



PROPERTY VERSUS CONTRACT.*

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Abstract

There is a fundamental trade-off between protecting property rights and enhancing reliance on contracts when intermediaries have the opportunity to transfer goods without the owner's consent. If buyers value the good more than original owners, protection of property misallocates value. Instead, enhancing the buyers' reliance on contracts causes misallocation if owners have the higher valuation. Our model shows that protection of property rises with the strength of a culture of morality and falls with the quality of the legal system. This is consistent with instrumental variables estimates based on a novel dataset measuring the wide legal variation existing in 77 jurisdictions.

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JEL classification: P14; L11; Z10; K11.

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1 Introduction

The relevance of protecting property rights and enhancing reliance on contracts for investment and trade has long been recognized (Acemoglu and Johnson, 2005; Besley and Ghatak, 2010). Yet, the literature has failed to identify a fundamental trade-off between these two institutional strategies emerging because, due to transaction costs, virtually all trade occurs through intermediaries. Hence, if an intermediary I transfers a good to an innocent buyer B without the consent of the original owner O , society needs to balance the protection of O 's property rights with B 's reliance on the contract. If buyers value the good more than original owners, protection of property misallocates value. Instead, enhancing the buyers' reliance on contracts causes misallocation if owners have the higher valuation.¹

This paper lays out a theory of the determinants of this institutional trade-off and explores its empirical implications using cross-country data on the rules resolving the conflict between dispossessed owners and innocent buyers of movable goods and, in particular, stolen ones.² Although we focus on the most primitive form of transfer without consent, theft, our analysis addresses an omnipresent issue, which can assume a wide variety of forms, for example: *void contract*, I buys a good from O and resells it to B , but later on the contract between I and O is voided; *double sale*, I sells an asset first to O and then to B ; *embezzlement*, O entrusts valuables to I , but I sells them to B ; *unauthorized agency*, I works for O 's company and enters into a contract, which she is not authorized to make, with B ; *forged negotiable instrument*, O is the drawer of a bearer's instrument that I forges and then sells to B .

In the model, homogeneous goods can be transferred to buyers only by intermediaries who in turn can either buy or steal from the original owners. Intermediaries are either "moral" and suffer a psychological cost from stealing or "immoral" and thus numb to feelings of guilt.

¹Legal systems also offer a series of contract, tort or unjust enrichment remedies, which give the losing party recourse against the intermediary. Yet, in reality, the intermediary may often be insolvent or impossible to find and bring to court so that the case is adjudicated between two equally innocent parties: the dispossessed original owner and the good-faith buyer.

²The incidence of theft is extremely relevant. The mean number of recorded cases of theft averaged over the sample used below was in 2006 around a theft every 100 inhabitants (UNODC, 2006). Some occurrences lead to multi-million dollars transactions as it is the case of works of art (Borodkin, 1995). An instructive example of the issue is *Winkworth v. Christie Manson and Woods Ltd.* (Chancery Div. 1980), in which Japanese miniatures stolen in England, brought to Italy and sold there, were then brought back to England where they remained in the hands of the buyer since the Italian law is more pro-buyer of the English one.

The intermediary type is private information. Each intermediary decides first whether to steal, buy, or exit the market and, then, eventually a selling price. Next, buyers observe a costless and imperfect signal on the title of the good and choose whether to buy. Finally, with an exogenous probability, the legal system observes the title of the good and enforces the law. We consider three rules: 1. owner protection prescribes that stolen goods should be returned to original owners; 2. good-faith buyer protection allows only good-faith buyers—i.e., those who received an uninformative signal—to keep stolen goods; 3. full buyer protection permits even bad-faith buyers to retain stolen goods. Since in reality every individual can be at some point either a buyer or an owner, we focus on the rule maximizing social welfare plus a preference shock. If buyers value the good more than original owners and the difference between owners' and buyers' valuations is not too wide, there are separating equilibria in which moral intermediaries signal their proper title by charging prices higher than those set for stolen goods by immoral intermediaries. Instead, when owners have the higher valuation, the market shrinks because moral intermediaries refrain from theft. Markets in which buyers have high valuations are more likely since they yield larger gains for intermediaries. Hence, we focus on this case and show that the extent of protection of the original owner will comparatively increase (decrease) with the share of moral intermediaries (quality of the legal system) because of the lower probability of theft (impact of public enforcement). The model's message survives when we consider several extensions to the basic set up, e.g.: original owners can costly protect their property, the signal on the intermediary's title is costly for the buyer, some buyers can be moral, and original owners have a buy-back option.

Testing the model's predictions brings two key challenges. On the one hand, it is necessary to observe the relative extent of protection of the original owner's property rights, the quality of the legal system, and the strength of a culture of morality for a sufficiently wide sample of comparable jurisdictions. On the other hand, the possible endogeneity of these covariates to unobserved determinants of legal institutions needs to be addressed. To achieve these goals, we approached experts and gathered data on the rules concerning the acquisition of ownership over stolen movable goods in 128 jurisdictions. For 77 of them, we could construct a proxy for a culture of morality, defined as the first principal component extracted from the self-reported level of generalized trust and that of respect in the population, and one for the

quality of the legal system, defined as the first principal component extracted from the total number of police personnel and professional judges. Building on cross-cultural psychology (Licht, Goldschmidt, and Schwartz, 2007), we instrument the former with linguistic features capturing the cultural emphasis on individualism and the latter with those detecting a major acceptance of a centralized enforcement power. Our estimates are strongly consistent with the model’s predictions even after controlling for other determinants of legal evolution such as the level of economic development and the legal origin of the jurisdiction.

The present study is strictly related to three bodies of research. The first one looks at the relative importance of protecting property rights and enforcing contracts at the macro level (Acemoglu and Johnson, 2005). In contrast, we examine the micro-details of the trade-off between these two institutional strategies.³ The second one sees the legal system as a response to the risk that the majority of market participants are coerced by a minority of more powerful special interests (Glaeser and Shleifer, 2003; Guerriero, 2012a) or similarly powerful untrustworthy agents (Aghion et al., 2010).⁴ We broaden the scope of this literature by considering the more general problem of non-consensual transfers. The third stream of literature compares different good-faith purchase regimes on the basis of owner’s prevention and buyer’s information costs (Landes and Posner, 1996; Ben-Shahar, 1997; Medina, 2003; Schwartz and Scott, 2011), but does not explain the observed cross-country variation. Crucially, we do this by endogenizing not only the supply of theft but also the market structure—i.e., prices and identities of market participants. Also, we test our theory by using an original dataset of rules regulating the transfer of movable goods, which can be used in the future to shed light on property rights and contracting institutions at the micro level.

The rest of the paper is organized as follows. Section 2 illustrates the basic set up of the model, whereas section 3 assesses how robust the main model’s prediction is to alternative assumptions. Section 4 illustrates the empirical exercise and section 5 offers some concluding comments. Finally, the appendix contains proofs, tables, and figures.

³Strictly speaking, we do not consider enforcement of contracts, which is relevant only between two contracting parties, but the more general notion of enhancing *reliance on contract*, which applies also to third parties.

⁴Other papers looking at coercion as an alternative to markets are Piccione and Rubinstein (2007) and Acemoglu and Wolitzky (2011). Yet, neither of them consider the role of culture. A related literature concerns with transfers occurring directly through coercion (markets) between an original owner and a taker (buyer) (Calabresi and Melamed, 1972). In contrast, we consider situations in which transactions only take place through an intermediary, who can use coercion or markets, while the final buyer is innocent.

2 Theory

Preliminaries.—We consider the interaction among a mass one of intermediaries, a group of original owners of a homogeneous good, and one of potential buyers. The last two groups are bigger than the first one and, for sake of simplicity, we assume that they have the same mass equal to one plus an atomistic agent. Given our focus on the use of either theft or markets if an intermediary is needed, we posit that original owners and buyers do not interact directly because, for instance, the buyers are physically distant or unfit to steal. The intermediaries can store one good and meet one randomly drawn buyer: this detail spares us a set of essentially arbitrary assumptions about the queuing mechanism that agents with the same valuation should follow. Also, there is Bertrand competition among the original owners in selling their good to the intermediaries so that intermediaries can always buy at the lowest possible price and resell at the highest price potential buyers are willing to pay (for a model in which trade also produces a resale value for the owner, see Medina, 2003).

All intermediaries value the good at 0, all original owners at $U > 0$ and all buyers at $V > 0$. These valuations are common knowledge. For simplicity sake, we maintain that V can equal either $\underline{V} \equiv U - \Delta$ or $\bar{V} \equiv U + \Delta$, where Δ measures the difference between the owner's and the buyer's valuation.⁵ We consider the second case as being more likely since markets in which buyers have high valuations yield larger gains for all types of intermediaries.⁶ Thus, they will self-select into these kinds of markets.⁷ Anyway, the argument we make would go through unchanged if we allowed buyers to be heterogeneous in their valuations.⁸ Also, as clarified by an increasing body of research on property rights and economic development

⁵In reality, a stronger owner protection implies more secure property rights and, in turn, could increase the original owner's valuation. Yet, the valuation of a buyer successfully acquiring property would move in the same direction. Given this level effect, not only the agents' valuations but also the input and investment decisions of the firm producing the good should not be systematically affected by legal rules.

⁶We show in the basic model that the gain for moral (immoral) intermediaries is 0 (either $(1 - q)\underline{V}$ or \underline{V}) if buyers have low valuations and $\bar{V} - U$ (either $(1 - q)\bar{V}$ or \bar{V}) if buyers have high valuations.

⁷An additional argument is that one of the functions of intermediaries is to inform original owners of resale opportunities so that their presence makes it easier a match with high-valuing buyers.

⁸In this case, the mass of the high (low) valuation buyers should equal $\bar{n} > 1$ ($\underline{n} > 1$) plus one atomistic agent and the mass of the intermediaries (buyers) should be $\bar{n} + \underline{n}$ ($\bar{n} + \underline{n}$ plus two atomistic agents). Also \bar{n} (\underline{n}) intermediaries should only deal with high (low) valuation buyers. This assumption would make our testable predictions a function of the share of the high valuing buyers but, provided that this fraction is greater than one half, this dependence would be irrelevant. The possible buyer's valuations can be easily made asymmetric around the value U at the cost of a slightly more cumbersome algebra.

(Besley and Ghatak, 2010), U captures economic value in general. It can be an input in a production process, or an effort in the case of embezzlement;⁹ it can incorporate the owner’s improvement effort—already sunk and net of asset specificities—or her extra utility from pledging the good as a collateral when it can not be easily transformed in liquidity.

A share μ of the intermediaries is “moral” and bears a psychological cost m from stealing and a share $1 - \mu$ is “immoral” and hence numb to feelings of guilt.¹⁰ Building on the expanding evidence on the relevance of intrinsic motivations for economic exchange (Sapienza and Zingales, 2009; Tabellini, 2010), we assume that:

A1: $m > U$.

Assumption A1 can be relaxed at the cost of increasing the number of equilibria (see section 3). Given the relative sizes of each group, assumption A1 implies that the moral cost of stealing is larger than the price of the good and ensures that moral intermediaries never steal. Also, the assumption that buyers do not suffer any moral loss from buying a defective-title good can be justified by the existence of some form of cognitive dissonance due to the lack of direct experience of coercion (Cooper, 2007) and is relaxed in section 3.

Timing.—At time t_0 society chooses among the institutions described below on the basis of the sum of the expected welfare and a mean-zero pro-buyer protection shock. Next, at time t_1 , the intermediary makes a take-it-or-leave it offer to the buyer. At time t_2 , the buyer first observes a costless signal, that is informative with probability $s \leq 1$ only when the good is stolen, and then decides whether to buy the good or not.¹¹ Finally, at time t_3 , with probability q , the enforcement system observes the true title of the goods sold and enforces the law.¹² The case in which the intermediary is caught is not interesting because, under this scenario, the transfer could in principle be undone: i.e., the original owner could reclaim her good from the buyer and the buyer the price from the intermediary.¹³ We consider three rules:

⁹In this case, if the original owner can choose among different productive uses institutional choice would also be aimed at avoiding diversion of resources from productive to unproductive uses (Besley and Ghatak, 2010).

