregone pride, ψ. The HQ's profit is simply zero in the case of opportunistic expropriation with probability p_0, while it is equal to $(1 - \alpha)x$ with probability $(1 - p_0)$ in the case of no expropriation. The supplier i's expected payoff is:

$$\mathbb{E}[\pi_i] = p_0 \pi_i^e + (1 - p_0)\pi_i^e \tag{1}$$

A supplier i could invest ζ_i in $t = 1$, which in turn increases profits realized from the partnership. If the supplier chooses to defect, it earns

$$\pi_i^e(\zeta_i) = \tilde{x}(\zeta_i) - \chi\psi(\zeta_i) - c(\zeta_i), \tag{2}$$

[4] Both the principal and the agent are risk neutral and there is no discounting.

where the infringing supplier's investment in knowledge absorption is destined at increasing its own profits: $\tilde{x}_\zeta(\zeta) > 0$. Instead, its profit in case of no expropriation becomes

$$\pi_i^{ne}(\zeta_i) = \alpha x(\zeta_i) - c(\zeta_i), \tag{3}$$

where investing in knowledge absorption increases potential gains from the relationship: $x_\zeta(\zeta) > 0$. Note that the knowledge absorbed brings gains under both scenarios (expropriation and no expropriation). However, since returns to infringement are higher, incentives to comply with the contract also change as suppliers are not only more capable, but also a bigger threat. Of course, for individualistic agents these gains are countered by the disutility from foregone pride in case the investment is used for misappropriated use of the HQ's technology, i.e., $\psi_\zeta(\zeta) > 0$. All else equal, suppliers on average would be less interested in fulfilling the contract such that $\tilde{p} > p_0$ because they could realize higher returns alone as a rival to the HQ.[5]

Hence, by investing, a supplier may achieve an expected profit

$$\mathbb{E}[\pi_i(\zeta_i)] = \tilde{p}\pi_i^e(\zeta_i) + (1-\tilde{p})\pi_i^{ne}(\zeta_i) \tag{4}$$

Maximization of eq. (4) foresees an optimal level of investment to absorb the blueprint technology that corresponds to

$$\zeta_i^* \Longrightarrow \alpha x_\zeta(\zeta_i) + \tilde{p}\left(\tilde{x}_\zeta(\zeta_i) - \alpha x_\zeta(\zeta_i) - \chi\psi_\zeta(\zeta_i)\right) = c_\zeta(\zeta_i). \tag{5}$$

4 Technology and Organization

By backward induction and for a given realization of all payoffs, we can solve the supplier's problem determining its incentive and participation constraints necessary to satisfy the contract. Starting from eqs. (1), (4) and (5), the supplier invests in knowledge absorption if

$$\mathbb{E}[\pi_i(\zeta_i^*)] \geqslant \mathbb{E}[\pi_i]. \tag{6}$$

[5] From an ex-ante perspective, $\tilde{p} \in [0,1]$ is drawn from the distribution function $F(p)$ with everywhere strictly positive density $f(p) > 0$, i.e., $\tilde{p} = \int_{p_0}^{1} pf(p)dp$.

After rearranging terms, we obtain

$$\alpha \triangle x_i + (\triangle \tilde{x}_i - \alpha \triangle x_i - \chi \triangle \psi) P \geqslant c(\zeta_i^*), \tag{7}$$

where $\triangle \tilde{x} = \tilde{x}(\zeta_i^*) - \tilde{x}$, $\triangle x = x(\zeta_i^*) - x$, $\triangle \psi = \psi(\zeta_i^*) - \psi$, $\forall i \in \{H, L\}$ and $P = \int_{p_0}^{1} (p - p_0) f(p) dp$. Therefore, eq. (6) is binding at the optimum so that

$$\alpha \geqslant \hat{\alpha}_i := \frac{c(\zeta_i^*)}{\triangle x_i (1 - P)} - \frac{\triangle \tilde{x}_i}{\triangle x_i} + \chi \frac{\triangle \psi}{\triangle x_i}. \tag{8}$$

A supplier requires a minimum level of $\alpha-$share in the contract, i.e., $\alpha = \hat{\alpha}_i$, to undertake the investment. When technology acquisition is costlier, i.e., higher $c(\zeta_i^*)$, or in the absence of valuable appropriable technology (with returns shown by the second and the third term of (8)) a higher $\hat{\alpha}_i$ is required to motivate suppliers to make the adequate investment.

A supplier's participation to the contract can be guaranteed if

$$[\pi_i^{ne}(\zeta_i^*) - \pi_i^{ne}] \geqslant [\pi_i^{e}(\zeta_i^*) - \pi_i^{e}], \tag{9}$$

which after rearranging terms gives

$$\alpha \geqslant \tilde{\alpha}_i := \frac{\triangle \tilde{x}_i}{\triangle x_i} - \chi \frac{\triangle \psi}{\triangle x_i}. \tag{10}$$

Expression (10) implies that more valuable technologies that produce higher returns upon infringement increase the share required to keep the supplier in the contract. The HQ offers a contract with an $\alpha-$share that maximize its expected profits

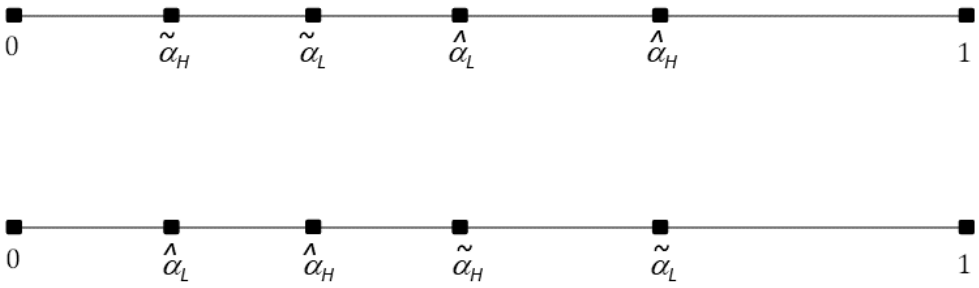
$$\mathbb{E}[\Pi] = (1 - \alpha) \triangle x_i (1 - P), \tag{11}$$

subject to the incentive and participation constraints, defined in eqs. (8) and (10).

This simple setting allows us to single out how the relative productivity of suppliers is solely dependent on the impact of individualism on knowledge absorption. First, from eq. (5), we know that the presence of pride encourages investment, i.e., $\zeta_H^* > \zeta_L^*$. This implies that the HQ must offer a higher $\hat{\alpha}-$share of the revenue to ensure investment by individualistic

suppliers, who are the more productive types. At the same time, a relatively lower $\tilde{\alpha}-$share is required to have them abide by the contract because pride reduces their incentives to breach.

Figure 1: Supplier Constraints



Above: low technology; Below: high technology

Figure 1 illustrates the relation between these two constraints and the technological environment. The first line represents the setting $\hat{\alpha}_i > \tilde{\alpha}_i$, which occurs when the required input does not contain valuable technology and incentives to invest are low as infringement is not a very attractive option. Suppliers therefore require a higher share to invest than to stay in the relationship. We refer to this case as the low technology sector. The second line instead depicts the transfer of a blueprint technology that renders reverse engineering more attractive i.e. $\hat{\alpha}_i < \tilde{\alpha}_i$. The incentive constraint of suppliers to invest are hence easier to satisfy than preventing them from breaching the contract and misappropriating the technology. A higher share is required to guarantee that suppliers use the provided technology within the contract. We define this as the high technology sector.

To induce both types to participate and invest, the HQ must offer a contract with share

$$\alpha = \max\{\hat{\alpha}_i; \tilde{\alpha}_i\} \quad i \in \{H, L\}. \tag{12}$$

Recall also from the property rights literature that offering a higher share can be interpreted as outsourcing (as opposed to integration) to provide supplier incentives and avoid inefficiencies caused by underinvestment. Elaborating further the low technology sector, we can therefore state the following Proposition:

Proposition 1. *In low technology sectors where $\hat{\alpha}_i > \tilde{\alpha}_i$, $\forall i \in \{H, L\}$, the two possible contracts shares that derive from (12) are $\hat{\alpha}_H$ and $\hat{\alpha}_L$. Given $\hat{\alpha}_H > \hat{\alpha}_L$ and that outsourcing is associated with a higher share,*

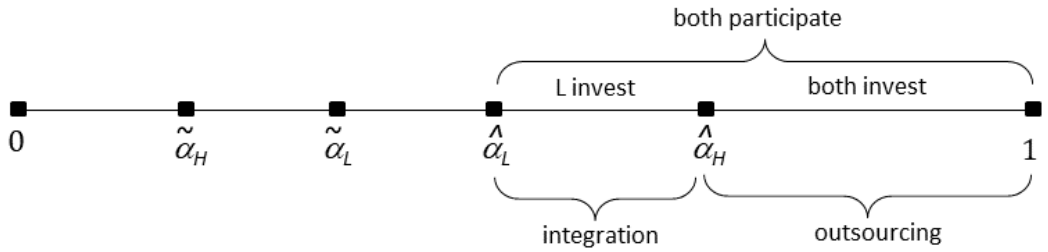
- An *outsourcing* contract in which all suppliers invest exists at $\alpha = \hat{\alpha}_H$ if $\lambda > \hat{\lambda}$,

$$\text{with } \hat{\lambda} := \frac{\triangle x_L(\hat{\alpha}_H - \hat{\alpha}_L)}{\triangle x_L(\hat{\alpha}_H - \hat{\alpha}_L) + (1 - \hat{\alpha}_H)\triangle x_H} \tag{13}$$

- An *integration* contract in which only L-type suppliers invest exists at $\alpha = \hat{\alpha}_L$ if $\lambda < \hat{\lambda}$.

Proof. See Appendix A. □

Figure 2: Low Technology Sectors



Outsourcing and Integration Contracts

Note that both organizational outcomes are characterized by a unique contract offered to all suppliers. The intuition is straightforward and can be observed in Figure 2.

In Proposition 1, the only varying component between the two contracts offered to suppliers is the extent of incentives in terms of organizational structure. When $\lambda > \hat{\lambda}$, all suppliers participate in the contract and receive the necessary incentive through outsourcing to engage in knowledge absorption for customization. Since there is a large proportion of the more productive individualistic suppliers (H-type), the HQ can achieve higher returns by satisfying their incentive constraint through a larger α-share. Alternatively for $\lambda < \hat{\lambda}$, a lower α-share in line with an integration strategy is offered, where both supplier types remain in the contract but only the less productive L-type invest in knowledge absorption as they require a lower reward. Since the proportion of individualists is low, the HQ no longer finds it optimal to pay a high α-share and keeps a larger share of profits to compensate for their lack of investment.

Turning to high technology sectors, Proposition 2 summarizes the results:

Proposition 2. *In high technology sectors, where $\tilde{\alpha}_i > \hat{\alpha}_i$, $\forall i \in \{H, L\}$, the two possible contract shares that derive from (12) are $\tilde{\alpha}_H$ and $\tilde{\alpha}_L$. Given $\tilde{\alpha}_L > \tilde{\alpha}_H$ and that outsourcing is associated with a higher share,*

- An *outsourcing* contract in which all suppliers participate at $\alpha = \tilde{\alpha}_L$ if $\lambda < \tilde{\lambda}$,

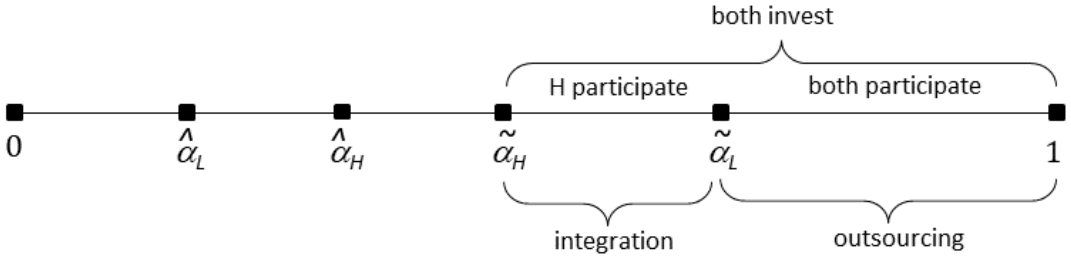
$$\text{with } \tilde{\lambda} := \frac{(1-\tilde{\alpha}_L)\triangle x_L}{(1-\tilde{\alpha}_L)\triangle x_L + (\tilde{\alpha}_L - \tilde{\alpha}_H)\triangle x_H} \tag{14}$$

- An *integration* contract in which only H-type suppliers participate at $\alpha = \tilde{\alpha}_H$ if $\lambda > \tilde{\lambda}$.

