BUREAUCRACY INTERMEDIARIES, CORRUPTION AND RED TAPE

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Bureaucracy intermediaries, corruption and red tape

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Abstract

Intermediaries helping individuals and firms with the government bureaucracy are common in developing countries. Although such bureaucracy intermediaries are, anecdotally, linked with corruption and welfare losses, few formal analyses exist.

In our model, a government license can benefit individuals. We study individuals net gain when acquiring the license through the regular bureaucratic procedure, through bribing or through intermediaries. For a given procedure, individuals using intermediaries are better off than if intermediaries and corruption had not existed. Intermediaries grease the wheels. We then study incentives of corrupt bureaucrats to create red tape. When free to choose levels of red tape, bureaucrats implement more red tape and individuals are unambiguously worse off in a setting with intermediaries than with direct corruption only.

Intermediaries can thus improve access to the bureaucracy, but also strengthen incentives to create red tape - a potential explanation why license procedures tend to be long in developing countries.

Keywords: Bureaucracy, Corruption, Intermediaries, Red tape

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1. Introduction

Intermediaries that help individuals and firms with the government bureaucracy are present throughout the developing world. Yet, there is a limited understanding of what such bureaucracy intermediaries do. Although the prevalence of intermediaries is, anecdotally, linked with corruption in the government bureaucracy and a welfare loss, there are few formal analyses of the topic. On the empirical side, there is an almost complete lack of studies involving bureaucracy intermediaries.

This paper aims at filling a gap in the theoretical literature on bureaucracy intermediaries. In a model where individuals can get a benefit by going through a license procedure at the government bureaucracy, we study how individuals’ net gain from the license is affected when the license can also be acquired through intermediaries. We study how the incentives of government bureaucrats to create red tape are affected when there are intermediaries, and what effects such “endogenous red tape” has on individuals’ gain from the license. We also endogenize the existence of the intermediary sector itself.

The study focuses on one specific aspect of what intermediaries can offer individuals and firms - time saving. Individuals can acquire the license through the regular procedure, or by bribing corrupt bureaucrats to get a speedier treatment, or from an intermediary, which allows for even more time saving. From individuals’ choice of how to acquire the license, we derive several interesting and novel results.

We first show that, ceteris paribus, individuals acquiring licenses through either corrupt bureaucrats or intermediaries are unambiguously better off than if corruption and intermediaries had not existed. Second, and importantly, we show that the incentives of bureaucrats to complicate bureaucratic procedures and add red tape differ in models with intermediaries. Bureaucrats find it optimal to create more red tape when there are intermediaries. Third, we show that, when corrupt bureaucrats can choose their “optimal” level of complication of the government bureaucracy, individuals’ net gain is lower in a model with intermediaries than in a model with “direct” corruption only.

An additional contribution of the paper is that we endogenize the existence of the intermediary sector. Whether the sector arises or not, the degree of competition within the sector, the effect on individuals’ gain from licensing, and bureaucrats’ “optimal” choice of the amount of red tape is analyzed in a model with endogenous entry and oligopolistic competition between intermediaries. We show that as long as entry costs into intermediation are not too high and when bureaucrats are free to choose the level of red tape, the intermediary sector exists, license procedures are longer and individuals are unambiguously worse off, than without intermediaries.

In order for citizens to acquire a license from the government bureaucracy, a number of steps typically have to be completed, involving visits to several offices, standing in line, making different payments, etc. Assume there is a benefit of \( g \) from such a license and that the procedure to get the license consists of \( n \) steps. As long as costs to acquire the license are smaller than \( g \), individuals will optimally choose to get it. The lower the cost, the better off individuals will be. Importantly, any reduction of license costs will make available a surplus that would otherwise be lost, for instance in queuing, waiting, going between different offices, etc, as well as on the extensive margin where some individuals
possibly switch from "informality", into getting the license.\footnote{In section 2, we document evidence on the prevalence of bureaucracy intermediaries in different parts of the world. Both individuals and firms use such intermediaries. The specific model in this paper is one of individuals' demand for intermediaries, a demand derived from time saving aspects. However, the model can be broadly interpreted to concern also firm demand for intermediaries.}

Consider bureaucrats that are interested in capturing the surplus associated with reducing individuals' license costs. Apart from legitimate license fees, individuals face other costs, such as monetary costs for transport, and time costs of queuing, waiting and going to the offices. It is bureaucrats' removal of these time costs, against payments from individuals, that is the focus in this paper. The model is inspired by the fact, especially true in developing countries, that individuals and firms getting licenses typically have to spend considerable amounts of time in completing license procedures, including visiting multiple government offices at different locations and at different points in time.\footnote{de Soto\cite{14} reported that starting a firm in Peru involved 11 different steps at 7 different government authorities. The procedure to obtain legal authorization to build a house on state-owned land involved 15 different steps at 6 different authorities, which in turn consisted of a total of 207 sub-steps at approximately 50 (sub-) offices/counters/desks. As reported in de Soto\cite{15}, the formalization of property, or similar procedures, involved 168 steps in the Philippines, 77 in Egypt and 111 in Haiti. Since the writings of de Soto, the Doing Business project at the World Bank has documented procedures for starting firms, registering property, getting credit etc., in a large number of countries. For the very same procedure, the number of government offices that has to be visited, the time delays involved and the costs tend to be significantly higher in the developing world, compared to developed countries (Djankov et al.\cite{16}, World Bank\cite{46}).} We refer to the reduction in such time costs as "speed money corruption" for which individuals pay "bribes" to bureaucrats. We take the principal-agent relationship between bureaucrats and the government as given, assume that bureaucrats can pocket the bribes charged, and focus on bureaucrats' optimal choice of such bribes.

The time costs can be broadly categorized as either one of the following two types: those that bureaucrats directly control and can affect, such as waiting times in lines and processing times of applications within the office, and those that bureaucrats cannot directly control, such as the time that individuals spend in transporting themselves between different offices of the bureaucracy.

