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Procedural Formalism and Social Networks in the Housing Market

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Procedural formalism and social networks in the housing market*

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Abstract

Why do some OECD countries have high levels of procedural formalism (PF) in the housing market? We provide an explanation based upon complementarities between the strength of social networks and the stringency of procedural formalism. The interest of social networks is that conflict resolution is independent of the law. When local people belong to social networks whereas foreigners do not, PF may facilitate housing search for locals at the expense of foreigners. To illustrate this mechanism we build a search-theoretic model of the housing market. The model emphasizes that the support for PF increases with the size of social networks, the default probability on the rent, the proportion of foreigners, and market tightness.

Keywords: Housing market regulation; Search and Matching

J.E.L classification : R38

1 Introduction

The aim of this paper is to explain why some OECD countries support high levels of procedural formalism (PF) on the housing market whereas it generates costs for landlords and tenants. PF constrains the landlord and the tenant to follow several independent procedural actions to resolve any dispute. PF involves time and costs in conflict resolution. Such costs are largely shared by the two parties through rent setting. However, they reduce the economic surplus associated with a rental. In turn, this surplus loss distorts the allocation of tenants to dwellings: rents increase above the tenants' gains induced by PF, and landlords become choosier.

Then why do we observe political support for legislation that reduces the economic surplus?

We propose an explanation based on the complementarity between the strength of social networks and the stringency of procedural formalism. The idea is to see the procedural formalism as a way to give an advantage to local people embedded in dense local social networks at the expense of foreigners without

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access to such networks. In such a case, PF may facilitate housing search for the local applicants. Indeed, a landlord will undertake legal action to solve a dispute with a tenant outside his social network. The cost of dispute resolution then increases with PF. However, if the landlord knows the tenant, the dispute will be solved within the network instead of before a court (see, e.g., Anderson and Francois, 2008): the kin of a tenant who makes default can be used as collateral, the tenant can leave the dwelling without additional cost and return to the parents' home, the landlord may be paid differently and violence may even be used. As a consequence, the cost of conflict resolution does not depend on the law. Thus, if conflict resolution turns out to be more expensive by law than within the social network, then landlords prefer to rent to people within their network. This provides a strong incentive to vote in favor of high levels of PF in the housing market.

Our study is motivated by some stylized facts. At macro level, there is a positive correlation between PF and the size or importance of local social networks. At micro level, there is evidence that foreigners are discriminated against in the rental market in Southern Europe where PF is strong.

At macro level, countries where local social networks are the most significant are also countries where PF is the highest. Following David et al (2010), we use the European Value Survey (EVS), World Value Survey (WVS) and European Community Household Panel (ECHP) to quantify the scale of social networks. We measure family ties from the EVS and WVS and friendship ties and neighborhood ties from ECHP. Appendix A gives more details on these different measures. PF is measured by the index of Djankov et al (2003). In Figure 1, we observe a North-South divide: in Southern Europe (Spain, Portugal and Italy) there is a higher frequency of contacts with friends and neighbors as well as higher levels of PF. The opposite prevails in Northern Europe. In Figure 2, we find the same North-South divide with family ties and PF.

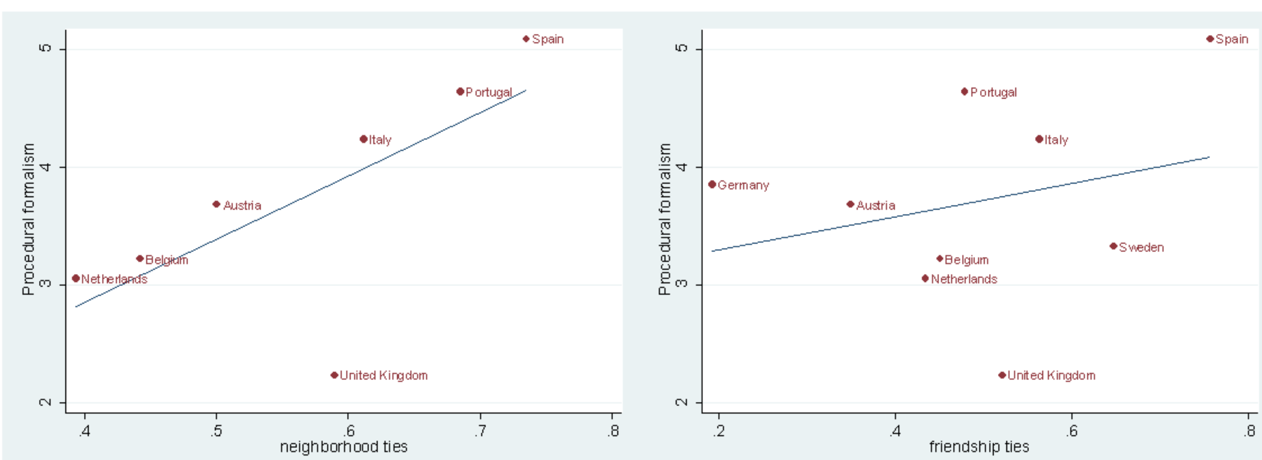

Fig.1: Social ties and Procedural Formalism. The figure displays the correlation between two measures of social capital and PF. Data source: ECHP for friendship and neighborhood ties. The PF index is from Djankov et al (2003). The sample period is 1994-2001. See Appendix A for more details.

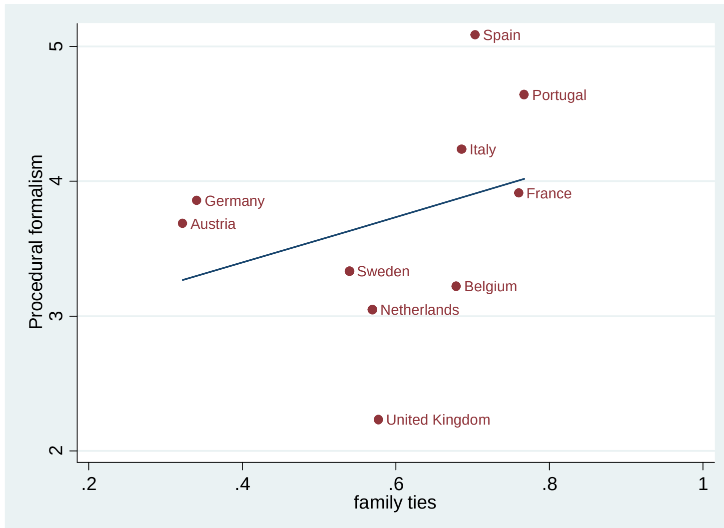

Fig.2: Family ties and Procedural Formalism. The figure displays the correlation between a measure of family ties and PF. Data source: EVS and WVS for family ties. The PF index is from Djankov et al (2003). The sample period is 1981-2004. See Appendix A for more details.