Proof. See Appendix B. □

With the choice now being between $\tilde{\alpha}_L$ and $\tilde{\alpha}_H$, condition $\tilde{\alpha}_L > \tilde{\alpha}_H$ suggests that now $\tilde{\alpha}_L$ coincides with a case of outsourcing. When the proportion of individualistic suppliers is low ($\lambda < \tilde{\lambda}$), the HQ offers a contract with share $\tilde{\alpha}_L$ to all suppliers, persuading both types to invest and participate. This share persuades also suppliers who do not suffer from foregone pride upon opportunistic behavior to stay in the contract and dissuades reverse engineering. Otherwise if $\lambda > \tilde{\lambda}$, an integration contract with only H-type suppliers prevails. In this case, the low proportion of the L-types makes it less detrimental to sacrifice the safeguarding of its transferred technology, prompting the HQ to keep a higher share of rents.

Figure 3: High Technology Sectors



Outsourcing and Integration Contracts

Figure 3 sketches the two potential contracts, which in this case could be a unique contract for all types or one in which only individualistic suppliers participate.

5 Legal Enforcement of Contracts

The analysis up to now generates a variety of contracts when the use of technology is left to suppliers' own judgement. The goal of this section is to assess the impact of contract enforcement through legal institutions through the lens of the intellectual property owner, i.e. the HQ.

Let us consider a situation, where perfect legal enforcement makes infringement prohibitively costly. This could be introduced in our timeline as $t = 0$, where nature decides whether or not contracts are enforced. Enforcement removes the distinction between the two supplier types, and thereby their incentives to steal the technology. Hence, the blueprint can only be used within the relationship for knowledge absorption and customization can no longer be used for opportunistic expropriation.

Maximization of eq. (3) now yields an optimal level of investment corresponding to

$$\bar{\zeta}^* \Rightarrow \alpha x_\zeta(\zeta_i) = c_\zeta(\zeta_i). \tag{15}$$

Therefore, the incentive constraint to invest is satisfied when

$$\pi_i\left(\bar{\zeta}^*\right) \geqslant \pi_i. \tag{16}$$

At the same time, the HQ can improve its payoff $\bar{\Pi}(.) = (1-\alpha)\triangle x$ by offering an α-share that induces the supplier to make the optimal level of investment $\bar{\zeta}^*$, so that

$$\alpha \geqslant \bar{\alpha} := \frac{c(\bar{\zeta}^*)}{\triangle \bar{x}}, \tag{17}$$

where $\triangle \bar{x} = x(\bar{\zeta}) - x$. Note that investment $\bar{\zeta}$ and therefore its returns $\triangle \bar{x}$ continue to be larger in high technology sectors. Thus, the HQ's problem simplifies to the maximization of its expected profit

$$\bar{\Pi} = (1-\bar{\alpha})\triangle \bar{x}, \tag{18}$$

subject to the incentive constraint in eq. (16).

In section 3 we have derived that the feeling of pride induces larger supplier investment, $\zeta_H^* > \zeta_L^*$. We now compare the level of investment with or without legal enforcement, as summarized in Lemma 1:

Lemma 1. *Legal contract enforcement reduces supplier's customization effort, i.e.,* $\zeta_i^* > \bar{\zeta}^*$ $\forall i \in \{a, m\}$.

Proof. See Appendix C. □

According to Lemma 1, suppliers enjoy a larger outside option in the absence of legal contract enforcement. The possibility of reverse engineering renders knowledge absorption more attractive, whereas it is excluded and punished by law under legal enforcement. The outside option increases the incentives to invest by making it possible for suppliers to use the technology for their own use, resulting in $\zeta_H^* > \zeta_L^* > \bar{\zeta}^*$.

Turning to the share offered to the supplier, with contract enforcement making participation mandatory, only the incentive constraint, $\bar{\alpha}$, is binding. As $\hat{\alpha}_i$ is high in low technology sectors, it is easier to satisfy the participation constraint under enforcement, retaining a higher share of the rents. Similarly, a high $\tilde{\alpha}_i$ in high technology sectors makes it possible to offer a lower share, as participation is guaranteed by enforcement. We can state that

Lemma 2. *Legal contract enforcement reduces the α-share offered in both low and high technology sectors.*

Proof. See Appendix D. □

5.1 Contract Enforcement and Supplier Relations

We can now proceed by evaluating the impact of contract enforcement on the value of the relationship with a supplier, given the proportion of individualistic agents, under each derived organizational structure. Let us start with low technology sectors, for which Proposition 1 states that integration (outsourcing) prevails when $\lambda < \hat{\lambda}$ ($\lambda > \hat{\lambda}$). Comparing the payoff of a relationship with and without enforcement yields $\mathbb{E}[\Pi]_{il} > \bar{\Pi}$ and $\mathbb{E}[\Pi]_{ol} > \bar{\Pi}$ if and only if the degree of individualism in the society is such that

$$\lambda < \bar{\lambda}_{il} = 1 - \frac{(1-\bar{\alpha})\triangle\bar{x}}{(1-\hat{\alpha}_L)\triangle x_i\,(1-P)}, \tag{19}$$

and

$$\lambda > \bar{\lambda}_{ol} = \frac{(1-\bar{\alpha})\triangle\bar{x} - \triangle x_L(1-\hat{\alpha}_H)\,(1-P)}{(1-\hat{\alpha}_H)(\triangle x_H - \triangle x_L)\,(1-P)}, \tag{20}$$

for the integration and outsourcing contracts respectively.

Consider first the case of integration, in which only the L-type invest. Inequality (19) suggests that $\bar{\lambda}_{il}$ is small in low technology sectors, as we know from Lemma 2 that the initial

share $\hat{\alpha}_i$ is high and $\bar{\alpha}$ relatively low. To the extent that $\bar{\lambda}_{il} < \hat{\lambda}$ holds, legal enforcement makes it possible to induce knowledge absorption by the (more productive) H-type through a lower profit share. This can benefit the HQ if the proportion of H-type agents who are persuaded to invest is large enough to compensate for reduced investment by the L-type due to the elimination of their outside option as per Lemma 1, which is the case if $\lambda > \bar{\lambda}_{il}$. We can state that:

Proposition 3. *For an integration contract in low technology sectors, HQ's expected payoff is larger with legal enforcement if it induces a large proportion of individualistic suppliers to invest* $(\bar{\lambda}_{il} < \lambda < \hat{\lambda})$.

Proof. Follows directly from eqs. (13), (17), (18), (19), (28), and Appendix E. □

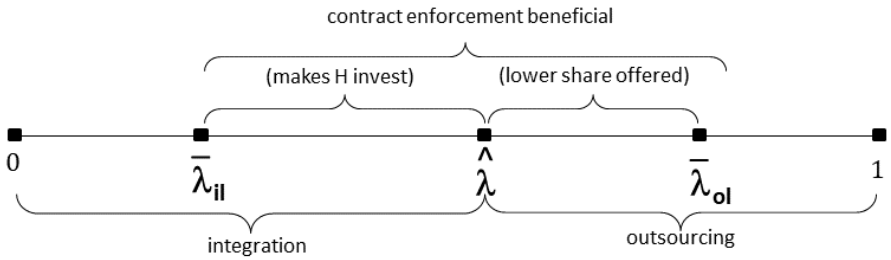
In low technology sectors, contract enforcement results in underinvestment by the L-type in the intensive margin, whereas it makes the highly productive H-type also invest for a lower share of profits. This increases the value of the relationship when the proportion of individualistic suppliers is large, which at the same time mitigates losses from underinvestment by a lower proportion of the non-individualist type in the extensive margin, $\lambda > \bar{\lambda}_{il}$.

Turning to an outsourcing contract, inequality (20) suggests that $\bar{\lambda}_{ol}$ is large in low technology sectors since we know from Lemma 2 that the initial share $\hat{\alpha}_i$ is high and $\bar{\alpha}$ relatively low. Legal enforcement allows the HQ to share a lower portion of the revenues, but according to Lemma 1 also reduces supplier incentives to invest. To the extent that $\bar{\lambda}_{ol} > \hat{\lambda}$, enforcement can be beneficial if gains from lower revenues shared dominates losses from depressed supplier incentives to invest. This occurs when the proportion of H-type suppliers is large, i.e. $\lambda < \bar{\lambda}_{ol}$, as the valued added of their investment and therefore the loss brought about by the reduced incentives is low. Otherwise, it results in significant underinvestment by the more numerous highly productive H-type, making the relationship less attractive to the HQ. Hence,

Proposition 4. *For an outsourcing contract in low technology sectors, HQ's expected payoff is larger with legal enforcement in the presence of a low proportion of individualistic suppliers through a lower share offered without a large drop in supplier investment* $(\bar{\lambda}_{ol} > \lambda > \hat{\lambda})$.

Proof. Follows directly from eqs. (13), (17), (18), (20), (27), and Appendix E. □

Figure 4: Impact of Legal Institutions on Contractual Relations



Contract Enforcement in Low Technology Sectors

The comprehensive illustration of low technology sectors is depicted in Figure 4, where we can observe that the impact of legal enforcement on the value of the relationship is non-linear in the pervasiveness of individualism in the society. With integration, contract enforcement is a remedy to induce investment by individualistic agents when they comprise a large part of the society, whereas it creates savings under outsourcing if their proportion is low.

We know from Proposition 2 that in high technology sectors an integration (outsourcing) contract prevails when $\lambda > \tilde{\lambda}$ ($\lambda < \tilde{\lambda}$). Recall that in these sectors returns to supplier investment is large and at the same time there exists a high risk of infringement. An environment without enforcement is preferred ($\mathbb{E}[\Pi]_{ih} > \bar{\Pi}$ and/or $\mathbb{E}[\Pi]_{oh} > \bar{\Pi}$) if and only if the level of individualism is such that

$$\lambda > \bar{\lambda}_{ih} = \frac{(1-\bar{\alpha})\triangle\bar{x}}{(1-\tilde{\alpha}_H)\triangle x_H\,(1-P)}, \tag{21}$$

and

$$\lambda > \bar{\lambda}_{oh} = \frac{(1-\bar{\alpha})\triangle\bar{x} - \triangle x_L(1-\tilde{\alpha}_L)\,(1-P)}{(1-\tilde{\alpha}_L)(\triangle x_H - \triangle x_L)\,(1-P)}, \tag{22}$$

for integration and outsourcing contracts respectively.

Under integration only the H-type suppliers respect the terms of the contract. Inequality (21) suggests that $\bar{\lambda}_{ih}$ is large in high technology sectors, as we know from Lemma 2 that the initial share required by suppliers to remain loyal $\tilde{\alpha}_H$ with no enforcement is high, and that with legal enforcement $\bar{\alpha}$ is relatively low. To the extent that $\bar{\lambda}_{ih} > \tilde{\lambda}$, legal institutions prevent infringement by the L-type and oblige them to comply with the contract while receiving a lower share of profits. This works to the HQ's advantage if the proportion of non-individualistic

suppliers who now invest in the contract rather than in reverse engineering is large enough to compensate for the negative effect of enforcement depicted in Lemma 1 on the already participating individualistic suppliers' investment. This occurs when $\lambda < \bar{\lambda}_{ih}$ and can be summarized as

Proposition 5. *For an integration contract in high technology sectors, HQ's expected payoff is larger with legal enforcement if it deters a large proportion of non-individualistic suppliers from infringement* $(\tilde{\lambda} < \lambda < \bar{\lambda}_{ih})$.

Proof. Follows directly from eqs. (14), (17), (18), (21), (35), and Appendix F. □

If instead $\lambda < \tilde{\lambda}$, the share offered to satisfy the participation constraint is higher and resembles an outsourcing contract. Inequality (22) suggests that $\bar{\lambda}_{oh}$ is large in high technology sectors since we know from Lemma 2 that the initial share $\tilde{\alpha}_i$ is high and $\bar{\alpha}$ relatively low. Here, contract enforcement allows the HQ to retain a higher share of profits due to the low $\bar{\alpha}$ without risking the expropriation of their technology, and brings benefits when the proportion of the L-type is sufficiently large, i.e. $\lambda < \bar{\lambda}_{oh}$. With a large enough $\bar{\lambda}_{oh}$ in sectors with valuable technology prone to misappropriation such that $\bar{\lambda}_{oh} > \tilde{\lambda}$, this threshold is not binding so that enforcement results in a larger payoff for the HQ at all low levels of individualism under which outsourcing prevails. We can state that:

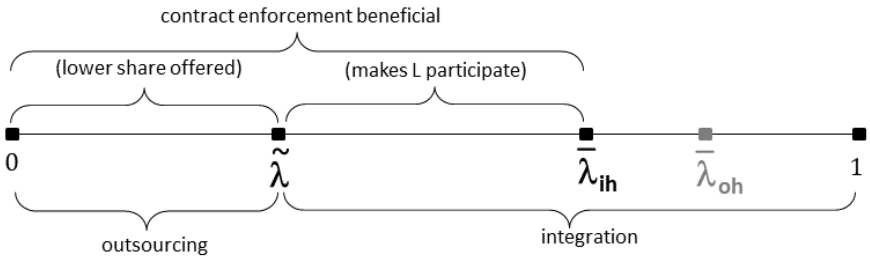
Proposition 6. *For an outsourcing contract in high technology sectors, HQ's expected payoff is always larger with legal enforcement through a lower share offered while ensuring that non-individualistic suppliers adhere to the contract* $(\lambda < \tilde{\lambda} < \bar{\lambda}_{oh})$.