Paying a bribe to a bureaucrat to speed up the handling of the procedure, is a typical example of the first category. In a Brazilian survey of entrepreneurs' costs and experiences to register a firm in the garment industry, 40 percent of firms affirm that "speeding up" the registration procedure is possible (Zylbersztajn et al.\cite{48}). In a related paper, Zylbersztajn and Graça find evidence of firms' "exposure to bribes solicited to accelerate the process"\cite[14]{49}. Gancheva\cite{18} discusses similar practices at firm start-up in Bulgaria. Queuing times inside the office is another time cost that bureaucrats can affect, by accepting bribes to let individuals jump lines. Even when paying for such "services", the license applicant typically has to complete the same steps as a regular applicant. What the intermediary function does however, is to also reduce costs that bureaucrats cannot directly control, and further shorten the time individuals spend in licensing and to eliminate steps that the individual has to undertake. This may include handing in and picking up the application at the different offices of the bureaucracy, undertake the necessary payments, assisting when the applicant fills in application forms, take care of paperwork that needs to be done, and deliver the completed license/certificate to the applicant. The applicant saves on transportation costs, both the monetary cost and the
time involved, and also economizes on time spent to find out exactly how the procedure works.\textsuperscript{3, 4}

We introduce, in section 3, a model in which bureaucrats can reduce individuals’ time costs at the bureaucracy, in exchange for bribes. A parameter $\alpha$ will represent the fraction of individuals’ time costs that bureaucrats are able to remove. We then think of a low $\alpha$ as representing the situation when “only” the service of faster processing times and/or less queuing can be provided, whereas a high $\alpha$ reflects the existence of intermediaries, offering the kind of additional services discussed above. We first use the model to study the effect on individuals’ gain from licensing when bureaucrats set bribes in order to maximize bribe revenue, for an exogenously specified bureaucratic procedure.

Many authors, e.g. de Soto [14], Rosenn [37], Tanzi [42], La Porta et al. [28], have hypothesized that bureaucrats deliberately create extra bureaucratic hurdles, or red tape, in order to extract bribes and, in addition, some have argued that such proceeds are channeled through intermediaries (Bertrand et al. [5]). As expressed by Rosenn, citing a typical Brazilian complaint regarding civil servants and the need to go through time consuming red tape: ”eles criam dificuldades para vender facilidades (they create difficulties in order to sell facilities)” (Rosenn [37, p. 535]). In actual license procedures, we often observe that a multitude of offices have to be visited, documents should be stamped and certified, individuals have to visit the same bureaucrat several times as the procedure progresses, etc.

Inspired by such evidence, we then let bureaucrats choose not only the level of the bribe but also the length/complexity of the bureaucratic procedure. We thus have in

\textsuperscript{3}In this paper, corruption thus means “speed money”. An individual can bribe a corrupt bureaucrat to avoid some time costs, or use an intermediary (that in turn pays corrupt bureaucrats), which avoids a larger fraction of time costs. Importantly, the bureaucrat always does his job however, in terms of making sure that individuals fulfill the necessary regulation. This is similar to what was termed “corruption without theft” by Shleifer and Vishny [38]. We do not consider the case where corrupt bureaucrats and/or intermediaries allow undeserving individuals to obtain licenses or permits. In addition, it is also important to distinguish “speed money” from “extortion”. Extortion refers to the case when bureaucrats charge for doing their job at all. An individual has to pay an illegal fee in order to get a document that he/she is legally entitled to. Differently, in the case of ”speed money”, the option to stand in line the regular way still exists and the individual thus has the choice to not bribe. This distinction, important for the model in this paper, thus differentiates “speed money” from “corruption without theft”. The distinction between the two gets blurred however when there is ”endogenous red tape”, i.e. when corrupt bureaucrats have the choice of working slowly - thereby affecting individuals’ incentive to pay speed money, as in Lui [32], or affect the length/complexity of the bureaucratic procedure, as will be the case here.

\textsuperscript{4}With its focus on speed money and endogenous red tape, the approach in this paper is different from many recent papers in the corruption literature. In this literature, a typical question is how the existence of corruption - which arises from a principal/agent relationship - affects the allocation of (scarce) government benefits/licenses/permits, and where the social benefit of allocating the permit to some (deserving) individuals is higher than allocating it to other (undeserving) individuals. Banerjee et al. [3] provide a framework for studying the effects of corruption and the emergence of red tape in such settings. Additional references are also provided in this paper. Bertrand et al. [5] document that in Delhi, India, using an intermediary/agent is the way to get a driver’s license without actually learning how to drive. The result from this type of corruption is individuals with driver’s licenses but without proper driving skills. It involves a social cost which is not present in, and not the purpose of, the analysis in this paper. Here, all applicants are "deserving". The cost involved in the allocation of licenses is instead time costs at the bureaucracy.
mind corrupt bureaucrats that either have discretion over the actual implementation of the licensing procedure, or that lobby against legislators in order to influence \( n \), or that channel some corruption proceeds to supervisors that have power over the implementation of the licensing procedure. In doing this analysis, we assume "centralized corruption" (Shleifer and Vishny [38]). All corrupt bureaucrats take one joint decision on bribe levels (and \( n \)). We study how the rent maximization problem, the "optimal" complexity of the procedure, and, importantly, individuals' gain from licensing, depends on \( \alpha \). Our results, with a corrupt bureaucracy that optimizes the length of the license procedure to maximize bribe revenue, echoes those of Lui [32], who analyzed endogenous red tape with bureaucratic corruption (without intermediaries). The important additional insight from our analysis of endogenous red tape is that, with intermediaries, procedures are unambiguously longer and individuals are unambiguously worse off, as compared to a model with "direct" bribing only.\(^5\)

The simple model of section 3, in which the intermediary function can be thought of as being an extension of the bureaucrat (think of a vertically integrated bureaucrat-intermediary entity), provides the main intuition for results that hold also in a more general setting. In section 4, an intermediary sector is formally modeled. Because we study endogenous intermediary entry and emergence of the sector itself, the paper provides new insights into when such services can be expected to exist.\(^6\)

Before proceeding with the formal analysis however, and to better understand bureaucrats' incentives to create red tape, we need to discuss the bureaucrat-intermediary interaction and why bureaucrats are able to capture all or some of the rents of intermediaries. An intermediary handles applications at the government bureaucracy, representing

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\(^5\)Lui [32] analyzes the "Myrdal hypothesis", i.e. if corrupt bureaucrats have an incentive to slow down service. In Lui's model, the bureaucrat awards a license in a one-step procedure. The bureaucrat chooses a speed of service, i.e. how fast he works with each application, that is neither too fast - which would leave individuals in the queue with too much surplus even if they have a cost of waiting, nor too slow - which would make individuals choose to not queue (and bribe) at all. In this paper, bureaucrats do not choose a speed of service but can instead affect the length of the procedure. Interestingly, in "Asian drama", Myrdal [33] not only hypothesizes about the speed of bureaucratic service but also documents the existence of intermediaries.