¹⁰Should the difference between a “moral” and an “immoral” intermediary be a psychological reward from not stealing, the algebra would be more complicated but the model would not deliver any new main insight.

¹¹The signal assumes value 1 only when the good was stolen and the draw is informative and 0 otherwise. Thus, $\hat{s} \in \{0, 1\}$ with $\Pr(\hat{s} = 0 | \text{proper title}) = 1$ and $\Pr(\hat{s} = 1 | \text{defective title}) = s$. Ben-Shahar (1997) models signals in a similar way but assumes that also the intermediary observes the signal.

¹² q is the probability that the good is located and that the original owner proves her case in court. The legal system makes asymmetric errors: it may fail to return a stolen good but never returns legitimate goods.

¹³What drives the results is the differential cost between moral and immoral intermediaries and not the back-

1. owner protection prescribes that a stolen good should be returned to the original owner; 2. good-faith buyer protection allows only good-faith buyers to retain a stolen good; 3. full buyer protection permits even bad-faith buyers to keep a stolen good. A buyer is considered in bad faith for legal purposes if she sees an informative signal. Hence, while the signal is observable and verifiable in court, the price paid is not verifiable and hence the inference from its observation is private to the buyer. This assumption squares with the fact that, on resale, most transactions are not subject to registration and resale prices can be difficult to recover. Also, it is a way to capture the important fact, not accounted for in other models, that good faith is a legal notion, which typically differs from the buyer’s actual knowledge about the title. The probability that a stolen good purchased by the buyer is returned to the original owner is $q < 1$ under owner protection, the joint probability of law enforcement and bad faith $sq < q$ under good-faith buyer protection, and zero under full buyer protection. The following simplifying but innocuous assumption—see section 3—relates s to q :

A2: $s \geq q$.

It is easier for a buyer than for the legal system to verify the title of the good because, for instance, she can ask an expert to accompany her for free. In section 3 not only do we relax assumption A2, but we study three generalization: 1. the original owner can protect her property; 2. buyer protection entitles the buyer to receive a monetary compensation rather than the good; 3. the signal is costly. We also maintain that $\theta \equiv \frac{\Delta}{\underline{V}} \in [0, 1]$ is not too large:

A3: $\theta < \theta^* \equiv (1 - q)q^{-1} \leq 1$.

At a closer look, θ should be considered an inverse measure of the intermediary’s potential for stealing relative to either buying when $V = \bar{V}$ or exiting the market when $V = \underline{V}$. For $V = \bar{V}$, θ is the ratio of the potential profit from trading a good with proper title over the cost of acquiring it. For $V = \underline{V}$, instead, θ is the ratio of the loss that the intermediary avoids by exiting the market over the upper bound to the price of stolen goods. If $V = \bar{V}$ and if θ is sufficiently small so that assumption A3 holds, then immoral intermediaries never buy the good and, thus, a high price has an informational content.¹⁴ If A3 fails, all intermediaries

ground probability of apprehension and conviction, which could affect the share of immoral intermediaries. Modern legal systems do not treat buyers differently depending on whether the thief is apprehended or not, suggesting that the relevant cases concern situations in which the thief is not found or is insolvent.

¹⁴Given a level of U , assumption A3 is more easily satisfied if preferences are less polarized because of, for instance, globalization; also, the hypothesis is without loss of generality when $q < 1/2$.

buy and the institutional design is not a function of either μ or q : this is the scenario usually considered by the existing literature (Besley and Ghatak, 2010).

2.1 An Economy With High Valuation Buyers

Owner protection.—Since moral intermediaries never steal, prices equal the maximum buyer’s willingness to pay, and selling a good with proper title produces a profit, the possible equilibria are: 1. a moral (immoral) intermediary buys (steals) the good from the original owner and resells it at the pooling price $\bar{p}^h \equiv \bar{V}$; 2. while a moral intermediary acquires the good from the original owner and charges \bar{p}^h , an immoral one steals the good and charges $\bar{p}^l \equiv (1 - q)\bar{V}$ to a buyer who, consequently, has to return the good with probability q . The latter is the only equilibrium since, from assumption A2, a stolen good priced at \bar{p}^h remains unsold a fraction s of the cases—i.e., when the signal is informative—and produces a profit $(1 - s)\bar{V} < (1 - q)\bar{V}$. Hence, the change in social welfare, defined as the change in the sum of the three agents’ payoffs with respect the baseline situation in which original owners keep their goods and both the intermediary and the buyer remain dormant, equals $\bar{W}_O = \mu(\bar{V} - U) + (1 - \mu)(1 - q)(\bar{V} - U)$, which increases (declines) with the share of moral intermediaries (quality of the legal system). To elaborate, if $V = \bar{V}$, enforcing the law means mis-allocating the good—i.e., handing it back to the agent with the lowest valuation.

Good-faith buyer protection.—A reasoning similar to the one used above reveals that the only equilibrium is separating and the moral intermediary charges \bar{p}^h for a legitimate good, whereas the immoral one charges \bar{p}^l for a stolen good. Counterintuitively, the signal s does not affect the price since it is revealed after the intermediary’s offer. Thus, the immoral intermediary does not know whether the buyer will receive no signal and be willing to pay \bar{p}^h or will receive a signal and be willing to pay only \bar{p}^l . Being forced to insure the buyer from bad faith, the intermediary sets a price \bar{p}^l . This time, the change in social welfare vis-à-vis the baseline scenario is $\bar{W}_{GF} = \mu(\bar{V} - U) + (1 - \mu)(1 - sq)(\bar{V} - U)$, which falls with s because an informative signal nullifies a welfare increasing transfer with probability q .

Full buyer protection.—Since the buyer can always legitimately retain a stolen good, she is always willing to pay up to her valuation. The only possible equilibrium is a pooling with unique price \bar{p}^h . The change in social welfare is maximal—i.e., $\bar{W}_B = \bar{V} - U$ —and does

neither depend on μ nor on q . The following lemma summarizes the analysis so far:

Lemma 1: *Given A1-A3, if $V = \bar{V}$, moral intermediaries buy the good at U and immoral ones steal it. Under both owner and good-faith buyer protection, the only equilibrium is separating: i.e., legitimate goods are sold at $\bar{p}^h \equiv \bar{V}$ and stolen ones at $\bar{p}^l \equiv (1 - q)\bar{V}$. Under full buyer protection, the only equilibrium is pooling and the unique price is \bar{p}^h . The change in social welfare is highest (lowest) under full buyer (owner) protection.*

2.2 An Economy With Low Valuation Buyers

If buyers have low valuation, moral intermediaries stay out of the market because the highest possible resell price is lower than the purchase price. The buyer anticipates that all goods on the market are stolen and hence discounts the probability of having to return the good while deciding whether to accept the intermediary's offer.

Owner protection.—The price equals the buyer's expected value $\underline{p}^l \equiv (1 - q)\underline{V}$ and the change in social welfare are given by $\underline{W}_O = -(1 - \mu)(1 - q)(U - \underline{V})$. If buyers have low valuation, transfers result in a social loss. Thus, as the market shrinks because μ rises or the legal system becomes more effective since q rises, social welfare increases.

Good-faith buyer protection.—Buyers have to return the good with probability q only if the signal is informative. Thus, immoral intermediaries have a choice between always selling the good by charging \underline{p}^l or selling the good only when the signal is not informative by charging $\underline{p}^h \equiv \underline{V}$. The former strategy maximizes welfare and thus $\underline{W}_{GF} = -(1 - \mu)(1 - sq)(U - \underline{V})$.

Full buyer protection.—Because buyers never have to return the good, the price is \underline{p}^h and the change in social welfare is $\underline{W}_B = -(1 - \mu)(U - \underline{V})$. Summarizing:

Lemma 2: *Given A1-A3, if $V = \underline{V}$ only immoral intermediaries stay on the market. They steal the good and sell it at $\underline{p}^l \equiv (1 - q)\underline{V}$ under owner protection and good-faith buyer protection and at $\underline{p}^h \equiv \underline{V}$ under full buyer protection. The change in welfare is highest (lowest) under owner (full buyer) protection.*

2.3 Endogenous Legal Institutions Selection

At time t_0 society chooses an institution on the basis of the expected change in welfare W_i , with $i \in \{O, GF, B\}$, and a mean-zero shock ε to her preferences for higher buyer pro-

tection;¹⁵ ε is distributed according to the density f on $[-\infty, \infty]$ and captures, for instance, cultural biases for protecting reliance on contract over property rights or heterogeneous costs of reforming transplanted institutions (Guerriero, 2012b). Hence, for instance, the probability that good-faith buyer protection is preferred to owner protection when $V = \bar{V}$ is $P(\bar{W}_{GF} - \bar{W}_O + \varepsilon \geq 0)$. By taking the derivatives with respect to the exogenous parameters of the three possible pair-wise comparisons for each the two possible economies we can assess how the institutional choice is affected by μ and q . As discussed in the appendix:

Proposition 1: *Given A1-A3, the probability that society selects a stronger protection of the buyer: 1. decreases with the share of moral types μ and increases with the quality of the legal system q when the potential buyers have high valuation; 2. increases with μ and decrease with q when the potential buyers have low valuation; 3. the impact of μ and q is stronger the larger is the difference between the owner's and the buyer's valuation Δ .*

If $\varepsilon = 0$, the rule allocating more often the good in the hands of the agent with the highest valuation always prevails; to elaborate, society always picks owner protection when the buyers have low valuation and always prefers buyer protection when the buyers have high valuation. This last result belongs to a series of findings revealing that insecure property rights can enhance welfare when, due to hold-up or market frictions, valuable assets or efforts are misallocated if left in the original' owner hands (Besley and Ghatak, 2010).

Preference shocks make this deterministic choice probabilistic giving, at the same time, a comparative role to μ and q . In particular, for $V = \bar{V}$, the greater the share of moral intermediaries, the lower is the likelihood of theft which, in turn, decreases the comparative advantage of buyer protection. In contrast, the greater the probability of law enforcement, the more efficiently owner protection undoes desirable transfers and, hence, the higher is the comparative advantage of buyer protection. All these comparative statics results have a magnitude which is larger the wider is the difference between the owner's and the buyer's valuation Δ , which indeed is a measure of the social impact of misallocation.¹⁶ These results are reversed when $V = \underline{V}$. As we have explained, since intermediaries self-select into

¹⁵Allowing for different shocks under different pair-wise comparisons of legal rules would make notation more cumbersome without changing the results.

¹⁶If $V = \bar{V}$, a rise in s decreases the odds that society moves toward good-faith buyer protection since it decreases the probability that a good is returned to the original owner. The opposite is true for $V = \underline{V}$.

markets with high-valuing buyers, we consider the scenario $V = \bar{V}$ as being the most likely even among the less market-oriented and developed jurisdictions we study in our empirical exercise. Building on this observation, our model produces the following testable predictions:

Testable Predictions: *The extent of protection of the owner increases with the share of moral intermediaries and decreases with the quality of the legal system. These two effects are stronger the wider is the difference between the owner’s and the buyer’s valuation.*

3 Robustness to Alternative Assumptions

Next, we assess how robust these predictions are to alternative assumptions.