Proof. Follows directly from eqs. (14), (17), (18), (22), (34), and Appendix F. □

The point emphasized in Proposition 6 is that in this case the major advantage of enforcement is that the HQ no longer needs to sacrifice the high outsourcing share of profits to assure participation.

The comprehensive illustration of high technology sectors is depicted in Figure 5. There exists a critical proportion of individualistic suppliers below which the valuable nature of the technology in these sectors make it crucial to avoid infringement through legal enforcement, $\lambda < \bar{\lambda}_{ih}$. A higher proportion of these agents instead makes a system of self-regulation preferable as it allows for benefits from their larger investment. Although investment takes place

Figure 5: Impact of Legal Institutions on Contractual Relations



Contract Enforcement in High Technology Sectors

by both types in this scenario, non-individualist suppliers prefer to use it for reverse engineering if the HQ does not offer a sufficiently large α to satisfy their participation constraint, i.e. an integration contract that occurs for $\lambda > \tilde{\lambda}$. A relatively large representation of this type ($\lambda < \bar{\lambda}_{ih}$) would make the HQ gain from legal measures in the extensive margin by having them included in safely enforced contracts. Enforcement also brings gains on the intensive margin as it allow the HQ to give up a lower share of the pie without risking to lose the market to non-individualistic suppliers. The latter cost-saving channel plays a larger role when the proportion of this type is even higher ($\lambda < \tilde{\lambda}$), which would otherwise require an outsourcing contract with a high $\tilde{\alpha}_L$ share to keep suppliers devoted to the partnership.

We can deduce from the analysis that legal institutions are generally preferred by HQs that own intellectual property when the desirable level of self-adherence is not present in the society. This is particularly true for outsourcing. The nature of gains brought about by contract enforcement vary and depend on sectoral characteristics. When technology is less valuable, legal enforcement can induce individualistic suppliers to undertake the optimal level of investment to absorb and utilize knowledge embedded in the blueprint. For more valuable technologies, it deters infringement by the non-individualistic type. In both cases, in can also bring savings in terms of reduced share of revenue offered to the supplier.

Under an outsourcing equilibrium, gains brought about by contract enforcement originate from offering a lower share to the supplier. Legal institutions are only favourable for a large relative presence of L-type suppliers when technology is less valuable, whereas it is always beneficial for valuable technologies. Recall however that in the latter case outsourcing occurs for low levels of individualism in the first place. In an integration equilibrium, contract enforcement results in higher investment by the H-type for low technology sectors and deters

infringement by the L-type in high technology sectors. Legal enforcement is therefore preferred by integrated firms when the HQ technology is less (more) valuable if the proportion of H-type (L-type) suppliers is high. This is also because the opportunity cost of legal institutions in terms of lower investment by L-type (H-type) suppliers to absorb knowledge in sectors with less (more) valuable technologies is lower when they constitute a smaller share of the market.

5.2 Duration of Contractual Relationships

Firms involved in global value chains usually have a large number and a complex network of supplier-buyer relationships. Therefore, it is virtually impossible to determine the profitability for each individual supplier relationship, so empirically we use the duration/stability of the relationship as a measure of supplier relationship performance. A stable relationship is a crucial aspect of supplier relationship performance and involves the commitment of both parties to maintaining a positive long-term relationship (Lai et al. 2005). As Chatain (2011) noted, predicting relationship termination is useful when it is not possible to directly observe value creation at the relationship level because factors that affect value creation also influence the termination of relationships.

Intuitively, given the level of individualism in a society and the resulting organizational choice by firms, relationship with a supplier is more durable in a legal environment that generates high returns. The HQ can choose whether to continue its partnership with a supplier or to eventually disrupt the relation and seek alternative more profitable solutions. Our findings further illustrate that the impact of contract enforcement and its interplay with culture (informal enforcement) in determining the longevity of a HQ's relationship with a supplier varies based on the technology content of an industry. Looking at the persistence of a contractual relation as an outcome of its profitability, contract enforcement always reinforces the relationship in societies with low levels of individualism. It is instead detrimental for the survival of a relationship in more individualistic societies, where informal enforcement plays a major role in inducing high levels of supplier investment and preventing opportunistic expropriation. In low technology industries where tangible property rights prevail, culture and law can be complementary in raising supplier investment committed to the relationship and therefore the duration of the relation. For high levels of individualism however where obligations are met

by informal means, enforcement can be redundant and makes the contract less attractive by reducing suppliers' investment to perform.

In what follows, we present the data and proceed with the empirical verification of the model predictions. We first investigate how firms' integration versus outsourcing decision for their sourcing transactions are affected by cultural dimension of individualism across supplier countries of inputs with different technological intensity. We then examine how legal contract enforcement and the level of individualism in the source country interact in impacting the longevity of sourcing relationships in product-market pairs.

6 Empirical Investigation

6.1 Data

The basis of our empirical analysis lies on the distinction between culture and legal institutions. Individualism is a key cultural dimension in cross-cultural studies (Gorodnichenko & Roland 2011), the measurement of which was proposed by Hofstede (2001, 2011) at national level. As discussed in the introduction, in our framework it captures an individual's value for self-achievement that manifests itself as a sense of pride, forfeited when misappropriating accomplishments by others.[6] Our other key independent variable instead must measure the quality of contract enforcement, property rights, and courts. This can be measured by rule of law (Alesina & Giuliano 2015), for which we use the indicator provided by World Bank (2015).

We conduct our empirical analysis on transaction-level trade data for the population of Slovenian firms. The trade transaction data are provided by the Statistical Office of the Republic of Slovenia (SORS) and include transactions at the most detailed 8-digit level of the European Combined Nomenclature (hereinafter CN) classification covering the 2002-2010 period. Using the unique firm identifiers, the transaction-level trade database is merged with (i) detailed information on the direction of firms' cross-border FDI outflows provided by the

[6] In collectivism, there would be no psychological disutility in copying an innovator's intellectual property as it is perceived as a communal good. Note however that individualism is not necessarily the counterpart of collectivism and that they are often treated as two independent dimensions (Man & Lam 2003, Oyserman et al. 2002).

Bank of Slovenia and (ii) firms' financial statements data from the Agency for Public Legal Records and Related Services (APLR). Hence, we have at our disposal firms' annual import transactions from partner countries as well as their outward FDI positions in the respective host partner countries. Additionally, we use a database on the performance of the foreign affiliates of Slovenian firms provided by the Bank of Slovenia, which contains further information on affiliates' performance, including core industry of activity. This database is only available since 2007. However, we do not have information about individual intra-firm trade transactions between Slovenian headquarters and their affiliates. In our final sample, we have 8,652 firms that performed almost 1.8 million product-market-specific import transactions from 63 different sourcing countries. Table 7 in Appendix G presents descriptive statistics for firms in the sample during the 2002-2010 period. On average, a firm from our dataset is 13 years old and employs 60 workers. It generates around 28% of its revenues in foreign markets with average value added per employee exceeding 40,000 EUR and debt to assets ratio around 65%.

Table 1: Summary statistics for low- and high-tech import transactions, 2002(2007)-2010

	Low-tech transactions			High-tech transactions		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Import transaction termination	1,643,023	0.3481	0.4764	145,519	0.4263	0.4945
Length of import spell	1,096,205	2.1308	1.5464	100,978	1.9375	1.4385
Integration	689,389	0.0005	0.0223	55,751	0.0002	0.0140
Rule of law	1,643,023	1.2684	0.6608	145,519	1.3865	0.5980
Culture IDV	1,643,023	65.3640	14.3505	145,519	66.4231	15.5808

Sources: Statistical Office, Bank of Slovenia. Hofstede (2001) and World Bank (2015).

For the purpose of the analysis, we define products at the 6-digit level of product group CN classification that fully complies with the 6-digit HS code.[7] Some of the key characteristics of the product-market specific import transactions are shown in Table 1. The prevailing type of

[7] In 2007, the HS classification underwent a substantial revision, therefore it was necessary to pair the HS6 2007 and HS6 2002 codes. In converting the HS2007 to HS2002 codes, we rely on Beveren, Bernard & Vandenbussche (2012) concordance approach but assign one single code of the HS 2002 edition to each HS 2007 code. This requires certain simplifications where the HS 2007 code is the result of either merging (1-to-n type of relationship) or splitting and merging (n-to-n relationship) of several codes in the previous 2002 classification. In this case, we follow the United Nations Statistics Division (2009) and give priority to one subheading among several with the same code as the HS 2007 subheading (if one exists). The retained code rule is based on the general World Customs Organisation's practice to only retain the existing code if no substantial changes have been made to its scope.

import transactions are low-tech, while high-tech products account slightly over 8% of HS6 product-market specific import transactions. High-tech product-market specific import spells are on average shorter lasting with around 43% of import termination observations in the sample compared to 35% in case of low-tech imports. Average length of specific HS6 product import spell from specific market is below 2 years for high-tech products, while the average longevity od low-tech import spells is above 2 years. Furthermore, the share of vertically integrated import relations (the categorisation into integrated and outsourced inputs is explained in the next section) is lower for the group of high-tech products compared to the low-tech ones, 0.02 and 0.05% respectively. One point of particular interest is that the high-tech inputs are on average sourced from countries' with higher value of both rule of law and individualism.

Table 2: Composition of product-market importing spells

	Low-tech transactions		High-tech transactions		All transactions	
Length of import spell	No. of observations	Share of total	No. of observations	Share of total	No. of observations	Share of total
1	582,105	53.10	59,873	59.29	641,978	53.62
2	183,035	16.70	15,908	15.75	198,943	16.62
3	124,576	11.36	10,258	10.16	134,834	11.26
4	88,275	8.05	6,569	6.51	94,844	7.92
5	62,540	5.71	4,406	4.36	66,946	5.59
6	41,604	3.80	2,870	2.84	44,472	3.71
7	14,072	1.28	1,094	1.08	15,166	1.27
Total	1,096,205	100	100,978	100	1,197,183	100

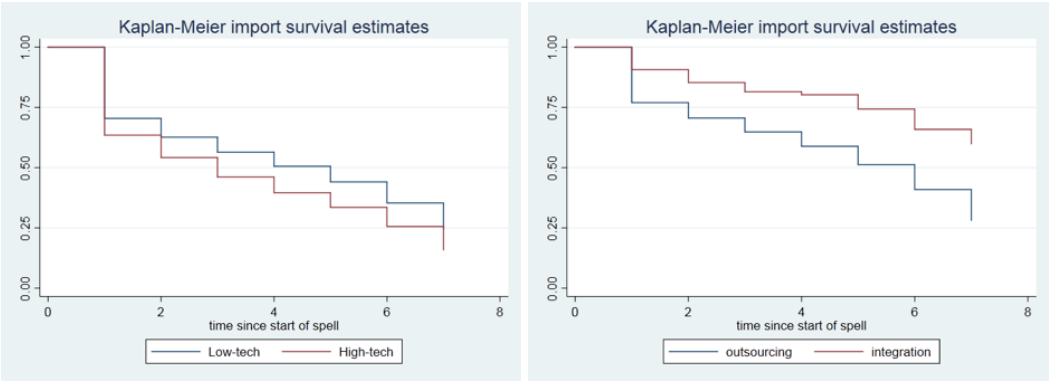
Source: Statistical Office of Republic of Slovenia

Composition of the sample with respect to the length of product-market specific import spells are presented in Table 2. The median spell length is 1 year for both low- and high-tech spells, with only 30% of low-tech and 25% of high-tech spells, respectively, exceeding 2 years. The longest product-market specific import spells in our sample are 7 years long and occur in 1.28 per cent of cases for low-tech goods and 1.08 per cent for high-tech ones.

Figure 6 shows the Kaplan-Meier import survival estimates[8] for the sample split between

[8]The Kaplan-Meier estimator is a non-parametric statistic used to estimate the survival function from lifetime data. In this instance it is used to depict the survival of product-market specific import spells. The probability that an product-market specific import relationship survives longer than t periods is given by $S(t) = \prod_{i:t_i \leq t}(1 - \frac{d_i}{n_i})$, where d_i/n_i is the share of terminated import transactions at time t_i.

Figure 6: Kaplan-Meier import survival estimates by technology intensity and organizational mode



Source: Statistical Office of Republic of Slovenia

high- and low-tech import spells (left panel) and transactions being integrated and those that were outsourced (right panel). Foremost, it is evident that the import survival rates are higher for low-tech transactions than high-tech ones, more so in the initial years when termination rates are noticeably higher for the high-tech transactions. The difference in survival rates is even more evident between the two organisational modes, with much higher survival rates in case of integrated transactions. Integration relationship is associated with around 15 percentage point higher survival rate after the first year of the product- market importing spells.