\(^6\)There are a few papers on bureaucracy intermediaries, somewhat related to this paper. Hasker and Okten [20] analyze the impact from intermediaries on the degree of socially beneficial regulation that is de facto followed, when some bureaucrats accept bribes to reduce regulation for individuals. Similarly, Bose and Gangopadhyay [7] analyze the effects of intermediaries on the amount of undeserving applicants that obtain licenses. In these models, the intermediary has an informational advantage over individuals, in that he knows which bureaucrats are willing to bend the rules (or accept undeserving individuals). This provides a clear rationale for individuals to use intermediaries. In models with intermediaries having such an informational advantage, increased enforcement of corruption in the regular bureaucracy, higher penalties for individuals that bribe bureaucrats, as well as increased uncertainty as to which are the corrupt bureaucrats, will typically act as an incentive to use intermediaries instead. Indeed, Hasker and Okten [20] find that traditional means of combating corruption are less effective, and can even be counterproductive, when there are intermediaries. Bose and Gangopadhyay [7] find, unsurprisingly, that the amount of undeserving applicants increases when there are intermediaries. In addition, in their model with endogenous queue lengths at counters, under certain conditions, not only undeserving but also deserving individuals will find the service of an intermediary useful, in locating corrupt (honest) bureaucrats. Both papers provide a theoretical framework for the role of intermediaries observed in the Indian drivers' license context by Bertrand et al. [5]. The present paper resembles these papers in that it contains the same three "actors", i.e. individuals, bureaucrats and intermediaries, but the type of corruption and the rationale for using the intermediary is different.
license applicants and acting on their behalf. It typically handles several applications from different applicants at the same time. These two features make the intermediary easily identifiable as an intermediary proper. Think of an intermediary that represents individuals applying for personal documents or entrepreneurs registering their business, where the intermediary will carry the IDs and other documents of the applicants, at the bureaucracy. If it is at the discretion of the bureaucrat to decide whether and how to handle intermediaries’ applications, this means that the bureaucrat possesses bargaining power vis-a-vis the intermediary and can capture part of the surplus associated with the intermediation activity. As the intermediation activity is typically informal, neither illegal nor strictly regulated, bureaucrats will have some discretion in their transactions with intermediaries. Even if the intermediary function were completely legal and formalized, which is not the standard case, there would be some scope for bureaucrats to decide how many intermediary applications to accept, and how promptly to go about in handling them.\textsuperscript{7}

An example of bureaucrat-intermediary interaction is from Brazil in general, and the department of transport (DETRAN) in the state of São Paulo in particular. At these offices, ”despachantes” (bureaucracy intermediaries) typically resolve the vehicle-related errands for a number of individuals at the same time, representing each one of them in their interaction with the authority. There is abundant anecdotal evidence that such despachantes typically do not stand in lines, about the hand-over of ”gifts” from despachantes to bureaucrats, but also that there are systems in place that make it possible for despachantes to achieve time saving not available to individuals. More specifically, despachantes have access to some of the information systems and computerized registries of the bureaucracy. One implication is that where an individual would have to undertake one extra step, e.g. go to an office of the bureaucracy to get an excerpt from a register, the despachante can handle the same step from its office without going physically to the bureaucracy. With such access, which is the result of a very close cooperation between the bureaucracy and despachantes, these intermediaries possess a true time-saving device.

Overall, there is evidence, also from other countries than Brazil, that intermediaries work in close collaboration with bureaucrats or that intermediaries are even former bureaucrats. Fjeldstad [17] presents evidence that a crack-down on corruption at the tax authority in Tanzania had the effect that fired bureaucrats instead started working as intermediaries, using their previous corruption networks. In Russia, Ankarcrona [1] reports that ”customs brokers” are typically former customs employees. Bertrand et al. [6] find evidence that ”agents” that help individuals to get a driver’s license in India work in collaboration with bureaucrats to circumvent regulation.

The paper proceeds as follows: Section 2 presents stylized facts about bureaucracy intermediaries. Section 3 introduces a model of time saving and ”speed money” in license procedures and in section 4 the model is augmented to explicitly include the intermediary sector. Section 5 discusses results. Proofs to section 4 are in the appendix.

\textsuperscript{7}As a theoretical case one could imagine a law stipulating that intermediaries are completely legal and can represent individuals at the bureaucracy, no upper limit on the number of applications that can be brought to the bureaucracy and intermediaries having very low-paid ”office boys” standing in lines. This would make it difficult for bureaucrats to capture any of the surplus associated with the intermediation activity. It is interesting to note that the Brazilian bureaucracy reform ”PoupaTempo”, discussed in section 5, not only prohibits intermediaries but also makes it necessary for applicants to get a new appointment number for each new errand [35].
2. Stylized facts about bureaucracy intermediaries

This section presents stylized facts and additional evidence about bureaucracy intermediaries in different parts of the world and provides a further rationale for the model to be presented.

Different types of intermediaries assisting with bureaucratic contacts are common throughout the developing world. Myrdal [33] documents their existence in India and Oldenburg [34] goes further with a more formal account of the role of intermediaries in a land consolidation program in Uttar Pradesh. Oldenburg identifies different roles of intermediaries within and outside the bureaucracy and details the functions of "brokers", "touts", "scribes", "consolidators", "helpers" and "barkers" within the land consolidation program. Levine [29] documents the existence of intermediaries in the interface between the Ghanaian bureaucracy and firms and individuals.