The original owner can protect her property.—The original owner can now impose a cost of stealing C on the intermediary by spending C —e.g., buying an alarm or a lock or placing her property in a safe. Since the buyer’s payoff is not directly affected by C the equilibrium prices is unaffected. Also, the original owner sets C equal to either a value deterring theft or to zero. In an economy with high valuation buyers, an original owner willing to deter theft should impose on the immoral intermediary a loss equal to the difference between the resale price of stolen goods and the net payoff from legal resale. In an economy with low valuation buyers, instead, legal resale is not an option and the minimum level of private protection deterring theft has to match the resale price. Thus, a stronger legal protection of the original owner reduces, at the same time, the benefits and the costs of private protection. The former effect is due to the lower expected loss from theft, the latter is driven by the lower price charged for stolen goods. The combination of these two effects produces a non-monotonic relationship between the protection afforded to the original owner by the law and the original owner’s private protection effort. Lemma 3 formalizes these observations:

Lemma 3: *Given A1-A3, if $V = \bar{V}$, there are two values of θ —i.e., $\bar{\theta}_{GF}$ and $\bar{\theta}_O$ with $\bar{\theta}_{GF} \leq \bar{\theta}_O \leq \theta^*$ —such that the original owner: 1. never protects her property if $\theta < \bar{\theta}_{GF}$; 2. protects her property only under good-faith buyer protection if $\bar{\theta}_{GF} \leq \theta < \bar{\theta}_O$; 3. protects her property under both owner and good-faith buyer protection if $\theta \geq \bar{\theta}_O$.*

This non-monotonicity is evident when $\bar{\theta}_{GF} \leq \theta < \bar{\theta}_O$. Here, a reform from full buyer to good-faith buyer protection, push the owner to protect her own property: that is, legal and private protection are complements. Yet, an even stronger legal protection—i.e., a

reform toward owner protection—completely discourages private protection, making the two decisions substitutes. Our conclusions differ from Schwartz and Scott’s (2011) claim that the two forms of protection are always substitutes because endogenizing the market structure unveils key feedbacks of the law on prices. Also, a higher θ boosts private protection because it makes buying relatively more convenient than stealing even for immoral intermediaries. The analysis is similar when $V = \underline{V}$ with the caveat that the thresholds we identify could not be in the relevant parameter ranges when either q or μ are sufficiently large:

Lemma 4: *Given A1-A3, if $V = \underline{V}$, there are values of θ —i.e., $\underline{\theta}_{GF}$, $\underline{\theta}_B$ and $\underline{\theta}_O$ with $\underline{\theta}_{GF} \leq \underline{\theta}_B = \underline{\theta}_O = \mu$ —such that the original owner: 1. never protects her property if $\theta < \underline{\theta}_{GF}$; 2. protects her property only under good-faith buyer protection if $\underline{\theta}_{GF} \leq \theta < \underline{\theta}_B$; 3. always protects her property if $\theta \geq \underline{\theta}_B$.*

Thus, proposition 1 remains unaffected in the most likely case in which θ is sufficiently small—i.e., either $\theta < \bar{\theta}_{GF}$ or $\theta < \underline{\theta}_{GF}$, and the following exceptions arise otherwise:

- i) For $V = \bar{V}$ and $\bar{\theta}_{GF} \leq \theta < \bar{\theta}_O$, the probability that society prefers good-faith buyer protection to owner protection increases with the quality of the legal system q ;
- ii) For $V = \bar{V}$ and $\theta \geq \bar{\theta}_O$, the probability that society moves away from full buyer protection increases with q and is insensitive to changes in μ ;
- iii) For $V = \underline{V}$ and $\underline{\theta}_{GF} \leq \theta < \underline{\theta}_B$, the probability that society moves toward full buyer protection increases with μ ;
- iv) For $V = \underline{V}$ and $\theta \geq \underline{\theta}_B$, μ has no impact on the institutional design.¹⁷

The signal on the good’s title is costly.—We now assume that the buyer receives the signal only if she invests $K > 0$ in information gathering before dealing with the intermediary—e.g., this time the expert wants to be rewarded. In this setting, a buyer would be considered in bad faith if she did not invest in information given that the cost was reasonably low or if she invested in information and the signal was informative. Inspection of the equilibria discussed in lemmas 1 and 2 reveals that buyers obtain a strictly positive expected payoff—i.e., $(1 - \mu)(1 - s)q\bar{V}$ for $V = \bar{V}$ and $(1 - s)q\underline{V}$ for $V = \underline{V}$ —only under good-faith buyer protec-

¹⁷The first two results can be interpreted as follows. For $\bar{\theta}_{GF} \leq \theta < \bar{\theta}_O$, good-faith buyer protection is desirable since private protection wipes out the supply of theft: this is especially welcome when stolen goods are often returned under other rules—i.e., q is high. For $\theta \geq \bar{\theta}_O$, this effect extends also to owner protection. Since now the goods are never returned, μ has no role. The last two results are due to the fact that in those cases private protection nullifies transfers and only when it is absent μ plays a role—i.e., it reduces theft.

tion. Hence, provided that the cost of acquiring information is lower than $(1 - \mu)(1 - s)q\bar{V}$ for $V = \bar{V}$ and lower than $(1 - s)q\underline{V}$ for $V = \underline{V}$, the buyer buys the signal only under good-faith buyer protection. The cost of information destroys the separating equilibrium because the good intermediary cannot offer a separating price lower than $\bar{V} - K$ in order to induce the buyer to buy the signal. As a result, the immoral intermediary mimics the moral one and the equilibrium pooling price is either high enough to allow both intermediaries to stay on the market and the buyer to have a weakly positive expected payoff—i.e., $\bar{p}^{h,S} \equiv \mu\bar{V} + (1 - \mu)(1 - q)\bar{V}$ —or equal to \bar{p}^l so that the moral intermediary exits the market since buying is unprofitable. While the latter happens if $\bar{p}^{h,S} < U$ or $\theta < \theta^S \equiv \frac{q(1-\mu)}{1-q(1-\mu)}$, the former is the case if $\theta \geq \theta^S$.¹⁸ Similar to the case of private protection of property by the owner, the extent of protection of her contract certainty by the buyer is a non-monotonic function of the corresponding protection afforded by the legal system. Also, for $V = \bar{V}$ and $\theta < \theta^S$ and for $V = \underline{V}$ the change in social welfare remains the same as in the benchmark case under owner and full buyer protection, while it falls by K under good-faith buyer protection: this leaves unchanged proposition 1. For $V = \bar{V}$ and $\theta \geq \theta^S$, instead, all goods for sale are stolen and the change in social welfare becomes $(1 - \mu)(1 - q)(\bar{V} - U)$, which means that the probability of a reform toward more protection of the buyer now rises with μ . Yet, once again, this happens in the less realistic range of parameters.

Moral buyers.—Let us now assume that a share μ of buyers are moral and suffer a loss m if they buy a good they know for sure is stolen because of the purchasing price or because they received an informative signal. The remaining buyers are insensitive to guilt. Because an intermediary has either a legitimate or a stolen good, the price cannot be used to screen different types of buyers. Yet, two novel patterns arise: 1. for θ sufficiently large the prospect of not selling because of the match with a moral buyer induces immoral intermediaries to buy the good; 2. the model endogenously produces a loss due to the just discussed match between an immoral intermediary and a moral buyer. The loss is driven by the fact that every intermediary values the good at zero. Since, under a slightly stricter version of assumption A2, this social cost affect symmetrically all rules whether V equals \underline{V} or \bar{V} , proposition 1 continues to hold true in the most likely case of a θ not too large.

¹⁸Notice that the $\theta \geq \theta^S$ scenario can be possible only when $\theta^S \leq \theta^*$ or $\mu \geq q^{-1}(2q - 1)$.

The original owner has a buy-back option.—We now assume that good-faith buyer protection entitles the good-faith buyer to receive a compensatory award if the owner decides to exercise her buy-back option and retain the good otherwise. We consider two possible award levels: the purchase price and the market price—i.e., the buyer’s valuation of the good, which is the price at which legitimate goods are sold on the market by moral intermediaries. When $V = \bar{V}$, the owner does not exercise the option except if compensation is based on a purchase price equal to $\bar{p}^l = (1 - q)\bar{V} < U$. In contrast, if buyers have low valuations, original owners always exercise their buy-back option and obtain back the good. Also, whenever exercised, the original owner’s buy-back option makes the change in social welfare under good-faith buyer protection equal to that prevailing under owner protection. This difference, however, leaves essentially unchanged our testable predictions.

Relaxing assumptions A1, A2, and A3.—Relaxing our three key assumptions increases the number of equilibria but leaves the testable predictions essentially unchanged. The key new features are that: 1. if m is sufficiently small, both types of intermediaries steal and moral costs accrue to the changes in social welfare; 2. if assumption A2 is relaxed, a separating equilibrium can no longer be supported and there can be an equilibrium where moral intermediaries buy, immoral ones steal, and the pooling price is such that uninformed buyers buy; 3. if assumption A3 also fails, immoral intermediaries also buy.

4 Evidence

To test the model’s predictions we need a comparable sample of jurisdictions that vary in the degree of protection afforded to the original owner and meaningful proxies for the share of moral intermediaries and the efficiency of the legal system.

The dependent variables.—As seen above, cases of good-faith purchase cover all the range of transferable goods, such as movable and immovable property, works of art, and financial instruments whether they were embezzled, lost, or stolen (Salomons, 2009). To avoid the complexities of agency relationships and real estate transactions, we focus on the rules concerning with the acquisition of ownership over stolen movable goods by a good-faith buyer.

Operationally, we sent questionnaires to members of Lex Mundi—i.e., the most prestigious international association of law firms (see also Djankov et al., [2003])—and its affiliate

HG.org, contributors to the World Bank doing business project (World Bank, 2010), and academics affiliated to the top-ranked law schools around the world. Experts working in 128 jurisdictions answered with detailed information about the evolution over the period 1981-2011 of the rules we are interested in. The lack of any significant reform over this period and the unavailability of observable proxies for the share of moral intermediaries and the efficiency of the legal system for part of these legal systems leaves us with a cross section of 77 jurisdictions. These are listed in table 2. We extracted from the questionnaires six variables increasing in the protection afforded to the owner *vis-à-vis* the good-faith buyer.

The first variable is the number of years after which any good-faith possessor of a movable good acquires ownership, *Adverse-Possession*. The longer this term of years, the stronger the protection afforded to the original owner. The next variables refer specifically to the purchase of stolen goods and indicate the number of years after which the buyer definitively acquires ownership of a stolen good purchased respectively in a private sale, *Property-Private*, in a public market, *Property-Market*, from a professional seller, *Property-Professional*, and in an auction, *Property-Auction*.¹⁹ Finally, we consider the dummy *Good-Faith*, which is equal to 0 when good-faith is presumed and 1 otherwise. Clearly, a buyer whose good-faith is always presumed receives more legal protection than a buyer who has to prove it.

The map in Figure 1 visualizes the wide variation in the distribution of pro-owner institutions around the world focusing on *Adverse-Possession*. The average general term for adverse possession by any good-faith possessor is 10.487 years with a standard deviation of 11.285 years which indicates the existence of a variety of solutions ranging from the strongest protection of the owner in the United States to the complete protection of the buyer in Italy. *Proxying morality and the efficiency of the legal system.*—In order to construct a proxy of the share of moral intermediaries in society, we build on individual answers taken from the five waves of the World Value Surveys carried out in 1981-1982, 1989-1990, 1994-1995, 1999-2000, and 2005-2006 (Inglehart et al. 2010) and from the four waves of the European Value Study carried out in 1981, 1990, 1999, and 2008. Following Tabellini (2010), we consider two

¹⁹If the law prescribes that the good-faith buyer can never acquire property rights we assign the variable a value of thirty, which is the maximum observed elsewhere in the sample. Switching to seventy years or to the life expectancy at birth of the jurisdiction does not qualitatively affect the results of the empirical exercise. This along with the other robustness checks discussed below is available upon request.

aspects: the level of generalized trust, *Trust*, and the importance of respect as a moral value to instill in the children, *Respect*.²⁰ These dimensions “ought to encourage welfare-enhancing social interactions” (Tabellini, 2010). In order to capture the underlying variation of these indicators, we focus on their first principal component, *Culture*.