At micro level, there is evidence that foreigners are discriminated against on the rental market in Southern Europe. With a field experiment carried out on the Internet, Bosch et al. (2010) show that applicants with a Moroccan sounding name are 15 percentage points less likely to be contacted by the property owner than those with a Spanish name. Similarly, Baldini and Federici (2011) show ethnic discrimination in the Italian rental market. Bouvard et al. (2009) argue that people of African descent are over-represented in social housing because they encounter greater difficulties renting in the private rental market. We interpret such results as evidence that landlords prefer to rent their dwelling to local applicants when the regulation on the rental market is strong.

A high level of PF drives landlords to demand strong guarantees when they do not know the tenant. Wasmer (2005) notes that a landlord in Quebec, where PF is lower than in France, is much less demanding guarantee-wise than a landlord in France. In Quebec, landlords do not demand more than a month of rent in advance, whereas in France landlords require guarantor and a security deposit. An investigation of UFC-Que Choisir, a leading association defending the interests of consumers, shows that many landlords require documents that the law formally forbids them from demanding. Moreover, 62% of the agencies require at least one prohibited document when they set a rent. The absence of guarantor is also a problem in 28% of cases. Consequently, several leading websites (marieclaire.fr[1], over-blog.com[2] or commentcamarche.net[3]) strongly recommend the use of social networks to find accommodation.

[1] http://www.marieclaire.fr/,se-loger-les-nouvelles-techniques-pour-trouver-un-appartement,20297,489252.asp
[2] http://www.over-blog.com/Comment_trouver_un_logement_a_Paris_rapidement-1095203869-art80094.html
[3] http://www.commentcamarche.net/faq/37622-comment-trouver-un-logement-sur-internet

The existence of several programs of state-sponsored insurance against rent default may seem at odds with our theory. Why would a Government that decided to implement a high level of PF decide to mitigate its effects? The answer is simple: these policies are largely ineffective. Private insurance companies that sell the insurance contracts impose very strict eligibility conditions. In the case of the Garantie Loyers Impayés, the landlord has to prove that the tenant has a permanent contract and earns at least three times the rent. These tenants do not default on the rent. The Garantie des Risques Locatifs is less demanding, but it still selects a subpopulation of potential tenants who are not very fragile. In the case of the Garantie Universelle des Loyers, the insurance is easier to obtain, but is expensive and tenants are not attracted to it.

We proceed in three steps. Section 2 develops a model where PF drives landlords to favor local applicants. The framework is a static matching model with an urn-ball matching function.[4] Each potential tenant sends one application for one vacant dwelling. A particular landlord may receive several applications and will choose the most profitable one. Therefore, each applicant is ranked according to match surplus. Such surplus decreases with the default probability and the cost of dispute resolution. Potential tenants with a high default probability have a low probability of obtaining the lease. When PF increases, local applicants who belong to the social network of the landlord become more attractive compared with applicants outside the network. It follows that PF increases the probability of obtaining the lease for connected applicants, whereas it decreases the probability for the others.

In Section 3, we study the social demand for PF. Local applicants are confronted with a trade-off. On the one hand, PF increases on average their probability to obtain a lease. On the other hand, PF involves paying higher rents when they are matched outside their social network. The preference for PF increases with the size of social networks. We also show that the political support for PF increases with the proportion of foreigners, those who necessarily pay the cost associated with it.

In Section 4, we calibrate the model on the French 2006 Housing Survey. We there assume that local agents vote under the veil of ignorance, i.e. without knowing their default probability. This is equivalent to probabilistic voting. This vote induces a redistribution between local agents of different default probabilities. The optimal level of PF is profitable to the weakest local applicants at the expense of the best agents. At aggregate level, the support for PF increases with the proportion of foreigners and market tightness. The level of PF increases with the skill differential between foreigners and local agents when the network size is large and decreases with it when the network size is small.

This paper adds to the growing literature on the positive analysis of Housing market regulation (HMR). As explained by Botero et al (2004), the regulation has three explanations: rent-seeking, legal origins of the judicial system and market failure.

According to the legal origin argument, regulation of the rental market depends on the fundamental

[4] Since Wheaton (1990) in the property market and Desgranges and Wasmer (2000) in the rental market, several papers (Mc Breen et al. (2011), Ménard (2009) and Wasmer (2005)) point out similarities between the rental market and the labor market and the relevance of analyzing the rental market with a search-theoretic model. To quote Wasmer (2005) : "Housing and labor markets exhibit many similarities. First, information is imperfect. Tenant quality, like worker quality, is unobserved. Second, separation is costly and time consuming. The laws and regulation typically complicate or slow down the termination process of the contractual relationship and make it more costly for firms and landlords to fire an employee/evict a tenant. And finally, there are rigidities in nominal wages and rents."

characteristics of the judicial system (Djankov et al, 2003). Common-law judicial systems lower the need for regulation as they are characterized by the importance of decision-making by juries, independent judges, and the emphasis on judicial discretion as opposed to code in civil law countries. However, these differences explain only about 40% of regulation variation between these countries. Our paper takes a complementary approach based upon the complementarity between the strength of social network and the stringency of housing market regulation.

The market failure argument analyses HMR as a way of improving welfare in the context of market imperfection. Transposing labor market arguments, Alesina et al (2010) argue that HMR is a way to reduce the monopsony power of the landlords in a context of depressed rental offers. People with strong family ties like to live near their family and moving away from home is costly. Thus, individuals with strong family ties rationally choose regulated labor markets to avoid moving and limiting the monopsony power of firms. We adopt a similar view: people with strong family ties/social network rationally demand high levels of regulation. However, we present a different approach where PF enables local people to get ahead of foreigners.

The rent seeking argument analyses HMR as a way to maximize the welfare of insiders who benefit from more secure leases. When the regulation is strong, landlords have greater difficulties in evicting tenants who fail to pay the rent. This protects insiders at the expense of outsiders. Desgranges and Wasmer (2000) and Wasmer (2005) show that the legislation on the rental market can generate discrimination and some problems between people outside the housing market (outsiders) and people who already rent (insiders). Our paper identifies a different class of insiders: would-be tenants who benefit from a dense social network.

Finally, our paper contributes in presenting another aspect of social networks in search-theoretic models. In our paper, applicants with dense social networks get ahead of other applicants in the rental queue. In the search literature (Calvo-Armengol and Zenou, 2005, Calvo-Armengol and Jackson, 2007, Galenianos, 2013, Mayer, 2011), social networks open a new ticket window or queue. Indeed, in these papers focusing on the labor market, workers have two channels to find a job: a traditional channel (newspapers, work center) and an informal one based on social networks. The firm hires the first worker who shows up, and favoritism is absent from the picture. In place of this, in our paper, there is a single queue for each rental, and belonging to the landlord's social network improves one's ranking in the queue.

2 The model

We introduce a search-theoretic model that defines the probability of obtaining a lease for foreign and local applicants according to the level of PF and the size of social network. We choose an urn-ball model because it provides an easy means to ensure that the landlords compare potential tenants. We consider a static economy peopled by M landlords, L local applicants and F foreign applicants. We note $F = Tx$ and $L = T(1-x)$ where T is the number of potential tenants and $x \in [0, 1/2]$. Among the M landlords, V have a rental. Applicants differ in default probability δ, which is distributed according to the cumulative distribution function H on the support $[0, \overline{\delta}]$. A defaulting agent does not pay the rent.