6.2 Estimates on Culture and Firm Organization

We start the empirical analysis with firm's organization decision in terms of integration versus outsourcing of inputs. Integration decision is observed at the firm's individual import transaction level of HS6 product-market specific pairs. The dependent variable in empirical model is a binary indicator ($Integration_{ihjt}$) reporting whether or not in year t firm i imports input h from source country j within the firm's boundaries.

In forming the integration decision variable, we need to overcome the general problem of lack of explicit information on which transactions are carried out within firm boundaries and which at arm's length. In tackling this issue, we combine trade transaction data and firm data on outward FDI positions where the former allows us to define the set of a firm's inputs sourced from abroad while the latter tells us in which host countries a firm has affiliates, if any, and what the affiliates' core activities are. In line with Alfaro et al. (2019) and Bolatto et al. (2023), we regard as traded '*intra-firm*' or '*integrated*' the inputs a parent firm imports from an affiliate's

host country that are classified under the core activity of the affiliate. More specifically, inputs that a firm sources from its affiliate's host country are regarded as '*integrated*' if classified under the core activity of the affiliate at the 4-digit industry level, whereas all other inputs that the firm imports from that country are considered as '*outsourced*'. Doing this also accounts for the fact that a firm may engage in both integration and outsourcing in a given location.[9]

Propositions 1 and 2 show that the effect of individualism on the organizational mode is the opposite for low and high technology sectors. The propositions are summarized/translated into the following testable prediction:

Testable Prediction 1. *A higher level of individualism in the society decreases the propensity to integrate in low technology sector and increases it for high technology sector.*

The integration variable defined above allows us to estimate the regression model at the most disaggregated firm-product-country level. In this first step, we investigate Testable Prediction 1 that links firm organisation decision to the level of individualism in sourcing country and the technology intensity of the inputs within the following augmented empirical specification:

$$\begin{aligned} Pr(Integration_{ihjt}) = \quad & \beta_0 + \beta_1 CultureIDV_{jt} + \beta_2 HighTech_h + \beta_3 HighTech_h \text{ x } CultureIDV_{jt} \\ & + X'_{it}\beta_4 + \sum \beta_{5,k} Industry_k + \sum \beta_{6,j} Country_j + \sum \beta_{7,t} Year_t + \mu_{ihjt}, \end{aligned} \quad (23)$$

where explanatory variables are transaction-specific, sourcing country-specific, and firm-specific. Import transactions are characterized by their technology intensity which is verified through *HighTech* dummy variable. We adopt the Eurostat classification that, in line with the OECD, defines high-tech products as those featuring high levels of R&D expenditure over total sales.[10] The groups classified as high-tech are aggregated on the basis of the Standard International

[9] If a firm has no FDI in a country, all imports coming from that country are regarded as '*outsourced*'. We link the core activity of an affiliate and imported inputs by the parent company by first adopting the RAMON concordance from 6-digit HS 2002 to 4-digit CPA 2002 classification, and subsequently from CPA 2002 to NACE Rev.1 at the 4-digit level based on the direct linkage in the structure of these two classifications. For manufactured goods, the elements of the CPA product classification are based on the HS classification.

[10] A detailed list of high-tech product category groups as classified by the Eurostat is publicly available for consultation at this link: https://ec.europa.eu/eostat/cache/metadata/Annexes/hteesmsan4.pdf. Further classification details can be found at https://ec.europa.eu/eurostat/cache/metadata/en/htecesms.htm.

Trade Classification (SITC) at 3-digit to 5-digit level, which we further translate to the HS classification codes that we use in our dataset.

The empirical specification includes the measure of individualism (CultureIDV). In line with Testable Prediction 1, we expect degree of individualism in society to affect the propensity to integrate low and high-tech goods in the opposite way. The divergent impact of culture between the high- and low-tech sectors is tested by inclusion of their interaction term ($HighTech$ x $CulturIDV$) which is predicted to be significant and positive.

Vector X_{it} contains standard firm-specific controls: age, size, capital intensity of production, labour productivity, export propensity and financial leverage. Size ($Size_{it}$) is measured by the number of employees. Age (Age_{it}) refers to years passed since the year of foundation reported in the Business Register of the Republic of Slovenia. Capital-intensity ($Kintensity_{it}$) is measured by fixed assets per worker, Labour productivity ($Lproductivity_{it}$) is defined as value added per employee. Export propensity ($ExPropensity_{it}$) is measured by the share of exports in total sales, while financial leverage as debt-to-assets ratio ($Debt/assets_{it}$). However, these firm-level variables may not be entirely exogenous because if a firm starts downscaling its product-market import portfolio before closing, these variables may change, and this change might be a predictor of the import termination decision. We therefore use lagged values of these variables in the model specifications. Ln prefixes in variable names denote the natural logarithm of a particular variable. We also include sets of (i) annual dummy variables to control for macroeconomic shocks; (ii) partner country dummies to account for country-specific time-invariant effects; and (iii) industry-specific effects, where a firm's industry affiliation is based on its core export product at the one-digit level of the HS classification.

With the binary outcome variable, integration model is estimated as probit regression, in which inverse standard normal distribution of the probability is modelled as a linear combination of the predictors. Probit estimator has been chosen over linear probability model since probability of integration is low compared to outsourcing; namely when probabilities are close to 0 or 1 linear probability model can yield probabilities that lie outside the $0-1$ range. We test for the issue of heteroscedasticity and when Wald's test for heteroscedasticity rejects the null hypothesis of homoscedastic variance (i.e. $H_0 : ln(\sigma_{i2}) = 0$) we apply a maximum-likelihood heteroscedastic probit model that generalizes probit model by allowing the scale of the inverse link function to vary from observation to observation as a function of the independent variables

(a firm size). Secondly, to account for unobserved heterogeneity at the firm-product-country level we opt for random effects probit model that explicitly exploits the panel structure of our data where unit of observation refers to import transaction of firm in a particular country. Since we cannot control for these effects in the pooled probit model, this panel approach allows controlling for everything that remains constant during the sample period with a firm's import transaction in particular product-country pair, i.e. firm-product-market fixed effects. In the random effects model, firm-country-product specific effects are assumed a random variable that is uncorrelated with the explanatory variables.

Table 3: Probit and random effects probit (RE probit) model of vertical integration at firm-input-market level for pooled sample and subsample of intermediate and capital goods

	(1) integration probit all goods	(2) integration probit all goods	(3) integration probit intermediates	(4) integration probit intermediates	(5) integration RE probit all goods	(6) integration RE probit intermediates
CultureIDV	-0.006	-0.438***	-0.009**	-0.345*	-0.029***	-0.057***
	(0.004)	(0.138)	(0.005)	(0.190)	(0.009)	(0.015)
HighTech	-2.585**	-1.794***	-2.570**	-2.391***	-11.19***	-12.31***
	(1.096)	(0.673)	(1.108)	(0.884)	(2.819)	(3.853)
HighTech#CultureIDV	0.037**	0.0244**	0.038**	0.035***	0.164***	0.191***
	(0.016)	(0.010)	(0.016)	(0.013)	(0.040)	(0.052)
Age	0.025***	0.024***	0.026***	0.027***	0.097***	0.161***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.014)	(0.025)
lnSize (-1)	0.085**	0.090**	0.132**	0.115**	0.518***	0.715***
	(0.041)	(0.040)	(0.058)	(0.057)	(0.075)	(0.131)
lnLproductivity (-1)	-0.096	-0.117	-0.156*	-0.172*	-0.202	-0.699***
	(0.071)	(0.075)	(0.091)	(0.096)	(0.175)	(0.263)
lnKintensity (-1)	0.09	0.110	0.111	0.134	0.476***	0.710***
	(0.112)	(0.113)	(0.141)	(0.137)	(0.129)	(0.199)
Debt/assets (-1)	-0.056	-0.085	-0.277	-0.258	0.156***	0.177
	(0.300)	(0.277)	(0.317)	(0.291)	(0.055)	(0.672)
ExPropensity (-1)	1.097***	1.150***	1.014***	1.087***	4.660***	5.025***
	(0.178)	(0.190)	(0.205)	(0.224)	(0.479)	(0.607)
lnGDP (-1)	-0.111***		-0.067		-0.488***	-0.239
	(0.041)		(0.043)		(0.104)	(0.170)
lnGDPpc (-1)	-0.369***		-0.424***		-1.780***	-1.891***
	(0.081)		(0.104)		(0.321)	(0.559)
lnDistance	-0.089		-0.091		-0.588***	-0.739***
	(0.065)		(0.075)		(0.176)	(0.287)
Constant	3.299	34.77***	2.587	25.765	10.47***	3.805
	(2.146)	(12.54)	(2.565)	(17.286)	(3.886)	(6.426)
Time eff.	Yes	Yes	Yes	Yes	Yes	Yes
Industry eff.	Yes	Yes	Yes	Yes	Yes	Yes
Country eff.	no	Yes	no	Yes	no	no
Log likelihood	-2980	-2665	-2062	-1810	-1866	-1210
Wald test	$\chi^2(23) =$ 357.7***	$\chi^2(41) =$ 997.2***	$\chi^2(21) =$ 388.4***	$\chi^2(34) =$ 855.2***	$\chi^2(23) =$ 401.4***	$\chi^2(21) =$ 377.3***
Likelihood-ratio test; $\rho = 0 : \chi^2(1)$ $(Prob > \chi^2)$	/	/	/	/	2227***	1703***
Observations	976,799	884,185	615,886	497,688	976,799	615,886
No. firm_market_product					534,812	352,559
Pseudo R2	0.26	0.33	0.29	0.36		

Note: Robust std. err. in round brackets, adjusted for firm clusters in probit models; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 3 shows results for probability of integration decision both for all import transactions and subsample of intermediate and capital goods, while Table 4 presents the marginal effects of individualism for low- and high-tech transactions corresponding to specifications from Table 3. Columns (1-4) in Table 3 report the results of the probit model with robust standard errors adjusted for firm clusters. As Wald's test fails to reject the null hypothesis of homoscedastic variance, ordinary pooled probit results are reported. The last two columns (5-6) instead present the results estimated by the random effects probit model controlling for unobserved heterogeneity for each firm-country-product that is invariant over time. The likelihood-ratio test confirms the importance of unobserved heterogeneity in these specifications.

Table 4: Average marginal effects of individualism based on technology intensity for specifications from Table 3

	CultureIDV probit all goods	CultureIDV probit all goods	CultureIDV probit intermediates	CultureIDV probit intermediates	CultureIDV RE probit all goods	CultureIDV RE probit intermediates
Low tech	-9.0e-6	-0.00063***	-0.00002***	-0.00061*	-6.7e-6**	-0.00001***
	(5.8e-6)	(0.0002)	(5.8e-6)	(0.0003)	(2.1e-6)	(2.1e-6)
High tech	0.00002	0.0003	0.00003	-0.0004	0.00002**	0.00002**
	(0.00002)	(0.0002)	(0.0002)	(0.0003)	(8.9e-6)	(0.00001)
Time eff.	yes	yes	yes	yes	yes	yes
Industry eff.	yes	yes	yes	yes	yes	yes
Country eff.	no	yes	no	yes	no	no

Note: Robust std. err. in round brackets, adjusted for firm clusters in probit models; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Results from Table 3 show that propensity to integrate is significantly lower for high-tech supplies compared to low-tech ones and that firms are less inclined towards integration of low-tech transactions in societies with higher level of individualism. The interaction of individualism with the dummy variable for technology intensity is positive and highly significant, suggesting that negative effect of higher level of individualism on integration is reduced for the high-tech inputs across all specifications. The differing effect of culture on the organizational mode for low and high technology intensive inputs is in support of Testable Prediction 1. Since the magnitude of the interaction effect depends on all covariates in the model, the interaction effect in probit models cannot be evaluated simply by looking at the sign, magnitude, and statistical significance of the coefficient on the interaction term, as pointed out by Ai & Norton (2003).[11] Hence, we provide in Table 4 estimates of marginal effects of individualism for low-

[11] Moreover, regression coefficients in probit models cannot be interpreted as simple slopes as in ordinary linear

and high-tech transactions for the specifications from Table 3. In line with the Proposition 1 and Testable Prediction 1, the average marginal effect of individualism on the probability of integration is negative for the low-tech transactions in all specifications but one (column 1), while the impact of individualism on integration probability is less significant for high-tech inputs, but becomes significantly positive, as predicted by Proposition 2, in random effect probit specifications in columns 5 and 6. The results thus lend support for our prediction that higher level of individualism in the society decreases the propensity to integrate in low-tech sector and tends to increase it for high-tech sector.