Turning to the efficiency of the legal system and building on the observed positive relation between the resources allocated to the justice system and the probability of apprehension (Levitt, 2004), we consider the first principal component extracted from the total police personnel and the total professional judges and magistrates per 100,000 inhabitants averaged between 1973 and 2009—*Enforcement*. These data are collected from all the available waves of the United Nations Survey of Crime Trends and Operations of Criminal Justice Systems (see, for instance, UNODC, 2006). Our estimates will be materially similar if we focus instead on measures of the perceived quality of the legal system like the law sub-component of the International Country Risk index or the total estimated duration of the procedure involved in collecting a commercial debt or a bounced check (Djankov et al., 2003). Table 3 illustrates the definitions, sources, and basic statistics of all the variables.

Identification.—Building on proposition 1, we focus on regressions of the form:

$$y_j = \alpha + \beta x_j + \gamma z_j + \epsilon_j, \tag{1}$$

where y_j is either a continuous measure of pro-owner rules or $Pr(Good-Faith_j = 1 \mid x_j, z_j)$. In this last case, the right hand side of (1) is $F(\alpha + \beta x_j + \gamma z_j)$ where we take F to be the standard Normal CDF. While x_j is *Culture*, z_j labels *Enforcement*. The implications to be tested are that $\beta > 0$, $\gamma < 0$, and that both coefficients increase with the scope of trade—i.e., are higher in the regressions looking at the more competitive settings of professional sellers and auctions than they are in those focusing on private sales and public markets.

As clarified by a recent literature on endogenous institutions (Boranbay and Guerriero, 2012), neither *Culture* nor *Enforcement* are exogenous. Accordingly, we first assume conditional independence and, then, relax it by turning to an instrumental variables estimator.

²⁰While *Trust* is the share of respondents answering “Most people can be trusted” to the question “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?”, *Respect* is the share of respondents mentioning “tolerance and respect for other people” as an important quality that children should be encouraged to learn.

Results under conditional independence.—Table 4 reports in columns (1) to (5) the estimated coefficients of the OLS regressions with dependent respectively *Adverse-Possession*, *Property-Private*, *Property-Market*, *Property-Professional*, and *Property-Auction*, and in column (6) the estimated marginal effects of the Probit with dependent *Good-Faith*. These are evaluated at the mean of the other regressors and give the percentage variation in the likelihood that dependent switches to one when the control rises by one percentage point.

The results are consistent with our testable prediction, and the implied effects are large. Starting from column (1), a one-standard-deviation rise in *Culture*—i.e., 1.1—is associated with an almost 3-year rise in the general term for adverse possession. On the other hand, a one-standard-deviation rise in *Enforcement*—i.e., almost 1—leads to a little less than a 4-year fall in *Adverse-Possession*. Both coefficients are significant at 5% or better. Similarly, higher values of *Culture* delay the moment in which the good-faith buyer acquires property and higher value of *Enforcement* anticipate it. These patterns are asymmetric across market conditions and, consistent with our model, stronger in more competitive settings—i.e., in columns (4) and (5) than in columns (2) and (3). Finally, countries with a higher share of moral types are significantly more likely to require an explicit proof of good-faith.

4.1 *Non Random Legal Institution Selection*

Relaxing conditional independence.—To identify determinants of *Culture* and *Enforcement* unrelated to legal evolution, we build on a recent literature informed by cross-cultural psychology (Licht, Goldschmidt, and Schwartz, 2007) and linking (in)formal institutions to the emphasis of the prevailing culture on autonomy versus embeddedness. “Societies whose cultures emphasize individual uniqueness and view individual persons as moral equals are likely to develop norms that promote societal transparency as a means for social coordination [...]. In contrast, societies [that] view the individual as an embedded part of hierarchically organized groups [...] accommodate exercise of power from above” (Licht, Goldschmidt, and Schwartz, 2007). Being language the central mechanism of cultural transmission, Kashima and Kashima (1998, 2005) have proposed the idea that long lasting grammatical rules embed the importance of these two cultural features.²¹ In particular, languages that forbid

²¹Linguists point out that this distinction originally was present in many languages, and was associated with a hierarchy of power—e.g., in Latin the higher (lower) ranked individual would address the lower (higher)

the speaker to drop the first-person pronoun emphasize the individual relative to his social context and thus induce mutual respect; languages that allow a speaker to choose among several second-person pronouns according to the social distance from another speaker, instead, favor the organization of a centralized system of control of deviant behaviors (Licht, Goldschmidt, and Schwartz, 2007). Hence, we use as an instrument for *Culture* (*Enforcement*) the indicator *Pronoun-Drop* (*Pronoun-Diff*) equal to one when the language spoken by the jurisdiction plurality group lacks (has) the first (second) of the two grammatical features we just mentioned, and 0 otherwise. Taking stock of the above discussion, while the relation between *Culture* and *Pronoun-Drop* should be negative, the one between *Enforcement* and *Pronoun-Diff* should be positive. The exclusion restriction is vindicated by the fact that the vast majority of jurisdictions in our sample are ex colonies which received from the colonizers their plurality group’s language. Hence, since colonization was fairly random (Guerriero, 2012b), it is extremely unlikely that the colonizer and the colonized faced similar unobserved, for instance geographical, determinants of the evolution of legal rules.

Finally, to make more credible the assumption of conditional independence of the instruments we also control for other important observables shaping the prevailing culture, the quality of legal system, and the difference between the owner’s and the buyer’s valuations. Starting from this last category, we crudely control for a development-driven rise in the scope of trade by introducing the natural logarithm of the 2009 real gross domestic product per capita relative to the USA at current prices, *Income*. Turning to other determinants of a culture of legality we consider, first, the percentage of the population that was Catholic, *Catholic*, and the one that was Muslim, *Muslim*, in 1980. An argument dating back to Max Weber views the ethic of the Protestantism as opposed to those of the other major monotheistic religions as the key driver of capitalism and individualism in Western Europe. Similarly, a recent strand of literature has looked at path-dependence as an important constraint to (in)formal institutions. On the one hand, Acemoglu, Johnson, and Robinson (2001) propose that climatic conditions discouraging the settlement of European colonizers induced a long-lasting pattern of extractive institutions. Accordingly, we consider the absolute value of the country capital latitude divided by 90, *Latitude*, as a proxy of increasingly more sta-

ranked by “Tu” (“Vos”). Later some languages dropped it (Kashima and Kashima, 1998; 2005).

ble climate conditions. On the other hand, Boranbay and Guerriero (2012) use data from Medieval European polities to document how the prospect of more secure property rights induces the population to acquire a stronger culture of cooperation to convince the elite to keep democracy and that this culture of cooperation is self-perpetuating. To consider this link between formal and informal institutions, we also take into account a rough measure of the benevolence of politicians, *Corruption*, and the strength of the constraints on the executive from the POLITY IV data set averaged over all the available years, *Democracy*.²²

More inclusive political institutions along with common interest public goods, such as fighting external wars, are also conducive to building the legal and fiscal capacity of the state (Besley and Persson, 2009). Accordingly, we also consider the share of the years between 1816, or the year of independence, and 1975 during which a country was involved in an external military conflict, *Conflicts*. Finally, we control for the type of legal tradition to which the jurisdiction belonged in 2000, *Common-Law*.²³ Since, as proved by Guerriero (2012b), the current law-making and adjudication institutions reflect the social effort to obtain the best balance between the volatility of the law induced by heterogeneous cultural values and the bias produced by weak political institutions, *Common-Law* is likely to be endogenous and to curb the impact of both *Culture* and *Enforcement*. Finally we explicitly take into account the source of a jurisdiction's initial legal tradition by adding a dummy for ex-English colonies, *British-Colony*, and one for ex-French colonies, *French-Colony*.²⁴

The IV estimates are displayed in table 5 and 6. The key observations is that, once the hypothesis of conditional independence is dropped, the coefficients become much bigger and always significant at 10% or better. This evidence remains stable when the other relevant omitted variables are considered: table 6 proves that this is the case when the dependent variable is *Adverse-Possession*, estimates available from the authors confirm the idea for all

²²This measure ranges between 1 and 7 and assumes higher values when the holder of executive powers is accountable to the citizenry and the government is constrained by checks and balances or by the rule of law.

²³*Common-Law* is the first principal component extracted from the following dummies and normalized in order to range between 0 and 1: 1. a dummy for case law; 2. a dummy equal to one if only new evidence or issues of law can be reviewed, or if there is no appeal; 3. an indicator equal to one if the judgement may be based on both law and equity grounds; 3. a dummy for adversarial evidence gathering procedures; 4. an indicator turning on if the evidence is mostly submitted at oral hearings before the judge (Guerriero, 2012b).

²⁴Including also an indicator for whether English common law was initially transplanted in the country (La Porta et al., 1999) has no effect on our estimates.

the other measures of pro-owner legal rules. Turning to the consistency of the estimates, the instruments have always a coefficient with the expected sign and they enter into the first stages in a separable form whereby *Pronoun-Drop* affects mainly *Culture* and *Pronoun-Diff* explains mainly *Enforcement*. This assures that the attenuation bias induced by the variable with the greatest measurement error does not load on to the other one (Acemoglu and Johnson, 2005). Also, the Kleibergen-Paap statistic tends to reject underidentification at the usual significance levels. Finally, when the product of *Pronoun-Drop* and *Pronoun-Diff* is used as a third instrument, the over-identification restrictions cannot be rejected at a level nowhere lower than 61% (5%) for the specifications analyzed in table 5 (6).

To illustrate the empirical findings: at one end of the spectrum, we find the United States which affords the strongest protection to the owner and uses a language allowing neither to drop the first-person pronoun nor to variate the second-person pronoun. At the opposite end of the spectrum, we find Italy which fully protects the buyer and use a language that allows both first-person pronoun drop and the use of different second-person pronouns. France lies somewhere in the middle in terms of protection of the original owner and, accordingly, French does not permit to drop the first-person pronoun but has several second-person pronouns.²⁵

5 Conclusions

This paper has developed a theory of “endogenous legal institutions” (Aghion et al, 2010; Guerriero, 2012b) characterizing how societies, heterogeneous in their endowment of long run moral and enforcement capacity, balance protection of property rights with enhancement of reliance on contracts when intermediaries have an opportunity to transfer goods without the owner’s consent. This is increasingly relevant in times of economic crisis when the scope for trade diminishes over time and the likelihood of transfers without consent increases.

We close by highlighting two key avenues for further research. First, an important extension to our analysis is to inquire into the determinants of the ex post solutions to the conflict arising between the original owner (the issuer) and a good-faith buyer of a good

²⁵To elaborate, the LATE of the rise in *Adverse-Possession* due to an increase (fall) in *Culture* (*Enforcement*) induced by having a language forbidding to drop (allowing the use of) the first-person (differentiated second-person) pronoun is almost one standard-deviation (Angrist, Imbens, and Rubin, 1996).

(financial product) offered by an agent of the original owner (issuer) who did not have the authority to sell (design the product in a certain way)—i.e., embezzlement (unauthorized financial intermediation). Second, an open issue is to identify the primitive forces shaping the requirements for a valid transfer of property in different legal systems. This line of research could provide more details of the microeconomic mechanisms inducing the strong correlation between property rights protection and economic development documented by a long tradition of empirical studies (Acemoglu and Johnson, 2005).