Local agents are embedded in local social networks whereas foreigners are not. Each local agent knows

N landlords. The only interest of the social network is that conflict resolution does not depend on law. A landlord evicting a defaulting tenant pays D^n if the pair belongs to the same social network and D^m if not. Significantly, PF only affects D^m.

The probability that a given landlord has an available rental is V/M. As a local agent knows N landlords, the probability that he knows a landlord who has a rental is

$$n = 1 - \left(1 - \frac{V}{M}\right)^N . \tag{1}$$

The probability n increases with V and N. Hereafter, we refer to n as the *network size*. With probability n the local agent learns that a landlord in his social network rents a dwellings and applies as a *connected* agent. With complementary probability $1-n$, this is not the case and the agent applies as an *anonymous* agent. Foreigners have no social network and always apply as anonymous agents.

The timing is as follows:

1. All potential applicants send an application for one vacant dwelling.
2. Landlords, when facing several applicants, choose the most lucrative one.
3. The rent is the result of a bargaining process between the landlord and the tenant.

The model is solved by backward induction. In stages 2 and 3, we assume that landlords observe the default probability. This probability certainly has an unobserved component. However, it is typically related to the labor contract, the sector of occupation, and the wage. As already seen in the Introduction, landlords do not hesitate to require such information.

Stage 1: Bargaining step.

A tenant of type $i = n$ is connected, while a tenant of type $i = m$ is anonymous. The rent is R and the opportunity cost of rental is C. A landlord accepting a type-i tenant obtains the expected payoff:

$$R(1-\delta) - \delta D^i + \delta C. \tag{2}$$

The tenant obtains the expected payoff:

$$(\alpha - R)(1-\delta). \tag{3}$$

With probability $1-\delta$, the tenant pays the rent R and enjoys housing consumption α. With probability δ, he does not pay the rent and is evicted. Housing consumption is then normalized to zero. Therefore, a match between a type-i tenant and a landlord generates the following match surplus

$$S^i = (1-\delta)(\alpha - C) - \delta D^i. \tag{4}$$

The surplus generated by an anonymous match depends on PF, whereas the surplus created by a connected match does not. Both S^n and S^m negatively depend on the default probability δ and on the default cost D^i, i.e.

$$\frac{dS^i}{d\delta} = -\left(\alpha - C + D^i\right) < 0, \tag{5}$$

$$\frac{dS^i}{dD^i} = -\delta < 0. \tag{6}$$

The rent results from Nash bargaining between the landlord and the tenant:

$$\max_{R}\left((\alpha-R)\left(1-\delta\right)\right)^{\beta}\left(R\left(1-\delta\right)-\delta D^{i}\ +\delta C-C\right)^{1-\beta}, \tag{7}$$

where β is the bargaining power of tenants. Hence, a landlord and a type-i tenant negotiate the following rent:

$$R^{i}=\frac{\beta\delta D^{i}+\beta C\left(1-\delta\right)+\left(1-\beta\right)\left(1-\delta\right)\alpha}{\left(1-\delta\right)}. \tag{8}$$

The expected landlord's income is

$$\begin{aligned} Y^{i} &= C+\left(1-\beta\right)S^{i} \\ &= C+\left(1-\beta\right)\left[\left(1-\delta\right)\left(\alpha-C\right)-\delta D^{i}\right]. \end{aligned} \tag{9}$$

The expected income Y^i depends on the match surplus S^i. Hence, Y^i is negatively affected by the default rate δ and by the cost of dispute resolution D^i. At given default probability δ, a landlord prefers a connected match to an anonymous match if and only if $D^n < D^m$. Moreover, if the expected income is lower than the rental opportunity cost C, landlords prefer not to rent. Therefore, we deduce two threshold values of the default probability above which landlords prefer not to rent:

$$\delta^{i}=\frac{\alpha-C}{\alpha-C+D^{i}}. \tag{10}$$

Then, PF can exclude some tenants from the market, thereby reducing the rental market size. To simplify our analysis, we assume that all agents have a default probability δ below the two threshold values δ^n and δ^m. Appendix D investigates the case where some agents may have $\delta > \delta^m$.

Step 2: Selection

Each potential tenant sends an application to one landlord. Hence, a landlord may receive several applications, of which some come from connected agents while others come from anonymous agents. When comparing a connected and an anonymous agent, the landlord chooses the connected applicant if and only if $Y_i^n \geq Y_j^m$, that is $\delta_j \geq \frac{\delta_i(\alpha-C+D^n)}{\alpha-C+D^m}$. When both agents have the same type, the landlord chooses the agent with the lowest default probability.

To compute the probability for an applicant obtaining a lease, we define the distribution of landlords' expected income:

$$G(y)=\Pr[i=n]\Pr[Y^{n}\leq y]+\Pr[i=m]\Pr[Y^{m}\leq y], \tag{11}$$

where

$$\Pr[i=n]=n(1-x)\ \text{and}\ \Pr[i=m]=1-n(1-x). \tag{12}$$

The function $G(y)$ is the probability that the tenant pays less than the expected income y. This covers two cases according to agent types. In the case of a connected match, the expected income is Y^n. The probability that another applicant, randomly selected, pays less than Y^n is

$$G(Y^{n})=n(1-x)\left(1-H\left(\delta\right)\right)+\left(1-n(1-x)\right)\left(1-H\left(\frac{\delta\left(\alpha-C+D^{n}\right)}{\alpha-C+D^{m}}\right)\right). \tag{13}$$

Indeed, for a connected agent, the probability of being the best applicant is equal to:

- The probability of having the lowest default probability $1 - H(\delta)$ if the other applicant is also connected or

- The probability that Y^n is larger than Y^m, i.e. $\Pr[Y^m \leq Y^n] = 1 - H\left(\frac{\delta(\alpha - C + D^n)}{\alpha - C + D^m}\right)$, if the other applicant is anonymous.