As for the firm-specific control variables, the results in Table 3 indicate that larger and older firms with higher export propensity are more likely to integrate input supplier in all specifications. The effects of other firm-specific control variables are less clear-cut. While labour productivity tends to decrease the likelihood of vertical integration, firm's capital intensity becomes positively associated with the incidence of integration in random effects specifications. Lastly, no evidence is found for the significant role of financial leverage in firm organisation decision. Among country-specific 'gravity' controls, the likelihood of integration of import transactions decreases with the level of economic development and remoteness of the sourcing country whereas the impact of GDP is less robust and insignificant for the intermediate and capital good subsample.

6.3 Evidence on Contract Enforcement and Survival of Relationships

Given the relationship observed between culture and organizational mode in Propositions 1 and 2, we are now in the position to test the predictions obtained in Propositions 3 - 6 regarding the impact of contract enforcement on the duration of supplier relationships. Considering the entire spectrum of individualism, we expect to find contract enforcement beneficial for an intermediate range of individualism in low-tech sectors, and detrimental for the relationship under high values of individualism in high-tech sectors as summarized in the following two testable predictions:

Testable Prediction 2. *For low-tech transactions, stricter contract enforcement initially reinforces the positive impact of individualism on longevity of product-market specific supplier*

regressions, but in terms of Z-scores (i.e., as changes in Z-score for one unit increase in the explanatory variable).

relationship and counters it after a certain threshold (in an inverted U-shape manner).

Testable Prediction 3. *For high-tech transactions, stricter contract enforcement decreases the positive impact of individualism on longevity of the product-market specific relationships.*

We start with survival analysis to test the role of formal contract enforcement and its interplay with culture in longevity of sourcing a particular product-market pair (i.e. product-market import spell duration). In the survival analysis, our unit of observation is a firm's import spell of a certain product from a particular market. We define an import spell as a period of importing, that is, the number of years of importing a given HS6 product from a specific market between the first and last observed year of the firm's particular product-market import spell in our database.

Related to firm termination of certain product-market node, we define the hazard rate as the probability of the cessation of imports conditional on import survival (in a particular product-market pair) up to that period. As with any sample period, our data are subject to left- and right-censoring. Left-censoring occurs for firms that are already importing in the initial year of the sample, meaning that we cannot establish the starting point of those spells. To deal with this issue, we only consider those import spells that started within our period and, hence, exclude spells present in the initial year of our period, i.e. in the year 2002. Right-censoring, on the other hand, occurs at the end of the sample as we cannot determine when or whether the spell ended. Hence, the size of our sample is reduced by 2 years.

Although firm termination from a product-market pair may occur at any particular instant in time (as the stochastic processes occur in continuous time), the annual format of the dataset means that survival times have to be grouped into discrete annual intervals, i.e. known as interval censored data. We estimate complementary *log-log model* ($cloglog$) which is according to Jenkins (2005) the most commonly used discrete-time model for dealing with intrinsically continuous but grouped data. The underlying assumption of the proportional hazard model is that the hazard rate depends only on time at risk, so-called baseline hazard $\theta_c(t)$ and on explanatory variables affecting the hazard independently of time $\exp(\beta' X)$. The hazard rate function is defined as the probability of failure in interval j and $j+1$ divided by the probability of surviving at least until j. Following Prentice & Gloeckler (1978), the discrete-time hazard function takes the following form when complementary log-log distribution is assumed:

$$h(j, X_{ij}) = 1 - \exp[-\exp(\beta_0 + \beta^{'} X_{ij} + \gamma_j)] \tag{24}$$

where $h(j, X)$ indicates the interval hazard for the period between beginning and the end of the $j-th$ interval (year) and γ_j is interval baseline hazard defined as log of the difference between the integrated baseline hazard $\theta_c(t)$ evaluated at the end of the interval $(\alpha_{j-1}; -\alpha_j)$ and the beginning of the interval,

$$\gamma_h(j, X_{ij}) = log \int_{\alpha_{j-1}}^{\alpha_j} \theta_0(t)dt \tag{25}$$

The dependent variable in our import survival model is a binary variable $IMterm_{ihjt}$ that takes the value 1 in the last observed year of firm i's imports of $6-$digit HS product h from market j and 0 as long as it remains importing that product from the source country. The terminated spells are assumed to suffer an exit shock in t (assume value 1 in period t). Right-censored observations, where the exporting spell is ongoing in the last period of our sample or left-censored spells, which are continuing from the pre-sample period are excluded.

Import survival model is estimated separately for low and high-tech import spells to match the theoretically predicted divergent effect of contract enforcement and its interaction with individualism in dependence of technological intensity. According to testable prediction TP2, persistence of low-tech spells responds to presence of individualism and its interaction with the formal contract enforcement mechanisms in non-linear way, while high-tech import spells are predicted (testable prediction TP3) to be linearly related with formal and informal contract enforcement. Given these predictions, import survival models for low- and high-tech import transactions, respectively, are specified in the following way:

$$\begin{aligned} Pr(IMterm_{ihjt}) = \quad & \beta_0 + \beta_1 IMspell_{ihjt} + \beta_2 RuleLaw_{jt} + \beta_3 CultureIDV_{jt} + \beta_4 CultureIDV_{jt}^2 \\ & + \beta_5 RuleLaw_{jt} \text{ x } CultureIDV_{jt} + \beta_6 RuleLaw_{jt} \text{ x } CultureIDV_{jt}^2 + X_{it}^{'}\beta_7 \\ & + \sum \beta_{8,k} Industry_k + \sum \beta_{9,j} Country_j + \sum \beta_{10,t} Year_t + \mu_{ihjt} \end{aligned} \tag{26}$$

$$\begin{aligned} Pr(IMterm_{ihjt}) = \quad & \beta_0 + \beta_1 IMspell_{ihjt} + \beta_2 RuleLaw_{jt} + \beta_3 CultureIDV_{jt} + \beta_4 RuleLaw_{jt} \text{ x } CultureIDV_{jt} \\ & + X_{it}^{'}\beta_5 + \sum \beta_{6,k} Industry_k + \sum \beta_{7,j} Country_j + \sum \beta_{8,t} Year_t + \mu_{ihjt} \end{aligned}$$

To bring formal institutions along culture ($CultureIDV$) into our analysis, we use 'rule of law' ($RuleLaw$) from the Worldwide Governance Indicators (2015) database as a proxy for formal contract enforcement. Baseline hazard function enters in log(time) functional form, i.e. $lnIMspell$, whose coefficient is consistently negative indicating that the baseline hazard decreases with elapsed survival time. Furthermore, to account for eventual firm-product-market specific unobserved heterogeneity in the model we additionally employ random effects cloglog ($REcloglog$). Finally, for robustness purpose import survival specifications are estimated by probit and random effects probit estimators as well.[12]

6.3.1 Low Technology Sectors

We first present results of the survival analysis for the subsample of import product-market spells in low-tech sector. Table 5 shows results for all low-tech goods in columns (1-4), while columns (5-8) present results for the subsample of low-tech goods classified as intermediate and capital goods. Coefficients are presented in exponentiated form for ease of interpretation. All coefficients above 1 indicate an increase in the hazard rate, while those less than 1 indicate a decrease of the underlying hazard. In all $cloglog$ specifications, robust standard errors are adjusted for firm clusters.

The coefficient on log spell length ($\ln(IMspell)$) is consistently smaller than unity, therefore indicating that the baseline hazard decreases with elapsed survival time. The significant interaction terms between formal contract enforcement proxied by the rule of law index on one hand and both linear and quadratic terms of the informal enforcement variable measured by degree of individualism on the other hand confirm that the impact of contract enforcement varies with the degree of individualism in a non-linear manner as proposed by Testable Predictions 2. The positive linear and negative quadratic interaction effects suggest that contract enforcement is most beneficial for the longevity of product-market specific supplier relationships for an intermediate range of individualism (in an inverted U-shape manner). According to specification (4) from Table 5, for instance, the peak is around the individualism score of 52, which is below the mean value in the sample but above the mean across all countries (45) in Hofstede's database.

[12] Note that coefficients in $cloglog*$ are easier to interpret in exponentiated form ($\exp(b)$), which can be interpreted as hazard ratios (since the $cloglog$ model is the discrete time proportional hazards model).

Table 5: Complementary log-log import termination model ($IMterm$) at the firm-market-product level for low-tech subsample, (exponentiated coefficients)

	(1) cloglog all goods LOW TECH	(2) cloglog all goods LOW TECH	(3) RE cloglog all goods LOW TECH	(4) RE cloglog all goods LOW TECH	(5) cloglog intermediates LOW TECH	(6) cloglog intermediates LOW TECH	(7) RE cloglog intermediates LOW TECH	(8) RE cloglog intermediates LOW TECH
Ln(IMspell)	0.449***	0.450***	0.676***	0.673***	0.441***	0.443***	0.583***	0.582***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
RuleLaw	0.859*	2.848***	0.847***	4.975***	0.925	2.486**	0.914*	4.060***
	(0.069)	(1.089)	(0.034)	(1.099)	(0.093)	(1.054)	(0.046)	(1.130)
CultureIDV	0.994*	0.949**	0.992***	0.933**	0.990**	0.954	0.988***	0.941
	(0.003)	(0.023)	(0.002)	(0.030)	(0.004)	(0.031)	(0.002)	(0.046)
CultureIDV2	1.000	1.0003	1.000*	1.0003	1.000	1.0002	1.000	1.0003
	(0.000)	(0.000)	(0.0000)	(0.0002)	(0.000)	(0.000)	(0.000)	(0.000)
RuleLaw#CultureIDV	0.996	0.957***	0.993***	0.934***	0.995	0.960**	0.993***	0.939***
	(0.003)	(0.015)	(0.001)	(0.009)	(0.003)	(0.018)	(0.002)	(0.011)
RuleLaw #CultureIDV2	1.0001***	1.0004***	1.0001***	1.0007***	1.0001***	1.0004**	1.0001***	1.0006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	1.010***	1.009***	1.017***	1.017***	1.009***	1.008***	1.014***	1.013***
	(0.001)	(0.001)	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.000)	(0.000)
lnSize (-1)	0.954***	0.956***	0.935***	0.937***	0.961***	0.963***	0.946***	0.949***
	(0.006)	(0.006)	(0.001)	(0.001)	(0.007)	(0.007)	(0.002)	(0.002)
lnLproductivity (-1)	0.925***	0.924***	0.916***	0.914***	0.925***	0.924***	0.916***	0.914***
	(0.013)	(0.013)	(0.003)	(0.003)	(0.014)	(0.014)	(0.004)	(0.004)
lnKintensity (-1)	1.017***	1.018***	1.022***	1.023***	1.027***	1.028***	1.034***	1.035***
	(0.006)	(0.006)	(0.002)	(0.002)	(0.007)	(0.007)	(0.002)	(0.002)
Debt/assets (-1)	1.097*	1.103*	1.123***	1.131***	1.052	1.060*	1.046***	1.057***
	(0.059)	(0.059)	(0.009)	(0.009)	(0.037)	(0.037)	(0.011)	(0.011)
ExPropensity (-1)	1.169***	1.145***	1.264***	1.229***	1.155***	1.131***	1.268***	1.234***
	(0.033)	(0.031)	(0.009)	(0.009)	(0.037)	(0.035)	(0.011)	(0.011)
lnGDP (-1)	0.954***		0.931***		0.959***		0.941***	
	(0.006)		(0.002)		(0.007)		(0.003)	
lnGDPpc (-1)	1.311***		1.469***		1.277***		1.394***	
	(0.037)		(0.020)		(0.045)		(0.023)	
lnDistance	1.069***		1.106***		1.059***		1.085***	
	(0.011)		(0.005)		(0.011)		(0.006)	
Constant	0.298***	8.895***	0.149***	16.38***	0.357***	7.400**	0.211***	11.805*
	(0.098)	(6.773)	(0.019)	(15.69)	(0.132)	(6.730)	(0.034)	(17.170)
Time eff.	yes	yes	yes	yes	yes	yes	yes	yes
Industry eff.	yes	yes	yes	yes	yes	yes	yes	yes
Country eff.	no	yes	no	yes	no	yes	no	yes
Log likelihood	-690942	-693146	-688148	-690394	-430306	-431728	428615	-430090
Wald test	$\chi^2(30) =$ 10776***	$\chi^2(79) =$ 12480***	$\chi^2(30) =$ 31760***	$\chi^2(79) =$ 36725***	$\chi^2(30) =$ 9250***	$\chi^2(79) =$ 10825***	$\chi^2(30) =$ 26407***	$\chi^2(79) =$ 30456***
Likelihood-ratio test; $\rho = 0 : \chi^2(1)$ $(Prob > \chi^2)$	/	/	5589***	5503***	/	/	3383***	3277***
Observations	1,096,205	1,102,887	1,096,205	1,102,887	682,438	687,087	682,438	687,087
No. firm_market_product			619,990	624,216			406,392	409,318

Notes: Robust standard errors in parentheses, adjusted for firm clusters in cloglog specifications; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

The core firm-specific determinants of import survival are largely in line with the theoretical expectations. The results indicate that more productive and larger firms with lesser financial leverage are more likely to sustain long-lasting import spells. In contrast, results suggest that the likelihood of import termination increases with firm age, capital intensity of its production process and its export orientation suggesting higher supplier turn-over in older, capital-intensive and more export-oriented firms. As per "gravity parameters" (the source-

country's GDP and GDP per capita and distance between Slovenia and the partner country), we find longer duration of product-market specific import transactions from larger and nearby, but less developed markets. To test the robustness of complementary log-log results we estimate the specifications from Table 5 also with probit and random effects probit estimators and report the results in Table 8 in Appendix G. The probit results are fully in line with the baseline results reported in Table 5, without any deviation with respect to the significance and the sign of the regression coefficients.