Appendix

Proof of Lemma 1

Given assumptions A1-A3, inspection of table 1 is enough to see that, under owner protection, the payoff of the moral intermediary is the highest when she buys the good and resells it at $\bar{p}^h = \bar{V}$ and that the immoral intermediary is better off by stealing and charging $\bar{p}^l = (1 - q)\bar{V}$. These strategies produce a separating equilibrium which both agents weakly prefer to the pooling equilibrium in which the moral intermediary purchases the good and the immoral one steals it. Indeed, in the pooling equilibrium, both types would charge \bar{V} and the immoral intermediary would earn $(1 - s)\bar{V}$ since a share s of the buyers sees an informative signal. Yet, under assumption A2, $(1 - s)\bar{V}$ is strictly lower than the payoff obtained by charging \bar{p}^l and selling for sure. A similar reasoning clarifies why there is a unique separating equilibrium under good-faith buyer protection. Under full buyer protection instead, the unique equilibrium is pooling since the buyer buys at any price weakly lower than \bar{V} and so, under assumption A1, immoral intermediaries steal and moral ones buy. \square

Proof of Proposition 1

If $V = \bar{V}$ the probability that society leans towards more pro-buyer institutions is characterized by $P(B \succ O) = P((1 - \mu)q\Delta + \varepsilon \geq 0)$, $P(B \succ GF) = P((1 - \mu)sq\Delta + \varepsilon \geq 0)$, and $P(GF \succ O) = P((1 - \mu)(1 - s)q\Delta + \varepsilon \geq 0)$. If, instead, $V = \underline{V}$ the same probability is characterized by $P(B \succ O) = P(\varepsilon - (1 - \mu)q\Delta \geq 0)$, $P(B \succ GF) = P(\varepsilon - (1 - \mu)sq\Delta \geq 0)$, and $P(GF \succ O) = P(\varepsilon - (1 - \mu)(1 - s)q\Delta \geq 0)$. The fact that the comparative statics discussed in proposition 1 hold can be easily checked by inspection. \square

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Tables and Figures

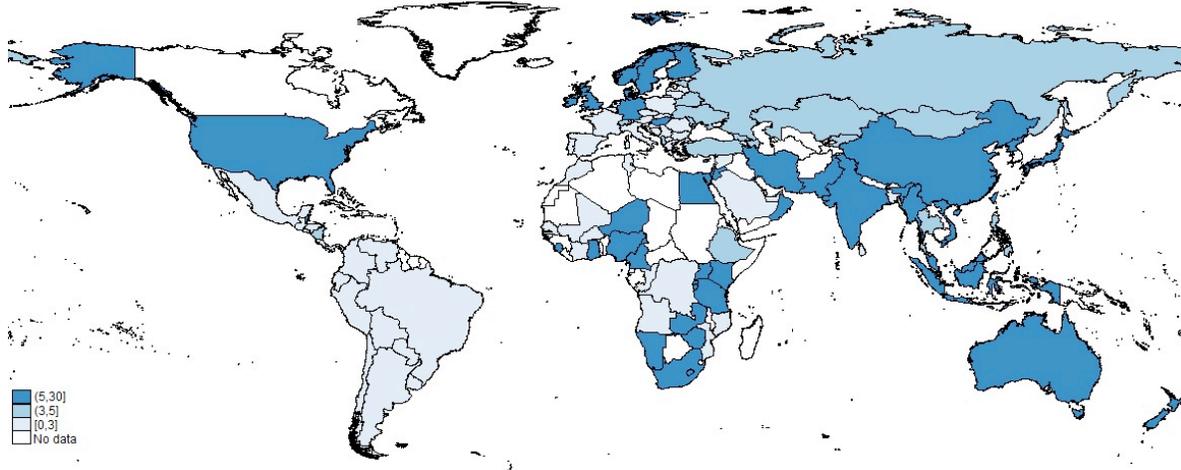
Table 1: Intermediary's Payoffs Under Owner and Good-Faith Buyer Protection If $V = \bar{V}$

	<i>Moral Intermediary</i>		<i>Immoral Intermediary</i>	
	\bar{p}^h	\bar{p}^l	\bar{p}^h	\bar{p}^l
Buy	$\bar{V} - U$	$(1 - q)\bar{V} - U$	$\bar{V} - U$	$(1 - q)\bar{V} - U$
Steal	$(1 - s)\bar{V} - m$	$(1 - q)\bar{V} - m$	$(1 - s)\bar{V}$	$(1 - q)\bar{V}$

Table 2: Sample

Albania; Argentina; Armenia; Australia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Chile; China; Colombia; Croatia; Cyprus; Czech Republic; Denmark; Dominican Republic; Egypt; El Salvador; Estonia; Ethiopia; Finland; France; Georgia; Germany; Great Britain; Greece; Guatemala; Hong Kong; Hungary; Indonesia; Ireland; Israel; Italy; Japan; Kyrgyz Republic; Latvia; Lithuania; Luxembourg; Macedonia; Malaysia; Malta; Mexico; Moldova; Montenegro; Morocco; Netherlands; New Zealand; Northern Ireland; Norway; Pakistan; Peru; Philippines; Poland; Portugal; Romania; Russia; Rwanda; Scotland; Singapore; Slovak Republic; Slovenia; South Africa; South Korea; Spain; Sweden; Switzerland; Thailand; Trinidad and Tobago; Turkey; Uganda; Ukraine; United States; Uruguay; Venezuela; Zambia.

Figure 1: *Adverse-Possession* Around the World



Notes: 1. The thresholds separating the three groups identify respectively the 30th and 50th percentile.

Table 3: Summary of Variables

Variable	Definition and Sources	Mean (Standard Deviation)
Pro-Owner legal institutions:	<i>Adverse-Possession:</i>	Years needed for adverse possession by any good-faith possessor of a movable good. Source: see text. 10.487 (11.285)
	<i>Property-Private:</i>	Years after which the good-faith buyer definitively acquires ownership of a stolen movable good purchased within a private sale. Source: see text. 12.714 (12.693)
	<i>Property-Market:</i>	Years after which the good-faith buyer definitively acquires ownership of a stolen movable good purchased within a public market. Source: see text. 10.961 (12.677)
	<i>Property-Professional:</i>	Years after which the good-faith buyer definitively acquires ownership of a stolen movable good purchased by a professional seller. Source: see text. 9.390 (12.068)
	<i>Property-Auction:</i>	Years after which the good-faith buyer definitively acquires ownership of a stolen movable good purchased within an auction sale. Source: see text. 8.610 (12.066)
	<i>Good-Faith:</i>	Dummy equal to 0 when good-faith is presumed and 1 otherwise. Source: laws and judicial decisions. 0.273 (0.448)
Culture and quality of public enforcement:	<i>Culture:</i>	See text. Source: World Value Survey and European Value Study, all available waves. 0.012 (1.053)
	<i>Enforcement:</i>	See text. Source: United Nations Survey of Crime Trends and Operations of Criminal Justice Systems, all available waves. 0.041 (0.939)
Individualism:	<i>Pronoun-Drop:</i>	1 if the language of the majority ethnic group allows dropping the first-person pronoun, 0 otherwise. Sources: Kashima and Kashima (1998, 2005). 0.586 (0.496)
	<i>Pronoun-Diff:</i>	1 if the language of the majority ethnic group has several second-person pronouns modulated according to the social distance between speakers. Sources: Kashima and Kashima (1998, 2005). 0.743 (0.440)
Other controls:	<i>Income:</i>	Natural logarithm of the real gross domestic product per capita relative to the USA at current prices. Source: Penn World Table (2011). 3.535 (0.978)
	<i>Catholic:</i>	Percentage of the population that was Catholic in 1980. Source: La Porta et al. (1999). 39.896 (38.657)
	<i>Muslim:</i>	Percentage of the population that was Muslims in 1980. Source: La Porta et al. (1999). 9.845 (23.333)
	<i>Latitude:</i>	Absolute value of the country capital latitude divided by 90. Source: World CIA Factbook at https://www.cia.gov/library/publications/ 0.397 (0.194)
	<i>Democracy:</i>	Executive constraints from the POLITY IV data set averaged over all the available years. Source: Marshall and Jaggers (2010). 4.695 (1.806)
	<i>Corruption:</i>	Average corruption score between 1996 and 2010. Source: Available at http://info.worldbank.org/governance/wgi/index.asp . 0.579 (1.066)
	<i>Conflicts:</i>	Share of the years between 1816, or the year of independence, and 1975 that a country was involved in an external military conflict. Source: Correlates of War data base at http://www.correlatesofwar.org/ . 0.084 (0.142)
	<i>Common-Law:</i>	See text. Source: Guerriero (2012b). 0.346 (0.251)
	<i>British-Colony:</i>	Dummy for ex-English colony. Source: La Porta et al. (1999). 0.257 (0.440)
	<i>French-Colony:</i>	Dummy for ex-French colony. Source: La Porta et al. (1999). 0.029 (0.168)

Note: 1. All the statistics are computed for the sample used to produce table 4 but *Pronoun-Drop* and *Pronoun-Diff* which refer to the sample used in table 5, *Income*, *Catholic*, *Muslim*, *Latitude*, *Democracy*, *Corruption*, *Conflicts*, *Common-Law*, *British-Colony*, and *French-Colony* which are computed for the sample used in table 6.

Table 4: Endogenous Pro-Owner Legal Institutions — OLS

	(1)	(2)	(3)	(4)	(5)	(6)
	The dependent variable is:					
	<i>Adverse-Possession</i>	<i>Property-Private</i>	<i>Property-Market</i>	<i>Property-Professional</i>	<i>Property-Auction</i>	<i>Good-Faith</i>
<i>Culture</i>	3.152 (1.159)***	1.198 (1.288)	1.928 (1.244)	1.619 (1.262)	2.910 (1.191)**	0.102 (0.047)**
<i>Enforcement</i>	- 4.075 (1.017)***	- 0.524 (1.752)	- 1.321 (1.709)	- 3.237 (1.037)***	- 3.030 (1.033)***	- 0.001 (0.057)
Estimation	OLS	OLS	OLS	OLS	OLS	Probit
R ²	0.19	0.01	0.03	0.08	0.11	
Pseudo R ²						0.06
Log pseudo-likelihood						- 42.495
Number of observations	77	77	77	77	77	77

Notes: 1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%.
 2. All specifications include a constant term.
 3. The entries are coefficients except in column (6), which reports marginal effects.

Table 5: Endogenous Pro-Owner Legal Institutions — IV

	(1)	(2)	(3)	(4)	(5)	(6)
	The dependent variable is:					
	<i>Adverse-Possession</i>	<i>Property-Private</i>	<i>Property-Market</i>	<i>Property-Professional</i>	<i>Property-Auction</i>	<i>Good-Faith</i>
<i>Culture</i>	10.362 (4.665)**	8.816 (4.370)**	11.467 (4.363)**	9.180 (4.690)**	8.584 (3.972)**	1.005 (0.603)*
<i>Enforcement</i>	- 21.980 (7.131)**	- 15.614 (7.474)**	- 15.005 (7.944)*	- 19.475 (7.918)**	- 16.409 (6.798)**	- 1.827 (1.109)*
First Stage for <i>Culture</i>						
<i>Pronoun-Drop</i>	- 1.105 (0.276)**	- 1.105 (0.276)**	- 1.105 (0.276)**	- 1.105 (0.276)**	- 1.105 (0.276)**	- 1.105 (0.276)**
<i>Pronoun-Diff</i>	0.121 (0.347)	0.121 (0.347)	0.121 (0.347)	0.121 (0.347)	0.121 (0.347)	0.121 (0.347)
R ² in the First Stage	0.24	0.24	0.24	0.24	0.24	0.24
First Stage for <i>Enforcement</i>						
<i>Pronoun-Drop</i>	- 0.394 (0.227)*	- 0.394 (0.227)*	- 0.394 (0.227)*	- 0.394 (0.227)*	- 0.394 (0.227)*	- 0.394 (0.227)*
<i>Pronoun-Diff</i>	0.660 (0.197)**	0.660 (0.197)**	0.660 (0.197)**	0.660 (0.197)**	0.660 (0.197)**	0.660 (0.197)**
R ² in the First Stage	0.10	0.10	0.10	0.10	0.10	0.10
<i>Estimation</i>	IV	IV	IV	IV	IV	Two-step IV Probit
P-value of under-identification test	0.01	0.01	0.01	0.01	0.01	
P-value of exogeneity test	0.00	0.01	0.01	0.01	0.03	
Number of observations	70	70	70	70	70	70

- Notes:
1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%.
 2. The entries are coefficients.
 3. All specifications include a constant term.
 4. The null hypothesis of the Kleibergen-Paap under-identification test is that the excluded instruments are uncorrelated with the endogenous regressors.
 5. The null hypothesis of the exogeneity test is that *Culture* and *Enforcement* can be treated as exogenous.