Similarly, if a landlord is anonymously matched, the expected income is Y^m. The probability that another individual pays less than Y^m is

$$G(Y^m) = n(1-x)\left(1 - H\left(\frac{\delta(\alpha - C + D^m)}{\alpha - C + D^n}\right)\right) + (1 - n(1-x))(1 - H(\delta)). \tag{14}$$

Consider a type-i agent who sends an application to one of the landlords. This landlord can receive up to $T-1$ other applications. Our agent obtains the lease if he is the best applicant. Hence, the probability to get the lease is

$$P_i = \sum_{t=0}^{T-1} \frac{(T-1)!}{t!(T-1-t)!}\left(\frac{1}{V}\right)^t \left(1 - \frac{1}{V}\right)^{T-1-t} G(Y^i)^t, \tag{15}$$

where $1/V$ is the probability of sending an application to one particular landlord. When V and T tend to infinity, we have:

$$P_i = e^{-\frac{T}{V}\left(1 - G\left(Y^i\right)\right)}. \tag{16}$$

The probability of getting a lease is negatively affected by the default probability. Indeed, probabilities P_n and P_m are decreasing in δ:

$$\frac{dP_n}{d\delta} = -\left(n\frac{T(1-x)}{V}h(\delta) + \frac{\alpha - C + D^n}{\alpha - C + D^m}h\left(\frac{\delta(\alpha - C + D^n)}{\alpha - C + D^m}\right)(1 - n(1-x))\frac{T}{V}\right)P_n \leq 0, \tag{17}$$

$$\frac{dP_m}{d\delta} = -\left(n\frac{T(1-x)}{V}\frac{\alpha - C + D^m}{\alpha - C + D^n}h\left(\frac{\delta(\alpha - C + D^m)}{\alpha - C + D^n}\right) + \frac{T}{V}(1 - n(1-x))h(\delta)\right)P_m \leq 0. \tag{18}$$

Therefore, agents with high default probability have fewer chances of obtaining a rental.

PF changes the ranking of applicants. Indeed, PF has opposite effects on P_n and P_m. On the one hand, we have

$$\frac{dP_m}{dD^m} = -n\frac{T(1-x)}{V}\frac{\delta}{\alpha - c + D^n}h\left(\frac{\delta(\alpha - C + D^m)}{\alpha - C + D^n}\right)P_m \leq 0. \tag{19}$$

The impact of PF on the probability P_m is negative for almost all δ and network sizes n. The impact is null only for agents with $\delta = 0$ (they never default), or $\delta = \overline{\delta}$ (all the other agents are preferred to them), or when there is no network $n = 0$.

On the other hand, when people are connected, we have

$$\frac{dP_n}{dD^m} = \frac{T}{V}(1 - n(1-x))\frac{\delta(\alpha - C + D^n)}{(\alpha - C + D^m)^2}h\left(\frac{\delta(\alpha - C + D^n)}{\alpha - C + D^m}\right)P_n \geq 0. \tag{20}$$

The impact of PF on the probability P_n is strictly positive for all δ and for all network size n differing from 0. Thus, PF increases the chances of getting the lease for connected applicants.

To summarize, PF allows connected applicants to be better ranked in rental queues. PF affects foreigners and local agents very differently as a result.

3 Impact of procedural formalism

The present section studies the expected payoffs of applicants as functions of PF and the size of social network.

A foreign applicant has no social network. Hence, the foreigner's expected utility is the product of the probability P_m and the match surplus S^m weighted by the bargaining power β:

$$U_f = \beta S^m P_m = \beta \left[(1-\delta)(\alpha - C) - \delta D^m \right] P_m. \tag{21}$$

The foreigner's expected utility decreases with the default probability δ. Indeed, as seen before, both the probability P_m and the match surplus S^m decrease with δ.

The previous Section establishes that S^m and P_m are negatively affected by the regulation when δ belongs to $\left(0, \overline{\delta}\right)$ and $n \neq 0$. Otherwise, the impact of the regulation on the expected utility is null. Therefore, the impact of PF on the foreigner's expected utility is negative or null:

$$\frac{dU_f}{dD^m} = \frac{dS^m}{dD^m} P_m + \frac{dP_m}{dD^m} \beta S^m \leq 0. \tag{22}$$

PF has two negative impacts. Firstly, it is more difficult for foreigners to be selected because they become more costly to evict than connected agents. Secondly, PF decreases the match surplus. The bargained rent is higher to balance the landlords' losses when a tenant fails to pay the rent. The magnitude of such effects increases with the default probability. Foreign applicants with a default probability equal to zero are not affected by the regulation.

A local applicant's expected utility is a little more sophisticated because local applicants are embedded in social networks. They can be connected as well as anonymous. With probability $1-n$, a local applicant is anonymous and has the same expected utility as a foreign applicant. However, with probability n, he is connected and his expected utility is:

$$\begin{aligned} U_l &= (1-n) P_m \beta \left[(1-\delta)(\alpha - C) - \delta D^m \right] + n P_n \beta \left[(1-\delta)(\alpha - C) - \delta D^n \right] \\ &= (1-n) \beta S^m P_m + n \beta P_n S^n. \end{aligned} \tag{23}$$

PF has an ambiguous impact on U_l:

$$\frac{dU_l}{dD^m} = (1-n) \beta \left(\frac{dS^m}{dD^m} P_m + \frac{dP_m}{dD^m} S^m \right) + n \beta S^n \frac{dP_n}{dD^m}. \tag{24}$$

When the tenant is anonymously matched, PF has a negative impact on his expected utility. Indeed, the regulation decreases both the match surplus S^m and the probability of obtaining a lease P_m. But when the local tenant is connected, PF increases his expected utility. Indeed, PF does not impact the match surplus S^n and increases the probability of obtaining a lease P_n.

An increase in PF increase a local applicant's expected utility when

$$\left| n \beta S^n \frac{dP_n}{dD^m} \right| > \left| (1-n) \beta \left(\frac{dS^m}{dD^m} P_m + \frac{dP_m}{dD^m} S^m \right) \right|. \tag{25}$$

We can deduce the following result.

Proposition 1 *PF increases the average probability of getting a lease for local applicants.*

Proof. We know that potential tenants have a default probability between zero and $\overline{\delta}$. Therefore, we can define the average probability of obtaining a lease for foreign and local applicants as follows:

$$\bar{P}_f = \int_0^{\bar{\delta}} P_m h(\delta)\, d\delta, \tag{26}$$

$$\bar{P}_l = n \int_0^{\bar{\delta}} P_n h(\delta)\, d\delta + (1-n) \int_0^{\bar{\delta}} P_m h(\delta)\, d\delta. \tag{27}$$

Moreover, we know that

$$(1-x)\bar{P}_l + x\bar{P}_f = \text{constant}, \tag{28}$$

because the number of applications is fixed. Furthermore, we know that $dP_m/dD^m \leq 0$. We can deduce from equation (26) that $d\bar{P}_f/dD^m \leq 0$. Finally, from this latter statement and equation (28) we can deduce that $d\bar{P}_l/dD^m \geq 0$. ■

Thus agents are confronted by a trade-off between the probability of obtaining a lease and the rent. On the one hand, PF decreases the match surplus when the tenant is anonymously matched ($dS^m/dD^m < 0$). On the other hand, Proposition 1 tells that, on average, PF increases the probability of obtaining a lease.

The average local applicant's expected utility $\bar{U}_l$ is defined by

$$\overline{U}_l = \int_0^{\bar{\delta}} U_l h(\delta) d\delta. \tag{29}$$

We can deduce the following result.

Proposition 2 *There exist n_1 and n_2, $n_1 \leq n_2$, such that*

i) if $n \leq n_1$, then $d\bar{U}_l/dD^m < 0$ for all $D^m \geq 0$;

ii) if $n \geq n_2$, then $d\bar{U}_l/dD^m > 0$ for all $D^m \geq 0$.