The prevalence of despachantes, used in bureaucratic contacts in Brazil, is documented by Rosenn [37] and, from a sociological and anthropological viewpoint, by DaMatta [12, 13]. Lawyer and legal thriller author John Grisham describes the Brazilian despachante as a "facilitator extraordinaire" that "is an integral part of Brazilian life" [19, p. 376]. In a comprehensive study entitled "Brazil is not for amateurs", Castor describes the despachante (or "dispatcher") as "a popular mediator of the relationships between the population and the state" [8, p. 79]. When studying the formalization of firms, Stone et al. [40], Zylbersztajn and Graça [48] and Zylbersztajn et al. [49] provide evidence that using intermediaries is the most common way to formalize a firm in Brazil. Husted [21] describes how "coyotes" help individuals obtain drivers' licenses in Mexico. Such coyotes are an example of "tramitadores", a more general and widely used term for (mostly) informal intermediaries present in most of (Spanish-speaking) Latin America, assisting individuals and firms with bureaucratic procedures ("tramites"). Proética [36] documents, for Peru, the degree of individuals' usage of tramitadores in different bureaucratic contacts. Lambsdorff [27] refers to tramitadores helping out with the bureaucracy in El Salvador. Examples of reports documenting the use of such intermediaries by firms, at formalization are CIET [10, 11] and IFC [23] for Bolivia, CIEN [9] for Guatemala, IFC [24] for Honduras and IFC [22] for Peru.\(^8\) Gancheva [18] and Yakovlev and Zhuravskaya [47] document the use of similar intermediaries by firms in Bulgaria and Russia, respectively.

Although none of the papers above, with the possible exception of Oldenburg [34], is a specific study of intermediaries, they point at the different functions performed. In some settings, the main reason why individuals use bureaucracy intermediaries seems to be the intermediary's knowledge of how bureaucratic procedures actually work. In many countries with large and non-transparent bureaucracies, actually finding out what is required in order to get, say, a passport, is a challenge in itself. Rosenn writes: "The despachante functions effectively because he knows how to fill out the bewildering variety of forms, to whom the copies should be delivered, and what documentation will be required" [37, p. 537]. Honduran firms claim that they use tramitadores, when becoming formal, because of lack of unified information from the authorities regarding the formalization procedure (IFC [24]). The same holds in a small sample of microenterprises.

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\(^8\)Another generic name, much in use in some parts of (Spanish-speaking) Latin America, for the type of intermediary in mind, is "gestor".
in Guatemala (CIEN [9]). For Bulgarian firms obtaining an operations permit, "the procedures are not clear, nor are they easily accessible to potential licenses applicants" (Gancheva [18, p. 22]).

Time-saving in bureaucratic procedures is a related reason why individuals and firms use intermediaries. Data from the World Bank Enterprise surveys on senior management time spent in dealing with requirements of government regulation confirm that the time spent with regulation varies a great deal between different parts of the world. Whereas the high-income OECD average is 4.2% of a work week, the world average is 9.8% and the Latin American/Caribbean average is 12.7% [45]. A 1996 World Bank report studying only a few countries showed similar values for the Latin American countries [44]. The numbers confirm earlier work by de Soto [14].

By frequent interactions, bureaucracy intermediaries learn how to handle the procedures at the government offices and can solve the bureaucratic matters faster than a particular individual or firm. The processing of many applications at the same time and having personal relations with bureaucrats are additional reasons why these intermediaries possess a "superior technology". As a result, the intermediary's cost for acquiring licenses are lower. Furthermore, Stone et al. [40] and Zylbersztajn and Graça [49] indicate that firms use intermediaries to become formal because these act much like "one stop shops". The time-saving achieved by using intermediaries thus consists of two parts: for intermediaries at the bureaucracy itself and for firms by eliminating the need to visit multiple offices. These two time-saving components are made explicit in the model in this paper.9

3. A model of time-saving, bribes and endogenous red tape in licensing

Consider a government license that brings a benefit of the value $g$ to any individual. Acquiring the license means going through a bureaucratic procedure consisting of $n$ identical steps. Each step of the procedure consists of one visit to the government bureaucracy, where the individual interacts with a bureaucrat who is a monopolist in this step. The individual pays the official fee and then proceeds to the next step of the procedure. The bureaucracy's cost of completing the procedure for an individual consists of two parts. The first part is the cost that the bureaucracy faces in undertaking the controls associated with awarding the license, for instance checking relevant criminal and tax records, etc. This cost is constant throughout the paper. We can think of it as deducted from individuals' license gain, such that $g$ represents the gain of the license after socially relevant controls have been undertaken. The second cost, $p$ per step of the procedure, is the bureaucracy's administrative cost of handling each application at each office. The monetary cost of the license is thus $np$, which is also the official license fee.

9From the supply side, one possible argument for the existence of bureaucracy intermediaries is that the government allows them to exist as a means of helping individuals and firms going through bureaucratic procedures. Bureaucracy intermediaries then become a "second best" option in societies where the government can do little to reform its bureaucracy. Another supply-side argument explaining their existence may be that intermediaries are easier to work with for bureaucrats because they "always have their papers in order". That is, the cost for handling applications from intermediaries is lower. Bureaucrats would then be able to serve more customers of the bureaucracy in less time, which would be socially beneficial.
Each step of the procedure is also associated with a time cost. Individuals, indexed by $i$, differ in their opportunity cost of time, $A_i$, which we will also refer to as “productivity”. Let $A_i$ be uniformly distributed on the unit interval, $(0 \leq A_i \leq 1)$, and let the total measure of individuals be 1. Total license costs to individuals are $np + nA_i$, and the net gain of acquiring the license through the official procedure is $g - (np + nA_i)$. If the regular bureaucracy were the only means to acquire the license, all individuals would acquire it as long as the gain for the individual with $A_i = 1$ is positive (i.e. for $n \leq \frac{g}{p+1}$).

Demand would then fall as $n$ grows, and equal zero at $n_{\text{max}} = \frac{g}{p}$, which is the maximum size of bureaucracy of interest in the model.

Now assume, as discussed above, that individuals can also acquire the license by bribing. For each of the steps the individual pays a bribe (instead of $p$), whereby time costs are reduced by a fraction $\alpha$, with $0 < \alpha < 1$. The gain that individuals can realize from bribing is thus proportional to $\alpha$. We assume that bureaucrats can not price discriminate between individuals with different opportunity costs of time. This is a central assumption, which is maintained throughout the paper. As stated above, we also use the assumption of centralized corruption (Shleifer and Vishny [38]). Corrupt bureaucrats take one joint decision on the total bribe level and then split the revenue equally between them. If the total bribe paid is $B$, the net gain that individuals derive from the license becomes $g - (B + (1 - \alpha)nA_i)$.