Table 6: Endogenous Pro-Owner Legal Institutions — Other Relevant Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	The dependent variable is <i>Adverse-Possession</i>							
<i>Culture</i>	8.628 (8.296)	9.370 (5.277)*	3.205 (11.517)	0.689 (7.336)	18.878 (21.306)	12.124 (6.350)**	13.348 (7.159)*	6.899 (3.208)**
<i>Enforcement</i>	- 23.505 (9.452)**	- 20.350 (7.631)**	- 28.808 (14.122)**	- 21.816 (6.958)**	- 24.807 (9.933)**	- 24.859 (7.588)**	- 38.333 (17.687)**	- 12.317 (7.167)*
<i>Income</i>	2.842 (7.280)							
<i>Catholic</i>		- 0.050 (0.074)						
<i>Muslim</i>		- 0.049 (0.101)						
<i>Latitude</i>			55.647 (63.367)					
<i>Democracy</i>				4.696 (3.030)				
<i>Corruption</i>					- 5.841 (15.062)			
<i>Conflicts</i>						- 22.545 (18.892)		
<i>Common-Law</i>							- 31.201 (21.166)	
<i>British-Colony</i>								10.120 (5.120)**
<i>French-Colony</i>								- 9.893 (4.024)**
<i>Estimation</i>	IV							
P-value of under-identification test	0.02	0.01	0.12	0.06	0.13	0.01	0.08	0.06
P-value of exogeneity test	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.27
Number of observations	70	70	70	66	69	70	63	70

- Notes:
1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%.
 2. The entries are coefficients.
 3. All specifications include a constant term.
 4. The null hypothesis of the Kleibergen-Paap under-identification test is that the excluded instruments are uncorrelated with the endogenous regressors.
 5. The null hypothesis of the exogeneity test is that *Culture* and *Enforcement* can be treated as exogenous.

Supplementary Material for:
“PROPERTY VERSUS CONTRACT.”*

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The Original Owner Can Protect Her Property

While the first (second) column of the table 1 shows the minimum levels of private protection needed for deterrence when buyers have high (low) valuation, the third column lists the expected loss from theft to the original owner. For $V = \bar{V}$, the original owner will protect her property when $\bar{C}_i \leq L_i$ —i.e., under owner protection if $\theta \geq \mu \frac{1-q}{q} \equiv \bar{\theta}_O$, under good-faith buyer protection if $\theta \geq \mu \frac{1-sq}{q} - 1 + s \equiv \bar{\theta}_{GF}$, and never under full buyer protection. Note that $\bar{\theta}_{GF}$ increases with s reaching $\bar{\theta}_O$ when s tends to 1; thus, $\bar{\theta}_{GF} \leq \bar{\theta}_O$. There are three cases: 1. if $\theta < \bar{\theta}_{GF}$, the original owner never protects her property; 2. if $\bar{\theta}_{GF} \leq \theta < \bar{\theta}_O$, the original owner protects her property only under good-faith buyer protection; 3. if $\bar{\theta}_O \leq \theta \leq \frac{1-q}{q} \equiv \theta^*$, the original owner protects her property under both owner and good-faith buyer protection. For $V = \underline{V}$, private protection materializes if $\underline{C}_i \leq L_i$. This time, the owner will protect her property under owner protection if $\theta \geq \mu \equiv \underline{\theta}_O$, under good-faith buyer protection if $\theta \geq 1 - (1 - \mu) \frac{1-sq}{1-q} \equiv \underline{\theta}_{GF}$, and under full buyer protection if $\theta \geq \mu \equiv \underline{\theta}_B$. Note that $\underline{\theta}_{GF}$ increases with s and approaches $\underline{\theta}_O$ as s goes to 1; thus, $\underline{\theta}_{GF} \leq \underline{\theta}_O = \underline{\theta}_B$. We have three cases: 1. if $\theta < \underline{\theta}_{GF}$, the original owner never protects her property; 2. if $\underline{\theta}_{GF} \leq \theta < \underline{\theta}_B$, the original owner protects her property only under good-faith buyer protection; 3. if $\underline{\theta}_B \leq \theta$ the original owner always protects her property.

The changes in social welfare and the institutional design will be affected only when the original owners protect property. When the latter happens and $V = \bar{V}$, the good will be purchased both by moral and immoral intermediaries and resold for \bar{V} so that the social welfare equals $\bar{V} - U$ minus the cost of protection \bar{C}_i or $(1 + q) \Delta - (1 - q) U$. If $\bar{\theta}_{GF} \leq \theta < \bar{\theta}_O$, private protection materializes only under good-faith buyer protection and

$$P(B \succ O) = P((1 - \mu) q \Delta + \varepsilon \geq 0); \quad P(B \succ GF) = P((1 - q) U - q \Delta + \varepsilon \geq 0);$$

$$P(GF \succ O) = P((2 - \mu) q \Delta - (1 - q) U + \varepsilon \geq 0).$$

Straightforward algebra applied to these and the following conditions produces the remarks discussed in the paper. If $\theta \geq \bar{\theta}_O$, the original owner protects her property under both good-faith buyer and owner protection so that:

$$P(B \succ O) = P((1 - q) U - q \Delta + \varepsilon \geq 0);$$

$$P(B \succ GF) = P((1 - q) U - q \Delta + \varepsilon \geq 0); \quad P(GF \succ O) = P(\varepsilon \geq 0).$$

If $V = \underline{V}$ and original owners choose to invest in private protection, the good will neither be stolen nor purchased. Thus, social welfare is the cost of private protection \underline{C}_i and thus either $-(1-q)(U-\Delta)$ under owner and good-faith buyer protection or $-U+\Delta$ under buyer protection. If $\theta < \underline{\theta}_{GF}$, there is no private protection under all rules and proposition 1 applies unchanged. If $\underline{\theta}_{GF} \leq \theta < \underline{\theta}_B$, the original owner protects only under good-faith buyer protection, which implies that $P(B \succ O) = P(\varepsilon - (1-\mu)q\Delta \geq 0)$;

$$P(B \succ GF) = P((1-q)(U-\Delta) - (1-\mu)\Delta + \varepsilon \geq 0);$$

$$P(GF \succ O) = P((1-q)[(2-\mu)\Delta - U] + \varepsilon \geq 0).$$

If $\theta \geq \underline{\theta}_B$, the original owner always invest and: $P(B \succ O) = P(\varepsilon - q(U-\Delta) \geq 0)$;

$$P(B \succ GF) = P(\varepsilon - q(U-\Delta) \geq 0); P(GF \succ O) = P(\varepsilon \geq 0). \quad \square$$

The Signal on the Good's Title Is Costly

For $V = \bar{V}$ and $\theta < \theta^S$, we have that: $P(B \succ O) = P((\mu + q - \mu q)\Delta + \varepsilon \geq 0)$;

$$P(B \succ GF) = P((1-\mu)sq\Delta - k + \varepsilon \geq 0);$$

$$P(GF \succ O) = P((\mu + q(1-\mu)(1-s))\Delta - k + \varepsilon \geq 0).$$

The difference with respect to Proposition 1 is that owner protection becomes comparatively less attractive if the share of moral intermediaries increases, due to the fact that the only way to transfer goods to high-value buyers under owner protection is through theft. \square

Moral Buyers

For sake of simplicity and symmetry with the set up studied in the paper we will assume in the following that $s \geq q + \mu(1-q)$: this implies that, for $V = \bar{V}$, an immoral intermediary weakly prefers stealing and then charging \bar{p}^l to stealing and then charging \bar{p}^h . Should the latter not be the case, the analysis will be similar but more cumbersome because there could be pooling equilibria around the price

$$\tilde{p} \equiv \Pr(\text{proper title} | \hat{s} = 0) \bar{V} + \Pr(\text{defective title} | \hat{s} = 0) (1-q) \bar{V} = (1-q) \bar{V} + \frac{q\mu}{1-s(1-\mu)} \bar{V}.^1$$

which is the price making all buyers indifferent between buying or not when the signal is uninformative and both types of intermediaries are in the market. Let's start with the $V = \bar{V}$ case by inquiring the existence of a separating equilibrium under owner protection. To avoid

¹ $\Pr(\text{proper title} | \hat{s} = 0) = \frac{\Pr(\hat{s}=0|\text{proper title}) \Pr(\text{proper title})}{\Pr(\hat{s}=0)} = \frac{\mu}{1-s(1-\mu)} = 1 - \Pr(\text{defective title} | \hat{s} = 0),$

the cost m , moral buyers will not pay \bar{p}^l since this price signals a good stolen for sure. Also, as Table 2 reveals, immoral intermediaries will not lower the price to $(1 - q)\bar{V} - m < \Delta$ in order to sell for sure since this strategy is dominated by the one of buying the good and then charging \bar{p}^h . Thus, there is a value of θ —i.e., $\bar{\theta}_O^M \equiv \frac{1 - [q + \mu(1 - q)]}{q + \mu(1 - q)} \leq \frac{1 - q}{q} \equiv \theta^*$ such that:²

1. If $\theta < \bar{\theta}_O^M$, immoral intermediaries choose to steal and charge \bar{p}^l so that the equilibrium is separating with prices \bar{p}^l and \bar{p}^h , moral buyers only buy legal goods, and the change in social welfare is $\mu\Delta + (1 - \mu)^2(1 - q)\Delta - \mu(1 - \mu)U$, where the last term is an endogenous loss from theft due to the unsold stolen goods;
2. If $\theta \geq \bar{\theta}_O^M$, immoral intermediaries choose to buy and charge \bar{p}^h so that all intermediaries buy and sell for \bar{p}^h and the change in social welfare is Δ .

Similarly, under good-faith buyer protection, we have that:

1. If $\theta < \bar{\theta}_O^M$, the only equilibrium is separating with prices \bar{p}^l and \bar{p}^h and the change in social welfare is $\mu\Delta + (1 - \mu)^2(1 - sq)\Delta - \mu(1 - \mu)U$;
2. If $\theta \geq \bar{\theta}_O^M$, all intermediaries buy and sell at \bar{p}^h and the change in social welfare is Δ .

Under full buyer protection, since a separating equilibrium is not possible, moral buyers remain in the market and buy if the signal they receive is not informative. In particular, there is a value of θ —i.e., $\bar{\theta}_B^M \equiv \frac{1 - \mu s}{\mu s} \geq \bar{\theta}_O^M$ but lower than θ^* —such that:

1. If $\theta < \bar{\theta}_B^M$, immoral intermediaries choose to steal and all the goods are charged at \bar{p}^h and go unsold only when an immoral intermediary meets a moral buyer who happens to be informed so that the change in social welfare is $[1 - \mu(1 - \mu)s]\Delta - \mu(1 - \mu)sU$;³
2. If $\theta \geq \bar{\theta}_B^M$, immoral intermediaries choose to buy and charge \bar{p}^h so that all intermediaries buy and sell for \bar{p}^h and the change in social welfare is Δ .

For $V = \underline{V}$, there are neither moral intermediaries nor moral buyers on the market. Only stolen goods are sold to immoral buyers for \underline{p}^l under both owner and good-faith buyer protection and for \underline{p}^h under full buyer protection. The changes in social welfare are:

²Note that the function $g(x) \equiv (1 - x)x^{-1}$ is strictly decreasing in x and $q + \mu(1 - q) \geq q$.