Proof. i) As $d\bar{U}_l/dD^m$ is continuous in n and $\lim_{n \longrightarrow 0} d\bar{U}_l/dD^m < 0$ for all $D^m \geq 0$, there exists n_1 such that for $n < n_1$ we have

$$\left| (1-n)\,\beta \int_0^{\bar{\delta}} \left(-\delta P_m + \frac{dP_m}{dD^m} S^m \right) h(\delta) d\delta \right| > \left| n\beta \int_0^{\bar{\delta}} S^n \frac{dP_n}{dD^m} h(\delta) d\delta \right|. \tag{30}$$

ii) As $d\bar{U}_l/dD^m$ is continuous in n and $\lim_{n \longrightarrow 1} d\bar{U}_l/dD^m > 0$ for all $D^m \geq 0$, there exists n_2 such that for $n > n_2$ we have

$$\left| (1-n)\,\beta \int_0^{\bar{\delta}} \left(-\delta P_m + \frac{dP_m}{dD^m} S^m \right) h(\delta) d\delta \right| < \left| n\beta \int_0^{\bar{\delta}} S^n \frac{dP_n}{dD^m} h(\delta) d\delta \right|. \tag{31}$$

■

When the size of social networks is small, local agents do not want to regulate the rental market (part i). Indeed, PF has little impact on the probability of obtaining a lease, but strongly decreases the match surplus. Conversely, if the size of social network is large, local agents want to regulate the market (part ii). Asking for high level of PF enables the local applicants to considerably increase their probability of getting a lease with little impact on match surplus. Note that Proposition 2 does not tell what happens when n belongs to (n_1, n_2). Indeed, the social network has two different effects on $d\bar{U}_l/dD^m$ of which the total effect is ambiguous and depends on $G(y)$:

$$\begin{aligned}\frac{d^2\bar{U}_l}{dD^m dn} &= -\beta\int_0^{\bar{\delta}}\left(-\delta P_m+\frac{dP_m}{dD^m}S^m\right)h(\delta)d\delta+\beta\int_0^{\bar{\delta}}S^n\frac{dP_n}{dD^m}h(\delta)d\delta \\ &\quad +(1-n)\,\beta\int_0^{\bar{\delta}}\left(-\delta\frac{dP_m}{dn}+\frac{d^2P_m}{dD^m dn}S^m\right)h(\delta)d\delta+n\beta\int_0^{\bar{\delta}}S^n\frac{d^2P_n}{dD^m dn}h(\delta)d\delta\ .\end{aligned} \tag{32}$$

When n increases, a local agent is more likely to be connected than anonymously matched. Thus the first effect is positive:

$$-\beta\int_0^{\bar{\delta}}\left(-\delta P_m+\frac{dP_m}{dD^m}S^m\right)h(\delta)d\delta+\beta\int_0^{\bar{\delta}}S^n\frac{dP_n}{dD^m}h(\delta)d\delta>0. \tag{33}$$

However, the size of social networks increases for all local applicants. This second effect is ambiguous on $d\bar{U}_l/dD^m$:

$$(1-n)\,\beta\int_0^{\bar{\delta}}\left(-\delta\frac{dP_m}{dn}+\frac{dP_m}{dD^m dn}S^m\right)h(\delta)d\delta+n\beta\int_0^{\bar{\delta}}S^n\frac{dP_n}{dD^m dn}h(\delta)d\delta. \tag{34}$$

Indeed, it decreases the positive effect of the regulation on the local probability of obtaining a lease P_n:

$$\begin{aligned}\frac{d^2P_n}{dD^m dn} &= \left(\frac{T}{V}\frac{\delta\left(\alpha-C+D^n\right)}{\left(\alpha-C+D^m\right)^2}h\left(\frac{\delta\left(\alpha-C+D^n\right)}{\alpha-C+D^m}\right)P_n\right) \\ &\quad .\left(-\left(1-x\right)+\left(1-n\left(1-x\right)\right)\frac{L}{V}\left(H\left(\frac{\delta\left(\alpha-C+D^n\right)}{\alpha-C+D^m}\right)-H\left(\delta\right)\right)\right)\leq 0,\end{aligned} \tag{35}$$

and has an ambiguous impact on dP_m/dD^m:

$$\begin{aligned}\frac{d^2P_m}{dD^m dn} &= \frac{T(1-x)}{V}\frac{\delta}{\alpha-c+D^n}h\left(\frac{\delta\left(\alpha-C+D^m\right)}{\alpha-C+D^n}\right)P_m \\ &\quad .\left(-1-n\frac{L}{V}\left(H\left(\delta\right)-H\left(\frac{\delta\left(\alpha-C+D^m\right)}{\alpha-C+D^n}\right)\right)\right).\end{aligned} \tag{36}$$

Therefore, the total result of the two effects highlighted in equations (33) and (34) is ambiguous and prevents us from concluding that $d\bar{U}_l/dD^m$ is monotonically increasing in n.

To highlight the different mechanisms seen above, the following section calibrates our model on French data. The objective is to determine the level of PF that maximizes the local agents' well-being.

4 Which level of regulation?

The present concern is the positive analysis of PF. It always has a negative impact on foreigners. However, foreigners are less numerous than local agents and, in any case, do not vote. Therefore, we focus on local agents. The objective is to determine how the social network size n and the distribution function $G(y)$ shape the preferred level of PF. We assume that local agents vote under the veil of ignorance, i.e. without knowing their default probability. The default probability is then revealed when the landlord and the potential tenant meet on the rental market. This assumption is equivalent to probabilistic voting when the weight attributed to foreigners is zero and the weight for the different local agents is equal to their demographic size. Moreover, the vote under the veil of ignorance catches the cohesion among local agents.

We calibrate the model on the French 2006 Housing Survey. We then maximize equation (29).

4.1 Parameterization

We normalize α to 1 without loss of generality. To set C, we suppose that if the market were without friction, C would be close to α. Thus we simulate the model with three values of $C = 0.25$, 0.5 and 0.75. We present in the main text the results with C equal to 0.5 whereas the results with C equal to 0.25 and 0.75 lie in Appendix C. The choice of β does not matter (see equation 25). Thus, we set $\beta = 0.5$. The random variable δ is uniformly distributed. We leave n free between 0 and 1, in order to see the impact of the social network on the demand for PF.

From the Housing Survey we find there are in France $31,300,000$ dwellings, $9,140,000$ local tenants L and $1,435,000$ foreign tenants F. We set $M = 31,300,000$. The local tenants are tenants of French nationality and the foreigners are all the others. In line with the model, we assume that foreigners do not know any landlord.

We also find that there are $2,000,000$ vacant dwellings. From these data we can deduce the number of rentals V in our model with the following equation:

$$Ve^{-\frac{10,575,000}{V}} = 2,000,000. \tag{37}$$

The probability that a landlord receives an application is $1/V$. However, as there are T potential tenants, the probability of a landlord not receiving any application is $(1 - 1/V)^T$. When T and V are sufficiently large, this probability is $e^{-\frac{T}{V}}$. Then, given that there are $2,000,000$ vacant dwellings and $10,575,000$ tenants in the French rental market, we can deduce from (37) that $V = 7,783,000$. To study the impact of market tightness on the demand for PF, we also set V to $10,575,000$ so that $V = L$ and to $12,575,000$ to cover a case where $V > L$.