6.3.2 High Technology Sectors

Now we turn to the results of survival analysis for the subsample of import product-market spells in high-tech sector. Table 6 shows results for all high-tech goods in columns (1-4), while columns (5-8) present results for the subsample of high-tech intermediate and capital goods.

The results in Table 6 suggest that both contract enforcement and level of individualism in a society tend to increase longevity of product-market specific import relationships in high-tech sector. The positive interaction term between formal and informal enforcement further indicate that they undermine to a certain extent each other's positive influence which is in line with Testable Prediction 3. As a result, rule of law increases survival of high-tech import transactions for low individualism and decreases it in societies with high level of individualism (e.g. the threshold score of individualism is around 87 based on specification in column (3) in Table 6). Although controlling for country-specific effects in columns (2, 4, 6 and 8) takes away the significance of the interaction term in the log-log model, the results based on the ordinary probit model, presented in Table 9 in Appendix G, restore the positive interaction terms also in these demanding specifications that include country fixed effects.

The results with respect to the firm-specific and sourcing country-specific ("gravity") determinants of import survival are highly comparable to the subsample of low-tech transactions, with the only exception of the firm financial leverage which becomes mostly insignificant in high-tech subsample. All other conclusions hold for both high-tech and low-tech transactions indicating no significant difference in the impact of firm-specific and gravity country-level control variables on the longevity of import transactions.

Table 6: Complementary log-log import termination model ($IMterm$) at the firm-market-product level for high-tech subsample, (exponentiated coefficients)

	(1) cloglog all goods HIGH TECH	(2) cloglog all goods HIGH TECH	(3) RE cloglog all goods HIGH TECH	(4) RE cloglog all goods HIGH TECH	(5) cloglog intermediates HIGH TECH	(6) cloglog intermediates HIGH TECH	(7) RE cloglog intermediates HIGH TECH	(8) RE cloglog intermediates HIGH TECH
Ln(IMspell)	0.481***	0.482***	0.744***	0.730***	0.483***	0.485***	0.634***	0.626***
	(0.007)	(0.007)	(0.021)	(0.020)	(0.007)	(0.007)	(0.014)	(0.014)
RuleLaw	0.617***	0.863	0.523***	0.879	0.651***	0.747	0.591***	0.775
	(0.035)	(0.223)	(0.030)	(0.253)	(0.040)	(0.224)	(0.035)	(0.240)
CultureIDV	0.991***	0.980*	0.988***	0.968**	0.992***	0.983	0.990***	0.978
	(0.001)	(0.010)	(0.001)	(0.016)	(0.001)	(0.010)	(0.001)	(0.016)
Rule_law# CultureIDV	1.006***	1.005	1.008***	1.006	1.005***	1.008	1.007***	1.008
	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)	(0.005)	(0.001)	(0.005)
Age	1.007***	1.006***	1.013***	1.013***	1.007***	1.006***	1.011***	1.010***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
lnSize (-1)	0.967***	0.969***	0.954***	0.956***	0.977***	0.979***	0.969***	0.971***
	(0.008)	(0.007)	(0.004)	(0.004)	(0.008)	(0.008)	(0.005)	(0.005)
lnLproductivity (-1)	0.911***	0.906***	0.889***	0.883***	0.920***	0.913***	0.909***	0.902***
	(0.017)	(0.016)	(0.010)	(0.010)	(0.020)	(0.019)	(0.011)	(0.011)
lnKintensity (-1)	1.036***	1.037***	1.052***	1.051***	1.044***	1.045***	1.058***	1.058***
	(0.009)	(0.008)	(0.006)	(0.006)	(0.010)	(0.009)	(0.006)	(0.006)
Debt/assets (-1)	1.044	1.060	1.049*	1.069**	1.048	1.058	1.054*	1.068**
	(0.054)	(0.054)	(0.028)	(0.028)	(0.056)	(0.055)	(0.030)	(0.030)
ExPropensity (-1)	1.219***	1.177***	1.330***	1.269***	1.236***	1.194***	1.345***	
	(0.043)	(0.041)	(0.031))	(0.029)	(0.047)	(0.044)	(0.032)	
lnGDP (-1)	0.950***		0.924***		0.950***		0.933***	
	(0.007)		(0.006)		(0.008)		(0.006)	
lnGDPpc (-1)	1.425***		1.625***		1.320***		1.412***	
	(0.056)		(0.063)		(0.055)		(0.057)	
lnDistance	1.075***		1.117***		1.070***		1.097***	
	(0.010)		(0.010)		(0.012)		(0.010)	
Constant	0.269***	9.302**	0.170***	29.92**	0.261***	3.078	0.176***	4.102
	(0.111)	(8.227)	(0.062)	(42.50)	(0.132)	(2.805)	(0.075)	(6.024)
Time eff.	yes	yes	yes	yes	yes	yes	yes	yes
Industry eff.	yes	yes	yes	yes	yes	yes	yes	yes
Country eff.	no	yes	no	yes	no	yes	no	yes
Log likelihood	-65028	-65908	-64764	-65664	-48463	-49187	-48304.627	-49041
Wald test	$\chi^2(28) =$ 4201***	$\chi^2(73) =$ 4975***	$\chi^2(28) =$ 3335***	$\chi^2(73) =$ 3991***	$\chi^2(28) =$ 3396***	$\chi^2(72) =$ 3872***	$\chi^2(28) =$ 3259***	$\chi^2(72) =$ 3873***
Likelihood-ratio test; $\rho = 0 : \chi^2(1)$ $(Prob > \chi^2)$	/	/	527***	488***	/	/	318***	292***
Observations	100,978	102,843	100,978	102,843	75,104	76,638	75,104	76,638
No. firm_market_product			62,570	63,705			48,393	49,334

Notes: Robust standard errors in parentheses, adjusted for firm clusters in cloglog specifications; $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

7 Concluding Remarks

Attempting to supplement, complement, or substitute existing informal institutions has its pros and cons. In a society based on an effective set of individualistic informal contract enforcement, the introduction of legal rules may undermine rather than promote exchange. Some societies base exchange relations on culture, without explicitly relying on the legal system to enforce the agreed upon exchange. Others use various contractual arrangements, such as an ownership structure to safeguard relationships. At times, a legal system does play a potentially

important role in enhancing the business environment by enforcing property rights, which are critical for business organization and innovation. Asymmetric information and incomplete contracts limit the extent to which cultural norms can facilitate exchange. After acquiring the human capital, agents may act opportunistically, discouraging the principal from continuing the relationship. Alternatively, asymmetry may lie on the fact that information about an agent's willingness to execute the contract is available only to the agent itself.

Our analysis focuses on the level of individualism in societies and its interaction with legal contract enforcement on the profitability and therefore duration of relationships with suppliers. Our goal is to explore the interaction between law and culture-conditioned enforcement, and understand the effectiveness of the former in different cultural environments. We identify circumstances in which contract enforcement can be beneficial for maintaining supplier relationships and others where it may lead to partnership disruption. To this end, we study the implications of relying on informal institutions as a means of enforcement for buyer-supplier relationships and for investments in absorbing and utilizing the acquired technology. Agents who engage in business practices with the HQ that owns and shares its intellectual property are heterogeneous in their intents. We introduce channels through which social and cultural values interact with legal institutions to study the characteristics of contracts and the preparation of a base for technological progress.

Our findings reveal the economic effect of individualism and formal contract enforcement, and their interaction in determining supplier behavior in undertaking investments in technology acquisition and its loyalty to the relationship under asymmetric information. In a society characterized by a higher level of individualism, supplier relations may not necessarily benefit from a contingent instrument of contract enforcement. Relying on social norms may be a sufficient and more effective form of protection in place of redundant legal institutions. However, this is not necessarily the case and depends on sectoral characteristics and the value of the technology transferred from the HQ to the supplier. The framework introduces different supplier types who invest time and effort in the elaboration of intellectual knowledge, where cultural norms and informal enforcement determine the incentives to stay in the contract and make the necessary technological investments.

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A Proof of Proposition 1

Proposition 1 claims the existence of contracts in outsourcing and integration as $\hat{\alpha}_i > \tilde{\alpha}_i$, $\forall i \in \{H, L\}$. As shown in the main text, these types of contracts are offered to all suppliers. The difference between them is the extent of incentives the suppliers may receive. First, there is no reason to offer $\alpha > \hat{\alpha}_H$ as the incentive constraint of H-type suppliers binds at the optimum. Then, as $\hat{\alpha}_H > \hat{\alpha}_L$, any contract offering $\alpha-$share lower than $\alpha < \hat{\alpha}_L$ is suboptimal for the HQ and the suppliers. Indeed, the HQ's expected payoff is zero and even suppliers' payoffs are lower. The proof proceeds by comparing the payoff of offering an outsourcing contract with a higher $\alpha-$share, i.e., $\hat{\alpha}_H$, or alternatively offering an integration contract with a lower $\alpha-$share, i.e., $\hat{\alpha}_L$. In the former, the profit of the HQ is:

$$\mathbb{E}[\Pi]_{ol} = (1 - \hat{\alpha}_H)(\lambda \triangle x_H + (1 - \lambda)\triangle x_L)\,(1 - P) \tag{27}$$

where $P = \int_{p_0}^{1}(p - p_0)f(p)dp$, while the subscript ol identifies an outsourcing contract in low technology sectors where all suppliers receive the necessary incentives to engage in customization. In the latter, the profit of the HQ when it offers an integration contract is:

$$\mathbb{E}[\Pi]_{il} = (1 - \hat{\alpha}_L)\,[(1 - \lambda)\triangle x_L\,(1 - P)] \tag{28}$$

where now the subscript il relates to the integration contract in low technology sectors where both suppliers are in the contract but only the less productive L-type invests in customization. By comparing eqs. (27) and (28), it is observable that $\forall \hat{\alpha}_i \in [0, 1]$, as $\lambda \in [0, 1]$, $\triangle x_H > \triangle x_L$ and $\zeta_H^* > \zeta_L^*$, then $\mathbb{E}[\Pi]_{ol} > \mathbb{E}[\Pi]_{il}$ if and only if,

$$\lambda > \hat{\lambda} := \frac{\triangle x_L(\hat{\alpha}_H - \hat{\alpha}_L)}{\triangle x_L(\hat{\alpha}_H - \hat{\alpha}_L) + (1 - \hat{\alpha}_H)\triangle x_H} \tag{29}$$

which is lower than 1. The HQ may give a larger rent in the contract to suppliers whenever the proportion of highly productive H-type suppliers is large enough. Interestingly, this means that even if the HQ allows for a larger $\alpha-$share and therefore higher payoffs for both suppliers, its potential gains are higher due to the incentives in customization of H-type suppliers. In this case, the HQ ensures the optimal stimulus to H-type suppliers to invest in knowledge

absorption.

Alternatively, if the proportion of eq. (29) is not satisfied, then the optimal contract for the HQ is an integration one as $\mathbb{E}[\Pi]_{il} > \mathbb{E}[\Pi]_{ol}$. In this case, a lower $\alpha-$share of contract compensates the lower payoff as H-type suppliers are not induced to make their optimal investment. We can even observe that the payoffs of the L-type suppliers in both cases are respectively,

$$\pi_{L,ol} = \hat{\alpha}_H x(\zeta_L^*) - c(\zeta_L^*) \tag{30}$$

and

$$\pi_{L,il} = \hat{\alpha}_L x(\zeta_L^*) - c(\zeta_L^*) \tag{31}$$

where l stands for low technology in all subsequent cases, and the remaining subscript L,ol identifies the payoff of L-type suppliers in the outsourcing contract, while L,il relates to the their profits in case of integration. It is easy to show that $\pi_{L,ol} > \pi_{L,il}$ since they marginally gain the difference $(\hat{\alpha}_H - \hat{\alpha}_L)$ of their incentive. For the H-type type instead, the payoff with the outsourcing contract is,

$$\pi_{H,ol} = \hat{\alpha}_H x(\zeta_H^*) - c(\zeta_H^*) \tag{32}$$

and in case of integration is,

$$\pi_{H,il} = \hat{\alpha}_L x \tag{33}$$

where H,ol and H,il explain the payoffs of L-type suppliers in case of outsourcing and integration. Comparing eqs. (32) and (33), we point out that the larger the cost of investing in knowledge absorption, the lower the possibility for the payoffs of H-type suppliers in outsourcing to be higher than the one in integration. This completes the proof.