³Again a price convincing moral buyers to buy also stolen goods is not viable because $(1 - q)\bar{V} - m < U$.

$$\underline{W}_O^M = -(1-\mu)^2(1-q)\Delta - \mu(1-\mu)U; \quad \underline{W}_{GF}^M = -(1-\mu)^2(1-sq)\Delta - \mu(1-\mu)U;$$

$$\underline{W}_B^M = -(1-\mu)^2\Delta - \mu(1-\mu)U.$$

Endogenous Institutions Selection

For $V = \bar{V}$ and $\theta \geq \bar{\theta}_B^M$, we have that:

$$P(B \succ O) = P(\varepsilon \geq 0); \quad P(B \succ GF) = P(\varepsilon \geq 0); \quad P(GF \succ O) = P(\varepsilon \geq 0).$$

Since the scope of trade is completely exploited, the probability that society will move toward more protection of the buyer is insensitive to both μ and q . For $\bar{\theta}_O^M \leq \theta < \bar{\theta}_B^M$, instead:

$$P(B \succ O) = P(\varepsilon - \mu(1-\mu)s(U + \Delta) \geq 0);$$

$$P(B \succ GF) = P(\varepsilon - \mu(1-\mu)s(U + \Delta) \geq 0); \quad P(GF \succ O) = P(\varepsilon \geq 0).$$

Because, this time, the price will always equal \underline{p}^h and goods will go unsold when an immoral intermediary meets an informed moral buyer, the probability that society will move toward more protection of the buyer will be a function of the odds of this match—i.e., $\mu(1-\mu)$.

Hence, it will fall (increase) with the share of moral agents when the latter is sufficiently small (big)—i.e., $\mu < 1/2$ ($\mu \geq 1/2$). Turning to the $\theta < \bar{\theta}_O^M$ case, it is true that $P(B \succ O) =$

$$P([1 - \mu - \mu(1-\mu)s - (1-\mu)^2(1-q)]\Delta + \mu(1-\mu)(1-s)U + \varepsilon \geq 0); \quad P(B \succ GF) =$$

$$P([1 - \mu - \mu(1-\mu)s - (1-\mu)^2(1-sq)]\Delta + \mu(1-\mu)(1-s)U + \varepsilon - \varepsilon \geq 0);$$

$$P(GF \succ O) = P((1-\mu)^2(1-s)q\Delta + \varepsilon \geq 0).$$

Consistently with proposition 1 in Dari-Mattiacci, Guerriero, and Huang (2012), the probability that society will move toward more protection of the buyer will rise with q and fall, in the most likely case, with μ .⁴ Finally, for what concerns the $V = \underline{V}$ scenario:

$$P(B \succ O) = P(\varepsilon - (1-\mu)^2q\Delta \geq 0); \quad P(B \succ GF) = P(\varepsilon - (1-\mu)^2sq\Delta \geq 0);$$

$$P(GF \succ O) = P(\varepsilon - (1-\mu)^2(1-s)q\Delta \geq 0),$$

which imply that the comparative statics discussed in proposition 1 remain unaffected. \square

The Original Owner Has a Buy-back Option

Noting changes under owner protection. If $V = \bar{V}$, under good-faith buyer protection a buyer in bad faith has to return the good, while a buyer in good faith is subject to the owner's buy-back option. Since buyers in bad faith have to return the good, the equilibrium does

⁴Indeed, $\frac{\partial P(B \succ O)}{\partial \mu} < 0$ ($\frac{\partial P(B \succ GF)}{\partial \mu} < 0$) whenever $\theta < \frac{(2\mu-1)(1-s)}{2\mu s-1-s+2(1-\mu)(1-q)}$ ($\theta < \frac{(2\mu-1)(1-s)}{2\mu s-1-s+2(1-\mu)(1-sq)}$).

not change with respect to Lemma 1. If the compensation to be paid by the owner is equal to the market price, owners do not reclaim stolen property from good-faith buyers and hence nothing changes with respect to the basic model. If instead the compensation is equal to the purchase price, owners reclaim stolen property if the purchase price is low enough: $\bar{p}^l < U$.⁵ In this case, the change in social welfare is reduced to $\bar{W}_{GF}^L = \mu\Delta + (1 - \mu)(1 - q)\Delta = \bar{W}_O$: when goods revert to the original owner irrespective of the good faith of the buyer, this rule performs in the same way as owner protection. Under full buyer protection, owners do not exercise the buy-back option because both the purchase price and the market price are equal to $\bar{V} > U$. Thus, goods remain with the buyer and model's message remains.

If $V = \underline{V}$, under good-faith buyer protection only immoral intermediaries remain on the market: they steal the good and sell it for \underline{p}^l . Owners reclaim stolen property under both compensation measures, because $\underline{p}^l = (1 - q)\underline{V} < \underline{V} < U$. Thus, the change in social welfare improves to $\underline{W}_{GF}^L = -(1 - \mu)(1 - q)\Delta = \underline{W}_O$, since goods revert to the original owner irrespective of the good faith of the buyer. Under full buyer protection, only stolen goods are on the market and they are sold for a high price. Owners exercise the option to buy back and hence all goods are reverted to them if found and $\underline{W}_B^L = \underline{W}_O$.

Relaxing Assumptions A1, A2, and A3

We first relax A1 and A3 holding A2 and then assess how restrictive the latter is.

Relaxing assumptions A1 and A3

Table 3 illustrates the equilibria arising in the $V = \bar{V}$ case.⁶ The key patterns can be summarized as follows: 1. being $s > q$ the intermediary's choice under owner and good-faith buyer protection is always between buying and then charging \bar{p}^h and stealing and then selling at \bar{p}^l ; 2. the equilibria under owner and good-faith buyer protection are the same; 3. if $m < U - q\bar{V}$ ($m < U$) both types of intermediaries steal and then sell for \bar{p}^l (\bar{p}^h) under owner and good-faith buyer (full buyer) protection; 4. if $m \geq 0 > U - q\bar{V}$ both types of intermediaries buy and charge \bar{p}^h ; 5. moral costs induce social losses.

Turning to the $V = \underline{V}$ case, as table 4 shows, if $m < (1 - q)\underline{V}$ both intermediaries will

⁵Note that this condition is always verified if $q \geq \frac{1}{2}$ (see Assumption A3).

⁶Here two categories are excluded from the table: the benchmark case—i.e., $m > U > q\bar{V}$ —and the $m < U - q\bar{V} < 0$ case which is ruled out by the non negativity of m .

steal and sell at either \underline{p}^l or \underline{p}^h ; if $(1 - q)\underline{V} \leq m < U$ the equilibria are the same as in Lemma 2 except under full buyer protection when every intermediary steals and then charges \underline{p}^h . Again moral costs produce a social loss.

For what finally concerns society's selection of institutions, for $V = \bar{V}$ we have that:

(i) $0 \leq m < U - q\bar{V}$: $P(B \succ O) = P(q\Delta + \varepsilon \geq 0)$, $P(B \succ GF) = P(sq\Delta + \varepsilon \geq 0)$, $P(GF \succ O) = P((q(1 - s))\Delta + \varepsilon \geq 0)$ which are insensitive to μ and increasing with q .

(ii) $U - q\bar{V} < 0 \leq m < U$: $P(B \succ O) = P(\varepsilon - \mu m \geq 0)$,
 $P(B \succ GF) = P(\varepsilon - \mu m \geq 0)$,

$P(GF \succ O) = P(\varepsilon \geq 0)$ which are insensitive to q and falling with μ .

(iii) $0 < U - q\bar{V} \leq m < U$: $P(B \succ O) = P((1 - \mu)q\Delta - \mu m + \varepsilon \geq 0)$;
 $P(B \succ GF) = P((1 - \mu)sq\Delta - \mu m + \varepsilon \geq 0)$;
 $P(GF \succ O) = P((1 - \mu)(1 - s)q\Delta + \varepsilon \geq 0)$ which are falling with μ and rising with q .

(iv) $U < \min\{m, q\bar{V}\}$:
 $P(B \succ O) = P(\varepsilon \geq 0)$; $P(B \succ GF) = P(\varepsilon \geq 0)$; $P(GF \succ O) = P(\varepsilon \geq 0)$;

which are insensitive to both q and μ .

When $V = \underline{V}$ we have, instead, that:

(i) $m < (1 - q)\underline{V}$: $P(B \succ O) = P(\varepsilon - q\Delta \geq 0)$; $P(B \succ GF) = P(\varepsilon - sq\Delta \geq 0)$;
 $P(GF \succ O) = P(\varepsilon - (1 - s)q\Delta \geq 0)$ which are insensitive to μ and decreasing with q .

(ii) $m \geq (1 - q)\underline{V}$:
 $P(B \succ O) = P(\varepsilon - (1 - (1 - \mu)(1 - q))\Delta - \mu m \geq 0)$;
 $P(B \succ GF) = P(\varepsilon - (1 - (1 - \mu)(1 - sq))\Delta - \mu m \geq 0)$;
 $P(GF \succ O) = P(\varepsilon - (1 - \mu)(1 - s)q\Delta \geq 0)$ which implies a drift towards good-faith buyer protection as μ (q) rises (falls) because of the moral loss arising under full buyer protection.

Relaxing assumptions A2

While the analysis would remain completely equal to the case just discussed for $V = \underline{V}$, for $V = \bar{V}$ a separating equilibrium cannot be enforced anymore. This means that in the third range of m analyzed in table 3—i.e., $0 < U - q\bar{V} \leq m < U$ —the equilibria under owner and good-faith buyer protection will be different. In particular, two sub-cases arise depending on whether $U - q\bar{V} \leq m < U - s\bar{V}$ or $m > U - s\bar{V} > U - q\bar{V}$.⁷ For $U - q\bar{V} \leq m < U - s\bar{V}$ all

⁷Because the buyers will never buy at \bar{p}^h a possibly stolen good, the following two sets of actions cannot

the intermediaries will steal and the analysis will resemble exactly the case $0 \leq m < U - q\bar{V}$ in table 3. For $U > m > U - s\bar{V} > U - q\bar{V}$, instead, the moral intermediaries will prefer to buy and the immoral ones to steal. This means that if the moral intermediaries remain in the market—i.e., if $\tilde{p} - U \geq 0$ or $\theta \geq (1 - \alpha) \alpha^{-1}$ where $\alpha \equiv (1 - q) + \frac{q\mu}{1 - s(1 - \mu)}$ —both types will charge \tilde{p} ; if instead the moral intermediaries find the pooling price impossible to sustain—i.e., if $\theta < (1 - \alpha) \alpha^{-1}$ —only goods stolen by the immoral intermediaries will be sold at \underline{p}^l . All in all, for $U > m > U - s\bar{V} > U - q\bar{V}$ and $\theta \geq (1 - \alpha) \alpha^{-1}$ the changes in social welfare will equal $\mu\Delta + (1 - \mu)((1 - s)(1 - q)\Delta - sU)$ under owner protection, $\mu\Delta + (1 - \mu)((1 - s)(1 - sq)\Delta - sU)$ under good-faith buyer protection, and $\Delta - \mu m$ under full buyer protection so that

$$P(B \succ O) = P((1 - \mu)(1 - (1 - s)(1 - q))\Delta + (1 - \mu)sU - \mu m + \varepsilon \geq 0);$$

$$P(B \succ GF) = P((1 - \mu)(1 - (1 - s)(1 - sq))\Delta + (1 - \mu)sU - \mu m + \varepsilon \geq 0);$$

$$P(GF \succ O) = P((1 - \mu)(1 - s)^2q\Delta + \varepsilon \geq 0),$$

which entail that the comparative statics discussed in proposition 1 remain unaffected. If $U > m > U - s\bar{V} > U - q\bar{V}$ and $\theta < (1 - \alpha) \alpha^{-1}$, instead, the changes in social welfare will equal $(1 - \mu)(1 - q)\Delta$ under owner protection, $(1 - \mu)(1 - sq)\Delta$ under good-faith buyer protection, and $\Delta - \mu m$ under full buyer protection. As a consequence:

$$P(B \succ O) = P((1 - (1 - \mu)(1 - q))\Delta - \mu m + \varepsilon \geq 0);$$

$$P(B \succ GF) = P((1 - (1 - \mu)(1 - sq))\Delta - \mu m + \varepsilon \geq 0);$$

$$P(GF \succ O) = P((1 - \mu)(1 - s)q\Delta + \varepsilon \geq 0),$$

which imply that only the first (second) comparative statics with respect to μ can differ from that stated in proposition 1 when $U - s\bar{V} < m < (1 - q)\Delta$ ($U - s\bar{V} < m < (1 - qs)\Delta$). \square

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constitute an equilibrium: 1. moral intermediaries buy and immoral ones steal and both charge at \bar{p}^h ; 2. all intermediaries steal and charge at \bar{p}^h .