From Djankov et al (2003), we have information to estimate the cost of conflict resolution. Appendix B shows a positive correlation between their PF index and the number of days required to evict a tenant who does not pay the rent. Therefore, we can estimate the cost of conflict resolution as the product of the opportunity cost of housing C by the number of months necessary to evict a tenant who does not pay the rent, nb_{months}. Thus $D^m = C \times nb_{months}$, where $nb_{months} \in [0, 32]$, as the maximum number of months observed in Europe is 32. By principle, D^n does not depend on the law. Implicitly, we suggest a low cost D^n in the countries where the social network is large because people have strong family/friendship ties.

Hence, D^n is the product of the opportunity cost C by $nb_{\min}$, the minimum number of months necessary for tenant eviction. Thus $D^n = C \times nb_{\min}$.

The resulting D^m varies between 0 and 24 and D^n between 0.5 and 1.5. Finally given the possible values of parameters α, C and D^m, δ belongs to $[0, 0.01]$. Indeed according to the threshold value δ^m (see equation (10)), $\delta \leq \frac{1-0.75}{1-0.75+0.75\times 32} \simeq 0.01$.

Parameters	L	F	V	α	C	β	n	D^m	D^n	δ
Baseline	9140	1435	7783	1	0.5	0.5	$[0,1]$	$[0,16.5]$	1	$[0,0.01]$

Table 1: Parameter values

4.2 Baseline results

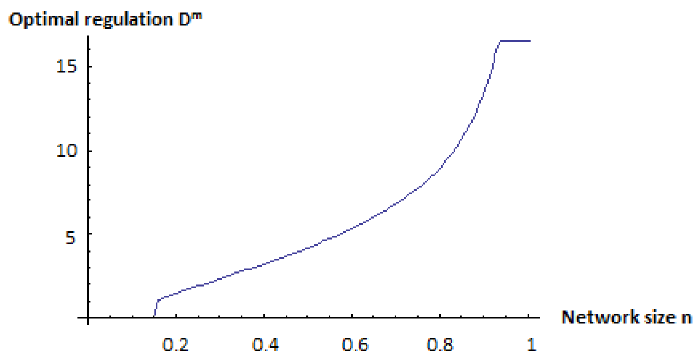

Fig.3: Network size and the social demand for PF. The curve depicts the arg max of equation (29) for each value of n. Parameter values are given by Table 1.

Figure 3 shows the baseline results. The preferred level of PF increases with the size of social networks. Local people use PF to increase their probability of obtaining a lease. When the social network is small (less than 0.16) local agents set PF to 0. When $n > 0.16$, local agents set a level of regulation larger than $D^n = 1$ and the social preference for PF grows with n. When n is sufficiently large, local agents choose the maximum level of PF. In this reasoning, all people stay in the market. Appendix D examines the complementary case where PF becomes so large that the least stable agents are forced to exit the rental market.

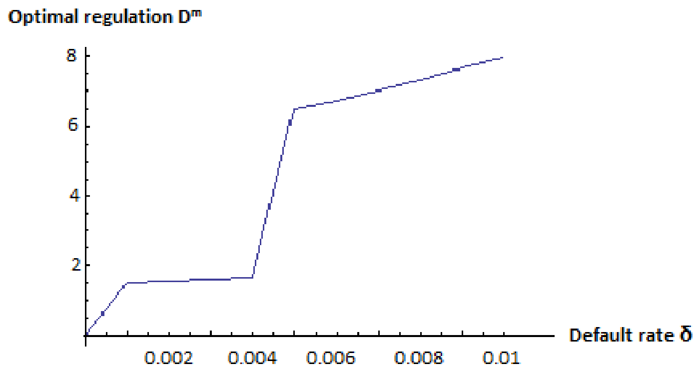

Fig.4: Individual default probability and the demand for PF. The curve depicts the arg max of equation (23). Parameter values are given by Table 1 when $n = 0.16$.

The vote under the veil of ignorance redistributes welfare between local agents of different default probabilities. To visualize such redistribution we compute the individual utility U_l for different values of δ. Figure 4 depicts the results. The desired level of D^m increases with the default probability. Of course, agents with $\delta = 0$ are not concerned by the regulation. They are sure to obtain a lease anyway. All the other agents can benefit from PF at the expense of foreigners. However, the cost of regulation decreases across δ, and this why high default agents have a stronger preference for regulation.

4.3 Foreigners

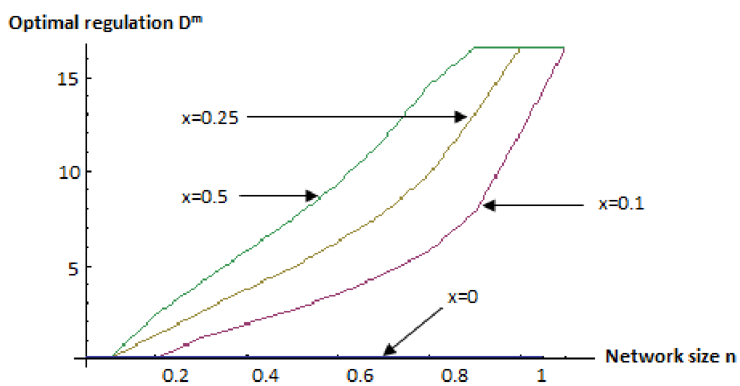

Fig.5: Proportion of foreigners and the demand for PF. The curves depict the arg max of equation (29). Parameter values are given by Table 1 with $F = Tx$, $L = T(1 - x)$ and $T = 10575$.

Figure 5 depicts the positive impact of the proportion of foreigners on the social preference for regulation. Without foreigners, local agents set the level of PF to 0 for all network sizes. This is expected:

local agents reject an institution that deteriorates the economic surplus when they have to bear the full cost of such deterioration.

So far, foreigners and local agents have the same distribution of δ. This implicitly supposes that foreigners and local agents have the same skills. However foreigners could be on average more or less skilled than local agents. To account for skill differences, we modify our model. The probabilities $G(Y^n)$ and $G(Y^m)$ become

$$G(Y^n) = (1-x)\left(n\left(1-H\left(\delta\right)\right)+(1-n)\left(1-H\left(\frac{\delta\left(\alpha-C+D^n\right)}{\alpha-C+D^m}\right)\right)\right)+x\left(1-U\left(\frac{\delta\left(\alpha-C+D^n\right)}{\alpha-C+D^m}\right)\right), \tag{38}$$

$$G(Y^m) = (1-x)\left(n\left(1-H\left(\frac{\delta\left(\alpha-C+D^m\right)}{\alpha-C+D^n}\right)\right)+(1-n)\left(1-H\left(\delta\right)\right)\right)+x\left(1-U\left(\delta\right)\right), \tag{39}$$

where U is the cdf with support $[\underline{\delta}, \widetilde{\delta}]$, $0 \leq \underline{\delta} < \widetilde{\delta} \leq \overline{\delta}$.