### 3.1. Individuals’ choice of how to get the license

From the expressions derived above, bribing will imply a higher net gain than going through the regular procedure if the following condition is satisfied:

$$g - (B + (1 - \alpha)nA_i) \geq g - (np + nA_i) \quad \text{i.e. if } A_i \geq \frac{B - np}{\alpha n} \quad (1)$$

Individuals with productivity above this threshold level thus prefer bribing. Another threshold will also become relevant if $n$ is large. The official procedure then becomes prohibitively costly to go through, and more so for high-productivity individuals. The relevant choice for such individuals is instead between bribing and not getting the license at all, i.e. to get the license if the net gain is positive:

$$g - (B + (1 - \alpha)nA_i) \geq 0 \quad \text{i.e. if } A_i \leq \frac{g - B}{(1 - \alpha)n} \quad (2)$$

Only individuals below this productivity level will choose to get the license at all. This latter condition on $A_i$ will thus bind if it is less than 1, the highest productivity level. With $A_i$ uniformly distributed, we can write the total demand for the license, through bribing, as $\text{Min}\{1, \frac{g - B}{(1 - \alpha)n} - \frac{B - np}{\alpha n}\}$.

### 3.2. Bureaucrats’ choice of the bribe level

Taking a joint decision on the bribe level $B$, and facing total costs of $np$, bureaucrats maximize bribe profits,

$$\text{Max}_B \pi = (B - np) \times (\text{Min}\{1, \frac{g - B}{(1 - \alpha)n} - \frac{B - np}{\alpha n}\}) \quad (3)$$
As indicated above, the solution to the problem depends on the length of the procedure \( n \), and is given below:

\[
B^*(n) = \begin{cases} 
np + \frac{\alpha n}{2} & \text{if } 0 \leq n \leq n^*_1 = \frac{n}{p+1-\frac{g}{2}} \\
g - (1 - \alpha)n & \text{if } n^*_1 \leq n \leq n^*_2 = \frac{g}{p+1-\frac{g}{2n}} \\
np + \frac{\alpha(g-np)}{2} & \text{if } n^*_2 \leq n \leq \frac{g}{p} 
\end{cases}
\]

We will refer to these cases as small-\( n \), middle-\( n \) and large-\( n \), respectively, and the corresponding profit levels \( \pi_s \), \( \pi_m \) and \( \pi_l \).

For small values of \( n \), the optimal bribe is such that individuals with productivity levels above \( A_i = 1/2 \) choose to get the license through bribing (plug in \( np + \frac{\alpha n}{2} \) in the threshold in 1). Individuals with lower productivity get the license from the regular bureaucracy. The mark-up over costs \( np \) that bureaucrats charge, i.e. \( \frac{\alpha n}{2} \), is proportional to individuals' gain from bribing. In the middle-range, the optimal bribe is such that the highest-productivity individual \( (A_i = 1) \) is indifferent between bribing and not getting the license at all, which means that the optimal bribe level will decrease as \( n \) increases. This implies that also individuals with productivity below \( A_i = 1/2 \) will bribe. For even larger \( n \), bribes will again increase with \( n \) and the mark-up is proportional to \( g - np \), the gain of the license minus costs that bureaucrats always incur. The high-productivity individuals can no longer afford the license and the low-productivity individuals increasingly switch to bribing as the regular bureaucracy becomes prohibitively expensive. Both the lower- and upper threshold converge to zero as \( n \) approaches \( n_{\text{max}} = \frac{g}{p} \), a bureaucracy size at which no individual can afford the license.

### 3.3. License allocations and individuals’ gain

In figure 1 the license allocation in the case of bribing (solid lines) is compared to the benchmark case when only the option of the regular bureaucracy exists (dot-dashed line). The graph displays (the upper solid line) the amount of licenses awarded for each size of the bureaucratic procedure, and through which means it was awarded. For the analysis to follow, define as \( G \) the aggregate net gain that individuals obtain from the license, i.e. the sum of net gains from licenses awarded through the regular bureaucracy and from bribing:

**Definition 1.** \( G \equiv \int_{\text{Bureaucracy}}(g - (np + nA_i)) \, dA_i + \int_{\text{Bribe}}(g - (B + (1 - \alpha)nA_i)) \, dA_i \)

In these integrals, the integration limits will depend on \( n \). It is clear from figure 1 that the amount of licenses awarded is greater when the option to bribe exists. As some individuals choose to bribe, and given that they always have the option to acquire the license from the regular bureaucracy, the aggregate gain \( G \) must be larger in the bribing case. This is formalized in proposition 1.

**Proposition 1.** The aggregate net license gain \( G \) is higher when the possibility to bribe exists, than if the license can only be acquired through the regular bureaucracy. No individual is worse off and some individuals are strictly better off. This holds irrespective of parameter values.
All individuals that bribe, and there will be some such individuals due to bureaucrats’ profit maximization, will be better off than they were when the option to bribe did not exist. In addition, the higher productivity an individual has, the larger is the gain from bribing compared to going through the regular bureaucracy (because bureaucrats cannot price discriminate). Proposition 1 thus states that corruption is good: the possibility to pay “speed money” means that (some) individuals can get the license at a lower total cost. It is a formalization of the “grease the wheels” view of corruption, see e.g. Bardhan [4] and Svensson [41] for a discussion and early references.

In section 1, we motivated that low values of the parameter $\alpha$ can be interpreted as representing the case in which bureaucrats can remove some - but not all - of the time costs that individuals face, and that a higher $\alpha$ represents the case with intermediaries. We can think of a high $\alpha$ as representing a vertically integrated corrupt bureaucracy and intermediary entity that takes one joint bribe setting decision and where there are no additional costs associated with intermediation. Intuitively, individuals should have a higher net gain $G$ the higher is $\alpha$, as they get a fraction of the surplus associated with reducing time costs. As stated in the following proposition this is indeed the case, except in the middle $n$-range.

**Proposition 2.** The aggregate net license gain $G$ increases with the fraction $\alpha$ of time costs that bureaucrats can remove, for bureaucracy sizes $n < n_1^* = \frac{q}{p+1-\frac{\alpha}{2}}$ and $n > n_2^* = \frac{q}{p+1-\frac{\alpha}{2}}$, i.e. $\frac{\partial G}{\partial \alpha} > 0$. For intermediate bureaucracy sizes, $\frac{\partial G}{\partial \alpha} < 0$.