B Proof of Proposition 2

Proposition 2 claims that now the incentives for both suppliers are lower than the participation ones as $\tilde{\alpha}_i > \hat{\alpha}_i \ \forall i \in \{H,L\}$. Again, two possible contracts can be offered. The only constraint that the HQ should take into account is the participation one for both suppliers. However, $\tilde{\alpha}_L > \tilde{\alpha}_H$ since H-type suppliers have lower incentive to break the contract due to the feeling of pride, ψ, perceived in the case of infringement. Note that there is no reason to

offer $\alpha > \tilde{\alpha}_L$ as the participation of L-type suppliers binds at the optimum. Then as $\tilde{\alpha}_L > \tilde{\alpha}_H$, the HQ would obtain zero payoff for any $\alpha-$share of contract lower than $\alpha < \tilde{\alpha}_H$ due to the consequences of infringement. This induces the firm to offer a contract with at least $\tilde{\alpha}_H$. The proof proceeds by identifying the condition of the HQ to offer a larger $\alpha-$share in the contract, i.e., $\tilde{\alpha}_L$, or $\tilde{\alpha}_H$. In the first case, we observe that the profit of the HQ in outsourcing is:

$$\mathbb{E}[\Pi]_{oh} = (1-\tilde{\alpha}_L)(\lambda \triangle x_H + (1-\lambda)\triangle x_L)\,(1-P) \tag{34}$$

where the subscript oh identifies the outsourcing contract in high technology sectors. In general, label h stands for high technology sector in all subsequent cases. Alternatively, the profit of the HQ is:

$$\mathbb{E}[\Pi]_{ih} = (1-\tilde{\alpha}_H)(\lambda \triangle x_H)\,(1-P) \tag{35}$$

where the subscript ih relates to the integration contract. Eq. (35) shows the type of contract that excludes the participation of L-type suppliers. By comparing eqs. (34) and (35), $\forall \tilde{\alpha}_i \in [0,1]$, $\tilde{\alpha}_L > \tilde{\alpha}_H$, $\lambda \in [0,1]$ and $\triangle x_H > \triangle x_L$ with $\zeta_H^* > \zeta_L^*$, we observe that $\mathbb{E}[\Pi]_{oh} > \mathbb{E}[\Pi]_{ih}$ if and only if,

$$\lambda < \tilde{\lambda} := \frac{(1-\tilde{\alpha}_L)\,\triangle x_L}{(1-\tilde{\alpha}_L)\,\triangle x_L + (\tilde{\alpha}_L - \tilde{\alpha}_H)\triangle x_H} \tag{36}$$

which is lower than 1. The existence of an outsourcing contract (with a larger $\alpha-$share $\tilde{\alpha}_L$) is thus possible if the proportion of L-type suppliers is relatively lower. In this case, the HQ optimally chooses to offer a contract to both suppliers, thus inducing the L-type to stay in the contract and giving extra rents to H-type suppliers, i.e., $(\tilde{\alpha}_L - \tilde{\alpha}_H)$. An outsourcing contract $\tilde{\alpha}_L > \tilde{\alpha}_H$ thus prevents L-type suppliers from misappropriating the technology . Alternatively, if $\lambda > \tilde{\lambda}$ the proportion of the H-type suppliers is high enough to ensure a higher payoff for the HQ even without the participation of the less productive types. The contract is in turn an integration one with a lower $\alpha-$share $\tilde{\alpha}_H$.

Regards to the suppliers, we observe that contrary to the results proposed in Proposition 1, we here obtain that the payoffs of H-type suppliers in both outsourcing and integration contracts, are respectively,

$$\pi_{H,oh} = \tilde{\alpha}_L x(\zeta_H^*) - c(\zeta_H^*) \tag{37}$$

and

$$\pi_{H,ih} = \tilde{\alpha}_H x(\zeta_H^*) - c(\zeta_H^*) \tag{38}$$

where the subscripts H,oh and H,ih identify H-type suppliers in outsourcing and integration. We observe that as $\pi_{H,oh} > \pi_{H,ih}$, H-type suppliers marginally gain the difference $(\tilde{\alpha}_L - \tilde{\alpha}_H)$ due to their participation at the contract, while for L-type suppliers, the payoffs in the two cases are the following,

$$\pi_{L,oh} = \tilde{\alpha}_L x(\zeta_L^*) - c(\zeta_L^*) \tag{39}$$

and

$$\pi_{L,ih} = \tilde{x}(\zeta_L^*) - c(\zeta_L^*) \tag{40}$$

and it is easy to see that $\pi_{L,ih} > \pi_{L,oh}$ as $\tilde{x}(.) > \tilde{\alpha}_L x(.)$ by assumption. This completes the proof.

C Proof of Lemma 1

Looking at the optimal incentive exerted by suppliers in the legal enforcement of contract, we observe in eq. (15) that:

$$\bar{\zeta}^* \Longrightarrow x_\zeta(\zeta_i) = \frac{c_\zeta(\zeta_i)}{\alpha} \tag{41}$$

Marginal costs and benefits of investing in knowledge absorption must be equal. Eq. (41) suggests that the left-hand side corresponds to the benefits of suppliers. They are identified at the margin by the potential larger payoffs that the absorbed knowledge can induce and this must be reflected on the right-hand side into a cost of this investment at the optimal level. Alternatively, we study the incentives in the contract with pride. Rearranging terms from eq.

(5) in section 3, we can easily show that,

$$\zeta_{i\,\forall i\in\{a,m\}}^{*} \Longrightarrow x_{\zeta}(\zeta_i) + \left(\tilde{x}_{\zeta}(\zeta_i) - \chi\psi_{\zeta}(\zeta_i)\right)\frac{P}{\alpha\,(1-P)} = \frac{c_{\zeta}(\zeta_i)}{\alpha\,(1-P)} \tag{42}$$

Even in this case, marginal costs and benefits must be equal to the optimal level. However, on the left-hand side, we can observe an additional term. It indicates the positive effect regarding the benefits that suppliers have due to the possibility of breaking the contract. Indeed the opportunity to expropriate the technology creates a further incentive inducing higher investment in knowledge absorption at the margin. The right-hand side must balance this at higher costs. As we know from the main text, the effect is even higher whether we add a negative component, i.e., $-\chi\psi_{\zeta}(\zeta_i)$ where $\chi = 1$ for H-type suppliers, as a feeling of pride which renders the H-type suppliers the more productive type. Concerning comparative statics, we can confirm that larger $\alpha-$share of contract reduces the incentive to invest because of the decrease in the marginal benefits and costs, and this is true in both cases. Meanwhile, the higher the probability of breaking the contract as in the integral $\int_{p_0}^{1} pf(p)dp$, the larger the incentives to invest inducing a rise of the marginal benefits and costs at the optimal level.

D Proof of Lemma 2

Let us start from the impact of a legal enforcement contract $\bar{\alpha}$ in low technology sectors, where $\hat{\alpha}_i > \tilde{\alpha}_i\ \forall i \in \{H, L\}$. In this case, $\hat{\alpha}_i > \Phi - \hat{\alpha}_i$ as $\tilde{\alpha}_i = \Phi - \hat{\alpha}_i$, where,

$$\Phi = \frac{c(\zeta_i^{*})}{\triangle x_i\,(1-P)} \tag{43}$$

from eq. (8) and $\tilde{\alpha}_i = \Phi - \hat{\alpha}_i$ in eq. (10). It follows that $\hat{\alpha}_i > \Phi/2$. Moreover, suppose that $\tilde{\alpha}_i > \Phi/2$, which implies that $\Phi - \hat{\alpha}_i > \Phi/2$, i.e. $\hat{\alpha}_i < \Phi/2$, not possible by contradiction as in the low technology sectors, $\hat{\alpha}_i > \tilde{\alpha}_i$. Therefore, we observe that $\hat{\alpha}_i \geq \Phi/2 > \tilde{\alpha}_i$. Note that $\tilde{\alpha}_i$ should be strictly lower than $\Phi/2$, otherwise $\hat{\alpha}_i = \tilde{\alpha}_i$, which is not possible. Introducing then a legal enforcement contract with $\bar{\alpha}$ defined as in eq. (17), we suppose first that $\bar{\alpha} \geq \Phi/2$, then, at minimum $\bar{\alpha} = \Phi/2$. Observing that $\bar{\alpha} < \tilde{\alpha}_i$, then $\Phi/2 < \Phi - \hat{\alpha}_i$, resulting into $\hat{\alpha}_i < \Phi/2$, which does not hold by definition. Instead, whenever $\bar{\alpha} \geq \Phi/2 > \tilde{\alpha}_i$, hence

$\Phi/2 > \Phi - \hat{\alpha}_i$, such that $\hat{\alpha}_i > \Phi/2$. In turn, it is possible to make the following ranking in the low technology sectors, as $\hat{\alpha}_i > \bar{\alpha} > \tilde{\alpha}_i$.

A similar analysis can be made by investigating the high technology sectors. We now observe the impact of a legal enforcement contract $\bar{\alpha}$ in high technology sectors, where $\tilde{\alpha}_i > \hat{\alpha}_i$ $\forall i \in \{H, L\}$. In this case, $\tilde{\alpha}_i > \hat{\alpha}_i = \Phi - \tilde{\alpha}_i$, i.e., $\tilde{\alpha}_i > \Phi/2$. Suppose now that $\hat{\alpha}_i > \Phi/2$, which implies that $\Phi/2 < \Phi - \tilde{\alpha}_i$ with $\Phi/2 > \tilde{\alpha}_i$, not possible by contradiction. The reason is that in the high technology sectors, $\tilde{\alpha}_i > \hat{\alpha}_i$. As a consequence, we observe that $\tilde{\alpha}_i \geq \Phi/2 > \hat{\alpha}_i$. Note that $\hat{\alpha}_i$ should be strictly lower than $\Phi/2$. Indeed, if $\hat{\alpha}_i = \Phi/2$, then by eq. (8), $\Phi/2 = \Phi - \tilde{\alpha}_i$, which would imply $\tilde{\alpha}_i = \Phi/2$ and this is not possible as $\tilde{\alpha}_i > \hat{\alpha}_i$ in high technology sectors. Further, we introduce a legal enforcement contract with $\bar{\alpha}$ defined as in eq. (17). Suppose first that $\bar{\alpha} \leq \Phi/2$, then, at maximum $\bar{\alpha} = \Phi/2$. Observing that $\bar{\alpha} < \hat{\alpha}_i$ then $\Phi/2 < \Phi - \tilde{\alpha}_i$, resulting into $\tilde{\alpha}_i < \Phi/2$, which does not hold by definition. Instead, whenever $\bar{\alpha} \geq \Phi/2 > \hat{\alpha}_i$, hence $\Phi/2 > \Phi - \tilde{\alpha}_i$, such that $\tilde{\alpha}_i > \Phi/2$. It is therefore possible to make the following ranking in the high technology sectors, as $\tilde{\alpha}_i > \bar{\alpha} > \hat{\alpha}_i$.

E For the proofs of Propositions 3 and 4

There exists a share of revenues under legal enforcement of contract in low technology sectors,

$$\hat{\alpha}_{lim} = \frac{\triangle x_L \triangle \bar{x} \left(\hat{\alpha}_H - \hat{\alpha}_L\right) + \triangle x_H (1 - \hat{\alpha}_H) \left((1 - \hat{\alpha}_L) \triangle x_L \left(1 - P\right) - \triangle \bar{x}\right)}{(1 - \hat{\alpha}_H) \triangle x_H \triangle \bar{x} + \triangle x_L \triangle \bar{x} \left(\hat{\alpha}_H - \hat{\alpha}_L\right)}, \tag{44}$$

such that for $\bar{\alpha} < \hat{\alpha}_{lim}$, we have the following $\lambda-$ranking: $\bar{\lambda}_{ol} > \bar{\lambda}_{il}$; $\bar{\lambda}_{ol} > \hat{\lambda}$, and $\bar{\lambda}_{pi} < \hat{\lambda}$. Such a ranking creates a setting, where $\bar{\lambda}_{il} < \hat{\lambda} < \bar{\lambda}_{ol}$ as analyzed in detail in Propositions 3 and 4.

If instead switching to a legal enforcement contract increases the share that goes to the suppliers, i.e., if $\bar{\alpha} > \hat{\alpha}_{lim}$ then we obtain $\bar{\lambda}_{ol} < \bar{\lambda}_{il}$; $\bar{\lambda}_{ol} < \hat{\lambda}$, and $\bar{\lambda}_{il} > \hat{\lambda}$. in this case, the ranking creates a setting, where $\bar{\lambda}_{ol} < \hat{\lambda} < \bar{\lambda}_{il}$.