We simulate two cases that we compare to the baseline results. Firstly, we simulate a case where the foreigners are on average less skilled than local agents. Then, the support of U is $[0.005, 0.01]$. Secondly, we simulate a case where the foreigners are on average more skilled than local agents. Then the support of U is $[0, 0.005]$.

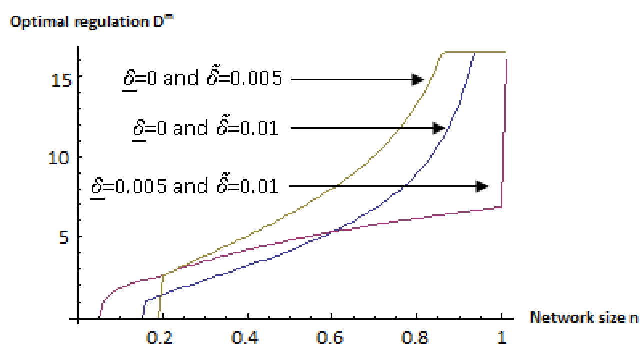

Fig.6: Foreigners' skills and the demand for PF. The curves depict the arg max of equation (29), where the functions $G(y^n)$ and $G(y^m)$ are replaced by (38) and (39). Parameter values are given by Table 1.

Figure 6 shows that the political support for PF increases with the skills of foreigners when the network size is strong, whereas it decreases when the network size is small.

4.4 Impact of V

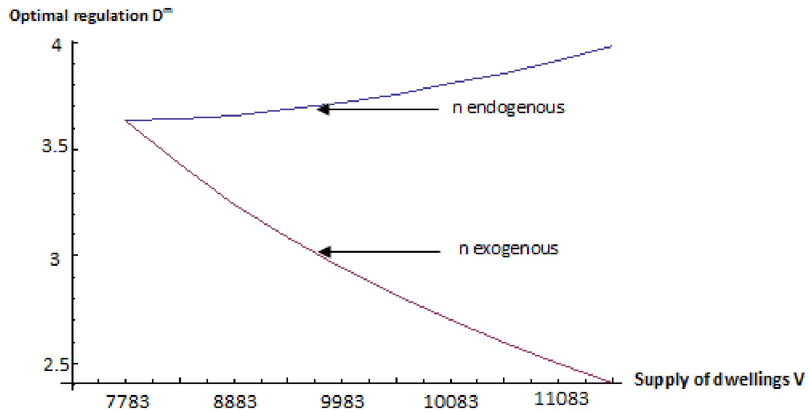

Fig.7: Supply for rentals and the demand for PF. The curves depict the arg max of equation (29). Parameter values are given by Table 1 with $n = 0.43$ when n is exogenous and with $M = 31300$ and $N = 1$ when n is endogenous.

Figure 7 depicts the impact of V on the social preference for regulation. When n is endogenous, the rise of V increases the level of PF desired by local agents, whereas it decreases it when n is exogenous. When n is exogenous the rise in V increases market tightness. This reduces the competition for rentals. Local agents then set a lower level of PF to increase match surplus. When n is endogenous, this negative effect is dominated by the fact that V increases the probability that local agents know at least one of the landlords with an available dwelling. This raises the return to PF.

To summarize, the model emphasizes that the support for regulation should increase with the size of social networks, the default probability, the proportion of foreigners and the market tightness.

5 Conclusion

This paper addresses a central question in public policy: why, in some countries, do we observe political support for legislation that reduces economic surplus? The explanation is based on the complementarity between the strength of social networks and the stringency of housing market regulation. The interest of the social network is that conflict resolution does not depend on law. When local people belong to dense local social networks whereas foreigners do not, PF facilitates housing search for the local applicants at the expense of foreigners.

Our study is motivated by some stylized facts. There is a positive correlation between procedural formalism and local social capital. Moreover, there is evidence that foreigners are discriminated against on the rental market in Southern Europe (where the housing market is heavily regulated). We build a search-theoretic model where PF enables the connected applicants to be better ranked than the other applicants. We show that local applicants have every interest in the regulation on the rental market being reinforced if their social network is sufficiently developed. Hence, local agents can use the regulation to increase their welfare.

In a second step, we show that the optimal level of regulation increases with the social network size, with market tightness and with the proportion of foreigners on the rental market.

The present paper could be extended in various directions. First of all, in our paper, the housing supply is taken as fixed. It would however be interesting to endogenize it. Secondly, we could extend our reasoning to the labor market. Indeed, Decreuse and van Ypersele (2012) show that housing market regulation and employment protection legislation are positively correlated, and Kramarz and Nordström Skans (2011) show that strong social ties are an important determinant of where young workers find their first job. Finally, we would like to extend this model to two regions.

Appendix

A Data

The *friendship ties* and *neighborhood ties* variables are obtained from ECHP as in David et al (2010). The sample period is 1994-2001 except Finland (1996-2001), Sweden (1997-2001), Austria (1995-2001) and Luxembourg (1994). In the ECHP, individuals are asked about i) the frequency of relationships with neighbors, ii) the frequency of contacts with friends and relatives outside the household. We transform answers into a daily frequency to simplify the exposition. Indeed, the answers are as follows: 1. On most days; 2. Once or twice a week; 3. Once or twice a month; 4. Less often than once a month; 5. Never. On this basis, David et al (2010) built the following index measure as used in Figure 1:

$$Z_{i,t} = I\left[X_{i,t} = 1\right] + I\left[X_{i,t} = 2\right]\frac{2}{7} + I\left[X_{i,t} = 3\right]\frac{2}{30} + I\left[X_{i,t} = 4\right]\frac{1}{60} + I\left[X_{i,t} = 5\right]0$$

where $Z_{i,t}$ is the index value for individual i at time t and $X_{i,t}$ the answer to the question. $I[.]$ is an indicator function that takes value 1 if the expression in brackets is true and 0 if it is not.

The *family ties* variable is obtained from the EVS and WVS survey. The question is: "Would you consider it important to teach your children to leave your home?". The answer to the question is yes/no and is attributed the value 1 or 0. We attribute 0 to the answer yes and 1 to the answer no. Thus, we obtain an index value of family ties between 0 and 1. Van de Velde (2008) and Reher (1998) explain that when family ties are strong in a country, young people, by their education and their culture, become independent later than young people in countries where family ties are weak.