For both small and large $n$, bureaucrats’ optimal bribes will be such that a constant fraction of the surplus associated with time saving can be captured. This is because bureaucrats cannot price discriminate. An increase in $\alpha$ implies a higher surplus to be divided between bureaucrats and individuals, we thus have $\frac{\partial G}{\partial \alpha} > 0$. In the middle-$n$ region, the individual with $A_i = 1$ will get an additional time saving of $(\Delta \alpha) n A_i = (\Delta \alpha) n$ as $\alpha$ increases, the bribe is increased accordingly, and bribing individuals with $A_i < 1$ are therefore worse off. In what follows, we return to the $\alpha$-dependence in detail.

### 3.4. Endogenous red tape and individuals’ gain from licensing

Thus far, we have considered the problem that bureaucrats face when maximizing revenue from ”speed money”, given a license procedure. That is, the implementation of the license procedure, i.e. the exact number of checks and controls, documents to be filled in, stamps to be obtained etc., represented by $n$, has been exogenously determined. However, if the corrupt bureaucrats can affect the way in which the license procedure is implemented, the analysis changes significantly. In actual license procedures, it is not uncommon that the same bureaucrat has to be visited several times, that application documents have to be certified/authenticated several times, that the individual herself has to deliver and pick up papers at an office on different days and times with varying opening hours, and so on (de Soto [14], Rosem [37]). As motivated in the introduction, we take the view that corrupt bureaucrats, while still obeying all rules and performing all relevant checks related to awarding the licenses, are free to choose how the procedure is implemented. That is, bureaucrats choose the number of steps $n$ of the procedure. In making this choice, the administrative costs of handling applications, i.e. $np$, are incurred.
Figure 2 shows bureaucrats’ profits $\pi$ (solid, inverted U) and individuals’ gain $G$ (dot-dashed) from the optimal solution in (4). The sum of $\pi$, $G$ and aggregate time costs incurred by individuals is also shown (upper solid curve). As long as all individuals get the license, these three terms must sum to $g - np$. The figure suggests that bureaucrats’ profits are maximized in the middle-$n$ region (indicated between the two adjacent markers on the horizontal axis). To show this formally we solve the profit maximization problem in (3), the only difference being that $n$ is now a choice variable. Corrupt bureaucrats thus solve

$$\text{Max}_{B,n} \pi = (B - np) \times \left( \min \{1, \frac{g - B}{(1 - \alpha)n}\} - \frac{B - np}{\alpha n} \right)$$

(5)

The problem has a solution only when $1 = \frac{g - B}{(1 - \alpha)n}$, as profits are strictly increasing or decreasing in $n$, for small- and large $n$, respectively. The solution is

$$B^* = g - (1 - \alpha)n^*, \quad n^* = \frac{g}{\sqrt{(1 + p)(1 + p - \alpha)}}$$

(6)

The first thing to note about the solution is that not only optimal bureaucracy profits $\pi^*$ (obtained by plugging in 6 in 5), but also the optimal length of the bureaucratic procedure, $n^*$, is increasing in $\alpha$. This is because bribing individuals can realize higher gains from the license as $\alpha$ increases, which in turn allows bureaucrats to increase the length of the license procedure and thereby the surplus related to time saving that can be extracted from individuals. Thus when bureaucrats/intermediaries can provide larger reductions in time costs for individuals, it is optimal to make procedures longer. Second, by plugging in $(B^*, n^*)$, and the corresponding threshold between the regular bureaucratic procedure and bribing, in the expression for $G$ in definition 1, one can show that the aggregate individual gain at the ”optimal” procedure length is decreasing in $\alpha$. We summarize these results below:

**Proposition 3.** Bureaucracy profits $\pi^*$, and the length of the bureaucratic procedure that maximizes bureaucrats’ bribe profits, $n^*$, increase in the fraction $\alpha$ of time costs that can be removed by the bureaucrat/intermediary. At $n^*$, individuals’ aggregate gain $G(n^*)$ from licensing is instead decreasing in $\alpha$, i.e. $\frac{\partial G(n^*)}{\partial \alpha} < 0$.

Proof. Aggregate gain at $n^*$. For individuals that do not bribe, it is clear that the increase in $n$ makes them worse off. Consider now individuals that bribe. As both $\alpha$ and $n^*$ increase, the effect on a briber’s gain is a priori unclear. Study the small-$n$ solution from (4), i.e. up to $n = n_1^*$, which is the procedure length at which the $A_i = 1$-individual is indifferent between bribing and ”informality”.$^{11}$ The bribe is $np + \frac{\alpha}{2}$, with gain $g - np - n\frac{\alpha}{2} - (1 - \alpha)nA_i$. Consider an increase in $\alpha$, and a subsequent increase in $n$, that leaves an individual indifferent (for simplicity assume $p = 0$). Equaling the total differential of the gain w.r.t. $(\alpha, n)$ to zero, gives

---

$^{10}$The first order conditions with respect to $B$ are unchanged from the problem in (3), which implies that we can first solve the problem with respect to $B$, which was done in (4), then with respect to $n$. This amounts to maximizing the profits implied by (4) with respect to $n$.

$^{11}$We know from proposition 2 that $\frac{\partial G}{\partial \alpha} < 0$ in the middle-$n$ region, so if $G(n_1^*)$ is decreasing in $\alpha$, this is enough to establish the proposition.
\[
\frac{1}{2} (n \Delta \alpha + \alpha \Delta n) = A_i (n \Delta \alpha - (1 - \alpha) \Delta n)
\] (7)

The LHS is the increase in the bribe when \( \alpha \) and \( n \) increase. It reflects that bureaucrats cannot price discriminate: all individuals face the same bribe increase. The RHS is the net reduction in time costs at the bureaucracy when \( \alpha \) and \( n \) increase. It shows that individuals with higher \( A_i \) get a larger reduction in time costs (for constant \( \Delta n \)). As a result, and in order to get equality in (7), the larger is \( A_i \), the larger is the \( \Delta n \) required to make the individual indifferent. But at \( n_i^* \) it is exactly the \( A_i = 1 \)-individual that is indifferent between bribing and ”informality”. The increase in \( \alpha \) thus results in an increase in \( n_i^* \), such that the \( A_i = 1 \)-individual is again indifferent. Other bribing individuals will therefore be worse off, as the increase \( \Delta n \) is ”too large”. This establishes \( \frac{\partial G(n^*)}{\partial \alpha} < 0 \), and hence follows from the lack of price discrimination. Note that \( p > 0 \) exacerbates the effect.