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Tables

Table 1: Costs of Protection and Losses from Theft

i	\underline{C}_i	\underline{C}_i	L_i
O	$U - q\bar{V}$	$(1 - q)\underline{V}$	$(1 - \mu)(1 - q)U$
GF	$U - q\bar{V}$	$(1 - q)\underline{V}$	$(1 - \mu)(1 - sq)U$
B	U	\underline{V}	$(1 - \mu)U$

Table 2: Immoral Intermediary's Payoffs When Buyers Can Be Moral, $i = O$, And $V = \bar{V}$

	\bar{p}^h	\bar{p}^l
Buy	$\bar{V} - U$	$(1 - \mu)(1 - q)\bar{V} - U$
Steal	$(1 - s)\bar{V}$	$(1 - \mu)(1 - q)\bar{V}$

Table 3: Moral and Immoral Intermediaries' Acts and Welfare Changes if $s \geq q$ and $V = \bar{V}$

	$0 \leq m < U - q\bar{V}$	$U - q\bar{V} < 0 \leq m < U$	$0 < U - q\bar{V} \leq m < U$	$U \leq \min \{m, q\bar{V}\}$
O	Steal, Steal, \bar{p}^l , $(1 - q) \Delta - \mu m$	Buy, Buy, \bar{p}^h , Δ	Lemma 1	Buy, Buy, \bar{p}^h , Δ
GF	Steal, Steal, \bar{p}^l , $(1 - sq) \Delta - \mu m$	Buy, Buy, \bar{p}^h , Δ	Lemma 1	Buy, Buy, \bar{p}^h , Δ
B	Steal, Steal, \bar{p}^h , $\Delta - \mu m$	Steal, Steal, \bar{p}^h , $\Delta - \mu m$	Steal, Steal, \bar{p}^h , $\Delta - \mu m$	Lemma 1

Table 4: Moral and Immoral Intermediaries' Acts and Welfare Changes if $s \geq q$ and $V = \underline{V}$

	$m < (1 - q)\underline{V}$	$(1 - q)\underline{V} \leq m < U$
O	Steal, Steal, \underline{p}^l , $-(1 - q) \Delta - \mu m$	Lemma 2
GF	Steal, Steal, \underline{p}^l , $-(1 - sq) \Delta - \mu m$	Lemma 2
B	Steal, Steal, \underline{p}^h , $-\Delta - \mu m$	Steal, Steal, \underline{p}^h , $-\Delta - \mu m$

Table 5: Endogenous *Property-Private* — Other Relevant Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	The dependent variable is <i>Property-Private</i>							
<i>Culture</i>	8.401 (8.357)	7.480 (5.023)	4.647 (10.976)	1.329 (7.819)	21.774 (23.681)	10.632 (6.033)*	11.435 (5.603)**	4.968 (3.299)
<i>Enforcement</i>	- 15.980 (10.676)	- 14.068 (8.031)*	- 19.592 (14.124)	- 14.457 (6.438)**	- 19.460 (11.609)*	- 18.580 (7.363)**	- 25.478 (17.026)	- 4.406 (7.907)
<i>Income</i>	0.681 (8.109)							
<i>Catholic</i>		- 0.056 (0.073)						
<i>Muslim</i>		- 0.076 (0.116)						
<i>Latitude</i>			32.420 (62.314)					
<i>Democracy</i>				4.040 (3.016)				
<i>Corruption</i>					- 9.452 (17.155)			
<i>Conflicts</i>						- 23.226 (18.685)		
<i>Common-Law</i>							- 20.780 (20.405)	
<i>British-Colony</i>								11.966 (5.550)**
<i>French-Colony</i>								- 7.096 (4.550)
Estimation	IV							
P-value of under-identification test	0.02	0.01	0.12	0.06	0.13	0.01	0.08	0.06
P-value of exogeneity test	0.01	0.03	0.00	0.01	0.02	0.00	0.01	0.47
Number of observations	70	70	70	66	69	70	63	70

- Notes:
1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%.
 2. The entries are coefficients.
 3. The null hypothesis of the Kleibergen-Paap under-identification test is that the excluded instruments are uncorrelated with the endogenous regressors.
 4. The null hypothesis of the exogeneity test is that *Culture* and *Enforcement* can be treated as exogenous.

Table 6: Endogenous *Property-Market* — Other Relevant Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	The dependent variable is <i>Property-Market</i>							
<i>Culture</i>	12.275 (8.736)	11.749 (5.500)**	9.522 (10.749)	6.540 (7.434)	26.995 (26.606)	13.586 (6.193)**	12.880 (5.180)**	7.591 (3.466)**
<i>Enforcement</i>	- 14.294 (11.786)	- 15.638 (8.838)*	- 16.860 (14.608)	- 12.103 (6.509)*	- 18.796 (13.544)	- 18.466 (8.055)**	- 22.129 (16.474)	- 3.511 (8.818)
<i>Income</i>	- 1.325 (8.850)							
<i>Catholic</i>		0.017 (0.076)						
<i>Muslim</i>		0.012 (0.131)						
<i>Latitude</i>			15.121 (62.881)					
<i>Democracy</i>				2.613 (2.776)				
<i>Corruption</i>					- 12.340 (19.481)			
<i>Conflicts</i>						- 27.105 (19.815)		
<i>Common-Law</i>							- 15.976 (18.154)	
<i>British-Colony</i>								12.366 (6.238)**
<i>French-Colony</i>								- 5.447 (5.480)
Estimation	IV							
P-value of under-identification test	0.02	0.01	0.12	0.06	0.13	0.01	0.08	0.06
P-value of exogeneity test	0.01	0.01	0.00	0.02	0.02	0.00	0.01	0.12
Number of observations	70	70	70	66	69	70	63	70

- Notes:
1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%.
 2. The entries are coefficients.
 3. The null hypothesis of the Kleibergen-Paap under-identification test is that the excluded instruments are uncorrelated with the endogenous regressors.
 4. The null hypothesis of the exogeneity test is that *Culture* and *Enforcement* can be treated as exogenous.

Table 7: Endogenous *Property-Professional* — Other Relevant Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	The dependent variable is <i>Property-Professional</i>							
<i>Culture</i>	7.779 (8.146)	8.144 (5.331)	1.281 (11.045)	0.163 (6.302)	18.242 (21.348)	10.772 (6.252)*	11.593 (6.390)*	5.543 (3.622)
<i>Enforcement</i>	- 20.707 (10.568)**	- 18.740 (8.787)**	- 27.009 (14.323)*	- 18.057 (6.242)***	- 22.258 (11.158)**	- 22.076 (8.315)***	- 30.601 (17.542)*	- 8.990 (8.481)
<i>Income</i>	2.297 (7.700)							
<i>Catholic</i>		- 0.036 (0.075)						
<i>Muslim</i>		- 0.065 (0.121)						
<i>Latitude</i>			61.415 (62.599)					
<i>Democracy</i>				4.718 (2.713)*				
<i>Corruption</i>					- 6.494 (15.124)			
<i>Conflicts</i>						- 20.377 (18.267)		
<i>Common-Law</i>							- 23.447 (20.658)	
<i>British-Colony</i>								11.143 (6.275)*
<i>French-Colony</i>								- 7.592 (4.878)
Estimation	IV							
P-value of under-identification test	0.02	0.01	0.12	0.06	0.13	0.01	0.08	0.06
P-value of exogeneity test	0.01	0.01	0.01	0.01	0.02	0.00	0.01	0.42
Number of observations	70	70	70	66	69	70	63	70

- Notes:
1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%.
 2. The entries are coefficients.
 3. The null hypothesis of the Kleibergen-Paap under-identification test is that the excluded instruments are uncorrelated with the endogenous regressors.
 4. The null hypothesis of the exogeneity test is that *Culture* and *Enforcement* can be treated as exogenous.

Table 8: Endogenous *Property-Auction* — Other Relevant Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
The dependent variable is <i>Property-Auction</i>								
<i>Culture</i>	5.939 (7.397)	8.327 (4.755)*	3.149 (9.312)	1.596 (5.681)	13.818 (17.900)	9.799 (5.268)*	10.096 (5.145)**	5.033 (3.344)
<i>Enforcement</i>	- 18.735 (8.523)**	- 16.499 (7.837)**	- 21.594 (12.489)*	- 14.820 (5.679)***	- 18.284 (8.747)**	- 18.395 (7.120)***	- 23.683 (14.924)	- 6.200 (8.107)
<i>Income</i>	4.336 (6.632)							
<i>Catholic</i>		- 0.005 (0.069)						
<i>Muslim</i>		- 0.020 (0.115)						
<i>Latitude</i>			42.258 (53.726)					
<i>Democracy</i>				3.669 (2.399)				
<i>Corruption</i>					- 3.420 (12.591)			
<i>Conflicts</i>						- 15.553 (15.992)		
<i>Common-Law</i>							- 14.526 (17.749)	
<i>British-Colony</i>								10.839 (6.032)*
<i>French-Colony</i>								- 7.628 (4.672)*
Estimation	IV							
P-value of under-identification test	0.02	0.01	0.12	0.06	0.13	0.01	0.08	0.06
P-value of exogeneity test	0.03	0.05	0.02	0.06	0.07	0.02	0.05	0.76
Number of observations	70	70	70	66	69	70	63	70
Notes:	<ol style="list-style-type: none"> 1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%. 2. The entries are coefficients. 3. The null hypothesis of the Kleibergen-Paap under-identification test is that the excluded instruments are uncorrelated with the endogenous regressors. 4. The null hypothesis of the exogeneity test is that <i>Culture</i> and <i>Enforcement</i> can be treated as exogenous. 							

Table 9: Endogenous *Good-Faith* — Other Relevant Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
The dependent variable is <i>Good-Faith</i>								
<i>Culture</i>	0.409 (1.092)	0.703 (0.631)	0.551 (1.508)	0.341 (0.809)	0.750 (1.965)	1.019 (0.693)	1.150 (0.832)	0.747 (0.486)
<i>Enforcement</i>	- 2.435 (1.630)	- 1.646 (1.071)	- 2.661 (2.454)	- 1.342 (0.862)	- 1.993 (1.231)*	- 1.850 (1.115)*	- 2.563 (2.322)	- 0.649 (1.277)
<i>Income</i>	1.021 (1.130)							
<i>Catholic</i>		- 0.012 (0.009)						
<i>Muslim</i>		- 0.023 (0.018)						
<i>Latitude</i>			4.697 (10.120)					
<i>Democracy</i>				0.363 (0.336)				
<i>Corruption</i>					0.410 (1.305)			
<i>Conflicts</i>						- 0.201 (2.529)		
<i>Common-Law</i>							- 1.428 (2.806)	
<i>British-Colony</i>								1.527 (0.848)*
Estimation	Two-step IV Probit							
Number of observations	70	70	70	66	69	70	63	68
Notes:	<ol style="list-style-type: none"> 1. *** denotes significant at the 1% confidence level; **, 5%; *, 10%. 2. The entries are coefficients. 3. <i>French-Colony</i> omitted from column (8)'s specification due to multicollinearity. 							