B Housing market regulation

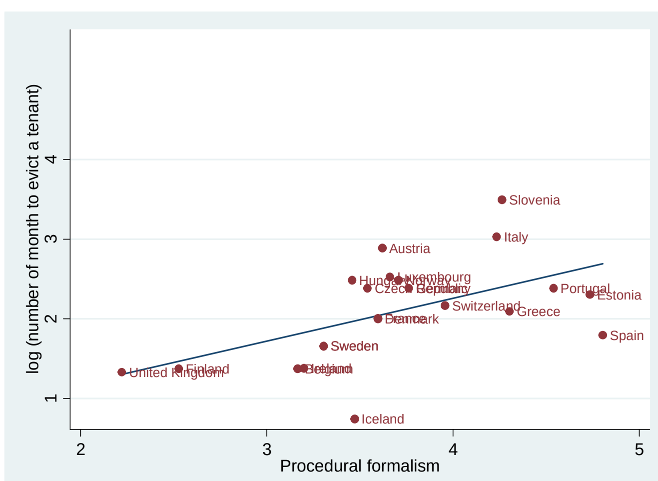

Fig.8: Correlation between PF and number of months to evict a tenant. Data source: Djankov et al (2003)

Country	Number of days to evict a tenant	Number of months to evict a tenant
Iceland	64	2.1053
United Kingdom	115	3.7829
Belgium	120	3.9474
Finland	120	3.9474
Ireland	121	3.9803
Sweden	160	5.2632
Spain	183	6.0197
Denmark	225	7.4013
France	226	7.4342
Greece	247	8.1250
Switzerland	266	8.7500
Estonia	305	10.0329
Czech Republic	330	10.8553
Portugal	330	10.8553
Germany	331	10.8882
Hungary	365	12.0066
Norway	365	12.0066
Luxembourg	380	12.5000
Austria	547	17.9924
Italy	630	20.7232
Slovenia	1003	32.9934

Table 2: Number of months to evict a tenant in Europe. Data source: Djankov et al (2003)

C Impact of C on the demand for PF

We examine the sensitivity of D^m to changes in C. This parameter is not the most exciting one in our analysis,which is why it has been relegated to Appendix. We have $D^m = C.nb_{months}$, where the number of months belong to $[0, 32]$. We also know that $D^n = C.nb_{\min}$, where $nb_{\min} = 2$. Then, given that the maximum number of months to evict a tenant in Europe is equal to 32, we can compute the maximum value $\bar{D}^m$ that local agents can choose. When C is equal to 0.25 is $\bar{D}^m = 8$; when $C = 0.75$ then $\bar{D}^m = 24$. Thus C changes the scale of the demand for PF.

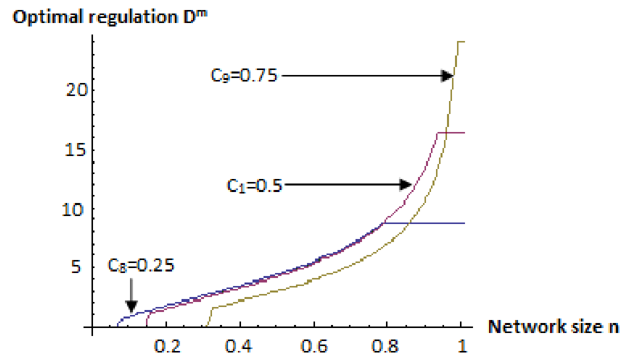

Fig.9: Impact of C on the demand for PF. The curves depict the $\arg\max$ of equation (29). Parameter values are given by Table 1.

Figure 9 shows that the political support for PF tends to decrease with the opportunity cost of renting C. When C is large, the economic surplus associated with a rental is small. Deteriorating it with PF has major implications for rents.

D Accounting for market eviction

So far, we have neglected the fact that the regulation can expel some agents from the market. To account for this phenomenon, we modify our model. The probabilities P_m and P_n become

$$P_n = e^{-\frac{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)+F\ H\left(\frac{\alpha-C}{\alpha-C+D^m}\right)}{V}\left(1-\left(\begin{array}{c} n\frac{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)}{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)+F\ H\left(\frac{\alpha-C}{\alpha-C+D^m}\right)}\left(1-H\left[\delta\right]\right)+ \\ \left(1-n\frac{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)}{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)+F\ H\left(\frac{\alpha-C}{\alpha-C+D^m}\right)}\right)\left(1-H\left(\frac{\delta(\alpha-C+D^n)}{\alpha-C+D^m}\right)\right)\end{array}\right)\right)}$$

and

$$P_m = e^{-\frac{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)+F\ H\left(\frac{\alpha-C}{\alpha-C+D^m}\right)}{V}\left(1-\left(\begin{array}{c} n\frac{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)}{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)+F\ H\left(\frac{\alpha-C}{\alpha-C+D^m}\right)}\left(1-H\left(\frac{\delta(\alpha-C+D^m)}{\alpha-C+D^n}\right)\right) \\ +\left(1-n\frac{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)}{L\ H\left(\frac{\alpha-C}{\alpha-C+D^n}\right)+F\ H\left(\frac{\alpha-C}{\alpha-C+D^m}\right)}\right)\left(1-H\left(\delta\right)\right)\end{array}\right)\right)}$$

The distribution $G(y)$ is modified: non-profitable agents (i.e. local applicants with a default probability δ larger than the threshold value δ^n and foreign applicants with a default probability larger than the threshold value δ^m) stay out of this distribution. Moreover we know that $\delta^n > \delta^m$ if and only if $D^m > D^n$. The mean expected utility of a local agent becomes:

$$\bar{U}_l = \int_0^{\delta^m} \left(\left(1-n\right)\beta S^m P_m + n\beta P_n S^n\right) h(\delta) d\delta. \tag{40}$$

We calibrate this model with the baseline parameter values, where we let D^m be free. We set n to 0.99 to maximize the demand for PF.

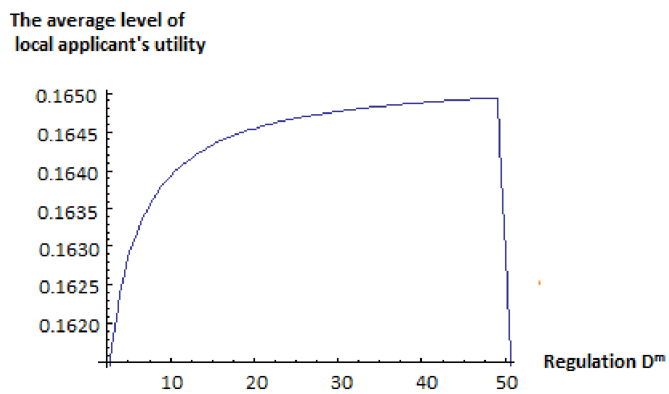

Fig.10: PF and the average utility of local agents.

Parameter values are given by Table 1 with $n = 0.99$.

Figure 10 shows that the average utility increases with PF up to the point where PF starts evicting the weakest local agents, those with the highest δ. Thus local agents never vote for a level of PF above this threshold value. Given $\delta^m = \frac{1-0.5}{1-0.5+D^m}$ (see equation (10)) and $\delta \in [0, 0.01]$, some local agents can be evicted from the rental market when $D^m \geq 52$. Indeed, $\frac{1-0.5}{1-0.5+52} < 0.01$.

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