We have thus established that the more time saving that can be offered - with more time saving being possible when there are bureaucracy intermediaries - the stronger are bureaucrats’ incentives to create red tape, and the worse off are individuals. This is a general result, and holds in a variety of settings: when some but not all bureaucrats are corrupt, when comparing a model with a bribe option only, to a model with both a bribe- and an intermediary option, as is shown in section 4; and for different degrees of competition in the intermediary sector.

Proposition 3 predicts that countries that have a sector of bureaucracy intermediaries should have longer bureaucratic procedures for getting licenses. Due to lack of data on the prevalence of bureaucracy intermediaries in different countries, this prediction is difficult to test. However, the model presents one channel, out of many possible, that can potentially explain the high correlations observed between corruption and the size of bureaucracy. The correlation between the country rankings of ”Ease of Doing Business”, which is a measure of bureaucratic complexity, from the World Bank, and the ”Corruption Perceptions Index”, from Transparency International, is around 0.8. Although these indices are, at best, proxies for variables in our model (\( n \) and \( \pi \), respectively), the following potential channel to create such a correlation is suggested here: Bureaucrats seek to maximize revenue from bribes \( \Rightarrow \) Bureaucrats seek to be able to reduce time costs at the bureaucracy more effectively (i.e. to increase \( \alpha \)), which is facilitated by the presence of intermediaries \( \Rightarrow \) The more effective the intermediary sector is in reducing time costs at the bureaucracy, the stronger the incentive for bureaucrats to complicate \( \Rightarrow \) The length of procedures, \( n \), and corruption profits, \( \pi \), increase.\(^\text{12}\)

Admittedly, this argument is silent about why corruption occurs in the first place, and about the details of the intermediary sector. The next section, by endogenizing

\(^{12}\)It should also be noted here that both large bureaucracies and the extent of corruption are highly (negatively) correlated with country income: the correlation coefficients between either of the two indices above, with GDP/capita, is around 0.75 in absolute value. These facts underline the development aspect of addressing issues related to bureaucracy and corruption. The data sources are World Bank [46], Transparency International [43] and IMF [26]. There are 172 countries with Doing Business, Corruption and GDP/capita data, which were used to calculate the correlation coefficients. The Corruption Perceptions Index, which runs from 1 to 10, was converted into a simple ranking of countries, with the least corrupt country ranked first. For GDP/capita, countries were ranked from low to high income.
the emergence and size of the sector itself, addresses the second of these shortcomings. Before presenting the augmented model, however, the following citation from Castor [8] illustrates the mechanisms studied in this paper. The author discusses various waves of Brazilian bureaucracy reforms, from the 1930’s until the 1990’s, the citation concerns the reform efforts by the head of the ”Extraordinary Ministry for De-Bureaucratization”, Helio Beltrão, in the early 1980’s (pp. 171-172):

Beltrão’s approach was basically to concentrate the efforts of his team on the simplification of the day-to-day life of the population and of business through the elimination of hundreds of unnecessary or redundant documents in bidding procedures, the financing and mortgaging of houses, the issuance of personal documents such as driver licenses, and similar everyday transactions. Even if some of the ”simplifications” of Beltrão survived and were incorporated in the administrative praxis, a large number of his innovations were quietly eliminated by the actions of bureaucrats who had lost their power to complicate others’ lives. They were helped by groups of professionals like ”dispatchers” and public notaries who had lost a substantial part of their business due to the reduction in requirements for documentation, signatures and stamps.

4. Bureaucracy intermediaries

In this section, we explicitly model both a bribe- and an intermediary option, as two different alternatives for individuals to obtain time cost reductions when getting the license. Instead of assuming a vertically-integrated bureaucracy/intermediary entity we thus model a separate intermediary sector, along with a corrupt bureaucracy. Bureaucrats now set two bribe levels; to individuals and to intermediaries. We refer to this model as the ”bribe and intermediary model”. We also include in the analysis the case where bureaucrats choose to only accept bribes indirectly, i.e. through intermediaries. This is referred to as the ”intermediary only model”.\textsuperscript{13}

Whether intermediaries exist or not, depends, among other factors, on individuals’ demand for licenses, on how complicated license procedures are and on costs to become an intermediary. This suggests that the existence of the sector itself, entry into the sector, its size and degree of competition, and the effects on license allocations should be endogenously determined within the model. In addition, when bureaucrats can choose the length of the procedure $n$, changes in $n$ will have an impact on the intermediary sector, in turn affecting bureaucrats’ choice of procedure length.

In our model an intermediary, as motivated in section 2, is a ”one stop shop”, at which individuals can obtain the same license as can be acquired either through the regular procedure, or through bribing. We make the assumption that using an intermediary eliminates all bureaucracy-related time costs for individuals, and that there are

\textsuperscript{13}A priori we should expect the model with intermediaries only to generate lower bureaucracy profits, as bureaucrats only use one of two available instruments. It turns out to be true that bureaucrats resort to the intermediary only option for a limited parameter space, but we need to include it in the analysis as the intermediary problem differs somewhat when direct bribing is not possible.
no time costs for individuals in the interaction with the intermediary.\textsuperscript{14} Individuals pay intermediaries a fee $d$, and obtain the license, thus realizing a net gain of $g - d$. Intermediaries, in turn, acquire the license from the government bureaucracy by paying a bribe $B_d$ to bureaucrats. Apart from $B_d$, intermediaries have no other costs at the government bureaucracy (in particular, no time costs). Intermediaries maximize profits and cannot price discriminate between individuals.\textsuperscript{15}

We use a standard Cournot model of oligopolistic competition between identical intermediaries. This provides us with a setting in which the intermediary price entails a mark-up over costs $B_d$, a mark-up that decreases as competition increases. The number of intermediaries, defined as $m$, is determined by a zero net-profit entry condition.\textsuperscript{16} More specifically, the cost to enter is $f$ per step of the license procedure, i.e. a total cost of $nf$, which is also the profit each intermediary will make. With this specification, entry costs reflect the fact that the longer the procedure, thus involving contacts with more bureaucrats and offices, the more costly it is for a prospective intermediary to learn.\textsuperscript{17}

In section 4.1, the bribe and intermediary model is presented, and in section 4.2 we briefly present the intermediary only model. In section 4.3 we determine, for each combination of $n$ and $f$, which model maximizes bureaucrats’ profits (the bribe only model- as presented in section 3, the bribe and intermediary model, or the intermediary only model).\textsuperscript{18} This determines allocations, optimal bureaucracy profits, whether intermediaries exist or not, and, in case of existence, the size of the intermediary sector. Bureaucrats’ optimal choice when $n$ is endogenous is then analyzed (section 4.4).