Therefore, legal IP enforcement in this case is never beneficial to the HQ because (i) it would be sharing a larger share of the revenue reducing the gains that could arise from this regime, and (ii) since it is a low technology sector, the risk of infringement is low. Note, however, that this scenario is less likely to occur given the sector characteristics ($\bar{\lambda}_{ol} > \hat{\lambda}$ and

$\bar{\lambda}_{il} < \hat{\lambda}$ requiring small $\bar{\alpha}$ and large $\hat{\alpha}_H$ and $\hat{\alpha}_L$).

F For the proof of Propositions 5 and 6

In the high technology sectors, the threshold share of revenues is instead,

$$\tilde{\alpha}_{lim} = \frac{\triangle\bar{x}(\triangle x_L(1-\tilde{\alpha}_L) + \triangle x_H(\tilde{\alpha}_L - \tilde{\alpha}_H)) - \triangle x_L \triangle x_H (1-\tilde{\alpha}_L)(1-\tilde{\alpha}_H)(1-P)}{\triangle\bar{x}(\triangle x_L(1-\tilde{\alpha}_L) + \triangle x_H(\tilde{\alpha}_L - \tilde{\alpha}_H))}, \tag{45}$$

where for $\bar{\alpha} < \tilde{\alpha}_{lim}$, we have the following $\lambda-$ranking: $\bar{\lambda}_{ih} < \bar{\lambda}_{oh}$; $\bar{\lambda}_{oh} > \tilde{\lambda}$, and $\bar{\lambda}_{ih} > \tilde{\lambda}$. These inequalities together create a setting, where $\tilde{\lambda} < \bar{\lambda}_{ih} < \bar{\lambda}_{oh}$ as analyzed in detail in Propositions 5 and 6.

If instead switching to a legal enforcement contract increases the share that goes to the suppliers, i.e., if $\bar{\alpha} > \tilde{\alpha}_{lim}$ then we obtain, $\bar{\lambda}_{ih} > \bar{\lambda}_{oh}$; $\bar{\lambda}_{oh} < \tilde{\lambda}$, and $\bar{\lambda}_{ih} < \tilde{\lambda}$. Such a ranking creates a setting, where $\bar{\lambda}_{oh} < \bar{\lambda}_{ih} < \tilde{\lambda}$. Therefore, legal enforcement of contract in this case is only beneficial to the HQ for very high (low) levels of L-type (H-type) agents in the society. Again, this is due to sharing a larger share of the revenue reducing the benefits this regime can bring for the HQ. There reason for the existence of a positive range of λ is that we are in a high technology environment where protection is more valuable compared to the low technology sectors. Note, however, that this scenario is less likely to occur given the sector characteristics ($\bar{\lambda}_{ih} > \tilde{\lambda}$ and $\bar{\lambda}_{oh} > \tilde{\lambda}$ requiring small $\bar{\alpha}$ and large $\tilde{\alpha}_H$ and $\tilde{\alpha}_L$).

G Tables

Table 7: Descriptive statistics of firms in the sample, 2002-2010

Variable	Obs	Mean	Std. Dev.
Firm age	30,235	13.02924	6.850274
No. of employees	30,235	59.91288	287.2351
Value added per empl.	30,143	41624.18	372910
Kapital intensity	30,143	115933.6	4817607
Debt to assets ratio	30,235	0.647328	1.190667
Export share	30,235	0.281259	0.314535

Note:Sources: Statistical Office of Republic of Slovenia and Agency of Republic of Slovenia for Public Legal Records and Related Services.

Table 8: Probit import termination model (IMterm) at the firm-market-product level for low-tech subsample

	(1) probit all goods LOW TECH	(2) probit all goods LOW TECH	(3) RE probit all goods LOW TECH	(4) RE probit all goods LOW TECH	(5) probit intermediates LOW TECH	(6) probit intermediates LOW TECH	(7) RE probit intermediates LOW TECH	(8) RE probit intermediates LOW TECH
RuleLaw	0.087	0.829***	-0.093**	1.427***	0.181*	0.800**	0.033	1.563***
	(0.075)	(0.287)	(0.046)	(0.211)	(0.093)	(0.329)	(0.065)	(0.287)
CultureIDV	0.001	-0.058***	-0.006***	-0.072*	-0.006	-0.063**	-0.013***	-0.084
	(0.004)	(0.022)	(0.002)	(0.042)	(0.004)	(0.031)	(0.003)	(0.073)
CultureIDV2	-0.0001*	0.0003*	-6.0e-05***	0.0004	-0.000	0.0003	0.000	0.0004
	(0.000)	(0.000)	(1.9e-05)	(0.0003)	(0.000)	(0.000)	(0.000)	(0.0005)
RuleLaw# CultureIDV	-0.010***	-0.035***	-0.011***	-0.061***	-0.012***	-0.036**	-0.015***	-0.072***
	(0.003)	(0.012)	(0.002)	(0.008)	(0.003)	(0.014)	(0.002)	(0.011)
RuleLaw# CultureIDV2	0.0001***	0.0004***	0.0002***	0.0006***	0.0001***	0.0004***	0.0002***	0.0007***
	(0.000)	(0.000)	(1.4e-05)	(7.9e-05)	(0.000)	(0.000)	(0.000)	(0.0001)
Age	0.003**	0.003**	0.020***	0.019***	0.002	0.001	0.017***	0.0159***
	(0.001)	(0.001)	(0.0003)	(0.0004)	(0.001)	(0.001)	(0.000)	(0.0005)
lnSize (-1)	-0.055***	-0.054***	-0.089***	-0.088***	-0.048***	-0.047***	-0.085***	-0.083***
	(0.006)	(0.006)	(0.002)	(0.002)	(0.007)	(0.007)	(0.002)	(0.002)
lnLproductivity (-1)	-0.120***	-0.122***	-0.130***	-0.134***	-0.114***	-0.116***	-0.133***	-0.136***
	(0.012)	(0.011)	(0.004)	(0.004)	(0.013)	(0.013)	(0.005)	(0.005)
lnKintensity (-1)	0.022***	0.022***	0.023***	0.023***	0.029***	0.030***	0.042***	0.043***
	(0.006)	(0.005)	(0.002)	(0.002)	(0.006)	(0.006)	(0.002)	(0.002)
Debt/assets (-1)	0.110***	0.114***	0.180***	0.187***	0.093***	0.098***	0.120***	0.130***
	(0.034)	(0.034)	(0.008)	(0.008)	(0.031)	(0.031)	(0.012)	(0.012)
ExPropensity (-1)	0.150***	0.138***	0.279***	0.255***	0.132***	0.119***	0.390***	0.365***
	(0.028)	(0.027)	(0.008)	(0.008)	(0.032)	(0.032)	(0.010)	(0.010)
lnGDP (-1)	-0.082***		-0.128***		-0.080***		-0.134***	
	(0.006)		(0.003)		(0.007)		(0.004)	
lnGDPpc (-1)	0.160***		0.428***		0.115***		0.393***	
	(0.026)		(0.015)		(0.030)		(0.021)	
lnDistance	0.119***		0.191***		0.110***		0.186***	
	(0.009)		(0.005)		(0.011)		(0.007)	
Constant	0.846***	3.037***	-1.081***	3.366***	1.273***	3.107***	-0.757***	3.339
	(0.311)	(0.686)	(0.145)	(1.255)	(0.329)	(0.892)	(0.200)	(2.193)
Time eff.	yes	yes	yes	yes	yes	yes	yes	yes
Industry eff.	yes	yes	yes	yes	yes	yes	yes	yes
Country eff.	no	yes	no	yes	no	yes	no	yes
Log likelihood	-1040090	-1042727	-963009	-965929	-654353	-655965	-605833	-607809
Wald test	$\chi^2(29) =$ 1845***	$\chi^2(78) =$ 2736***	$\chi^2(29) = 2$ 29564***	$\chi^2(78) =$ 31721***	$\chi^2(29) =$ 1597***	$\chi^2(78) =$ 2337***	$\chi^2(29) =$ 18872***	$\chi^2(78) =$ 20322***
Likelihood-ratio test; $\rho = 0 : \chi^2(1)$ $(Prob > \chi^2)$	/	/	1.5e+5***	1.5e+05***	/	/	9.7e+04***	9.6e+04***
Observations	1,643,023	1,651,629	1,643,023	1,651,629	1,032,905	1,038,891	1,032,905	1,038,891
No. firm_market_product			793,843	798,680			529,150	532,521

Notes: Robust standard errors in parentheses, adjusted for firm clusters in cloglog specifications; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 9: Probit import termination model (IMterm) at the firm-market-product level for high-tech subsample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	probit	probit	RE probit	RE probit	probit	probit	RE probit	RE probit
	all goods	all goods	all goods	all goods	intermediates	intermediates	intermediates	intermediates
	HIGH TECH	HIGH TECH	HIGH TECH	HIGH TECH	HIGH TECH	HIGH TECH	HIGH TECH	HIGH TECH
RuleLaw	-0.414***	-0.165	-0.648***	-0.241	-0.401***	-0.188	-0.614***	-0.258
	(0.054)	(0.202)	(0.062)	(0.276)	(0.059)	(0.240)	(0.073)	(0.319)
CultureIDV	-0.008***	-0.018*	-0.012***	-0.029*	-0.007***	-0.028**	-0.012***	-0.035
	(0.001)	(0.010)	(0.001)	(0.016)	(0.001)	(0.012)	(0.001)	(0.024)
RuleLaw# CultureIDV	0.005***	0.007**	0.007***	0.009**	0.005***	0.007**	0.007***	0.009*
	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)	(0.005)
Age	0.001	0.000	0.013***	0.012***	0.001	0.001	0.013***	0.012***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
lnSize (-1)	-0.045***	-0.044***	-0.055***	-0.054***	-0.033***	-0.032***	-0.042***	-0.041***
	(0.008)	(0.008)	(0.005)	(0.005)	(0.008)	(0.008)	(0.005)	(0.005)
lnLproductivity (-1)	-0.123***	-0.126***	-0.154***	-0.160***	-0.107***	-0.112***	-0.132***	-0.139***
	(0.018)	(0.018)	(0.011)	(0.011)	(0.021)	(0.021)	(0.013)	(0.013)
lnKintensity (-1)	0.038***	0.037***	0.055***	0.054***	0.042***	0.041***	0.066***	0.064***
	(0.008)	(0.008)	(0.006)	(0.006)	(0.009)	(0.009)	(0.006)	(0.006)
Debt/assets (-1)	0.101*	0.110**	0.120***	0.138***	0.109**	0.112**	0.149***	0.161***
	(0.052)	(0.052)	(0.027)	(0.026)	(0.054)	(0.053)	(0.032)	(0.031)
ExPropensity (-1)	0.240***	0.214***	0.322***	0.281***	0.225***	0.202***	0.395***	0.358***
	(0.038)	(0.038)	(0.023)	(0.023)	(0.040)	(0.040)	(0.027)	(0.027)
lnGDP (-1)	-0.092***		-0.131***		-0.099***		-0.142***	
	(0.008)		(0.007)		(0.009)		(0.008)	
lnGDPpc (-1)	0.252***		0.468***		0.201***		0.377***	
	(0.036)		(0.041)		(0.039)		(0.048)	
lnDistance	0.122***		0.186***		0.119***		0.185***	
	(0.010)		(0.009)		(0.011)		(0.011)	
Constant	0.709*	2.098**	-0.338	3.125**	0.899*	2.541**	-0.503	2.556
	(0.404)	(0.852)	(0.389)	(1.378)	(0.469)	(1.084)	(0.504)	(2.113)
Time eff.	yes	yes	yes	yes	yes	yes	yes	yes
Industry eff.	yes	yes	yes	yes	yes	yes	yes	yes
Country eff.	no	yes	no	yes	no	yes	no	yes
Log likelihood	-96873	-97941	-90121	-91234	-72233	-73097	-67524	-68448
Wald test	$\chi^2(27) =$ 1238***	$\chi^2(74) =$ 1892***	$\chi^2(27) =$ 3766***	$\chi^2(74) =$ 4132***	$\chi^2(27) =$ 943***	$\chi^2(72) =$ 1535***	$\chi^2(27) =$ 2830***	$\chi^2(72) =$ 3118***
Likelihood-ratio test; $\rho = 0 : \chi^2(1)$ $(Prob > \chi^2)$	/	/	1.4e+04***	1.3e+4***	/	/	9418***	9298***
Observations	145,519	147,970	145,519	147,970	108,432	110,461	108,432	110,461
No. firm_market_product			77,956	79,277			60,879	61,986

Notes: Robust standard errors in parentheses, adjusted for firm clusters in cloglog specifications; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.