In sections 4.1 and 4.2, bureaucrats’ choice of bribe levels are subject to the constraint that at least one intermediary should enter, i.e. total profits in the intermediary sector must be at least $nf$. In the bribe and intermediary model, the sequence of events is: Bureaucrats choose two bribe levels, $B$ and $B_d$, that individuals that bribe and intermediaries, respectively, will pay when acquiring the license. Second, given $B$ and $B_d$, a number $m \geq 1$ of intermediaries will simultaneously decide to enter and set a license fee $d$, determined through Cournot competition, such that each intermediary entrant makes zero net profits. Third, individuals, taking $B$ and $d$ as given, choose if and through which means to acquire the license. In the intermediary only model, bureaucrats choose $B_d$, that intermediaries will pay when acquiring the license. Second, given $B_d$, a number $m \geq 1$ of intermediaries will simultaneously decide to enter and set a license fee $d$, determined through Cournot competition, such that each intermediary entrant makes zero net profits. Third, individuals, taking $d$ as given, choose if and through which means to acquire the license.

\textsuperscript{14}In section 4, $\alpha$ refers to the time saving that is obtained by bribing, and the bribe only set-up is modeled as in section 3. Using intermediaries instead implies a complete reduction in time costs. Changes in $\alpha$ will therefore only change the difference between how much time that can be saved by bribing and by using an intermediary.

\textsuperscript{15}Adding a small time cost for individuals when using intermediaries, or for intermediaries at the bureaucracy, would not change the qualitative results of the paper.

\textsuperscript{16}In order to avoid analytical complications we allow $m$ to be a continuous variable, and the intermediary sector exists if and only if $m \geq 1$.

\textsuperscript{17}Constant entry costs, as opposed to $nf$, are discussed at the end of section 4.3.

\textsuperscript{18}Note again that the model from section 3 is thus recast as the bribe only model.
4.1. Bribe and intermediary model

4.1.1. Individuals’ choice of how to get the license

The threshold between the regular bureaucratic procedure and bribing is unchanged from expression 1 above, i.e. individuals with productivity

$$A_i \geq \frac{B-n_p}{\alpha n}$$

prefer to bribe. Individuals instead prefer intermediaries over bribing if

$$g - d \geq g - (B + (1 - \alpha)nA_i)$$ i.e. if $$A_i \geq \frac{d - B}{(1 - \alpha)n}$$ (8)

As it can never be optimal to have an intermediary fee larger than $$g$$, high-productivity individuals will always acquire the license, irrespective of $$n$$. This is different from the model in section 3, and comes from the assumption that there are no remaining time costs (and that we assume that individuals indifferent between informality and getting the license will acquire it). We can thus write the demand for intermediaries as

$$Q_d = 1 - d - B(1 - \alpha)n - \frac{B-n_p}{\alpha n}$$

and the demand for bribing as

$$Q_B = \frac{d-B}{(1-\alpha)n} - \frac{B-n_p}{\alpha n}$$

4.1.2. Intermediaries’ entry decision and choice of optimal fee

Upon entry, an intermediary makes a quantity choice $$q$$, taking the quantity of the other $$(m - 1)$$ intermediaries, defined as $$\tilde{q}$$, as given. With $$Q_d = q + \tilde{q}$$, we can solve for the indirect demand function $$d(q)$$, which is used in the profit function $$q \times (d(q) - B_d)$$, to get the individual intermediary’s profit maximization problem:

$$\text{Max} \quad q \times ((1 - \alpha)n + B - (1 - \alpha)nq - (1 - \alpha)n\tilde{q} - B_d)$$ (9)

Solving for $$q$$ as a function of $$\tilde{q}$$, then applying symmetry between intermediaries, the optimal $$q$$ is plugged back into $$d(q)$$ to get $$d(B, B_d, m) = \frac{1}{m+1}((1-\alpha)n + B) + \frac{m}{m+1}(B_d)$$. This response function captures the standard feature of Cournot competition, i.e. a mark-up over cost $$B_d$$ that gradually declines as the number of intermediaries, $$m$$, grows. Using this response function, and equaling per-intermediary profits with entry costs $$nf$$, we arrive at the expressions that determine $$m$$ and each intermediary’s pricing rule $$d$$, as functions of the bureaucracy bribe levels:

$$m(B, B_d) = \frac{d(B_d) - B_d}{nf} \times \left(1 - \frac{d(B_d) - B}{(1 - \alpha)n}\right) \text{ where } d(B_d) = B_d + n\sqrt{f(1 - \alpha)}$$ (10)

The expression for $$m(B, B_d)$$ is total intermediary sector profits, divided by $$nf$$. The mark-up in the intermediary sector is $$d(B_d) - B_d = n\sqrt{f(1 - \alpha)}$$, which increases in $$f$$.

4.1.3. Bureaucrats’ choice of bribe levels

Bureaucrats choose $$B$$ and $$B_d$$ to maximize profits derived from direct demand, $$Q_B$$, and demand channeled through intermediaries, i.e. $$Q_d$$. The profit maximization problem becomes

$$\text{Max}_{B, B_d} \Pi = (B - np) \times \left(\frac{d(B_d) - B}{(1 - \alpha)n} - \frac{B-n_p}{\alpha n}\right) + (B_d - np) \times \left(1 - \frac{d(B_d) - B}{(1 - \alpha)n}\right)$$

s.t. $$d(B_d) \leq g$$, $$m(B, B_d) \geq 1$$, $$B \leq (1 - \alpha)np + \alpha d(B_d)$$ (11)
The latter constraint assures that demand for bribing \( Q_B \) does not become negative. The solution is given in (12).

\[
\begin{align*}
  f &\leq f_1, \ 0 \leq n < n_{d=g} : d < g, m > 1 \\
  B &= np + \frac{n^a}{2}, \quad d = np + \frac{n}{2} + \frac{n \sqrt{f(1-a)}}{2}, \quad m = \sqrt{\frac{1-a}{4f}} - \frac{1}{2} \\
  f &\leq f_1, \ n_{d=g} \leq n < n_{\text{max}} : d = g, m > 1 \\
  B &= np + \alpha (g - np) - \frac{n \alpha \sqrt{f(1-a)}}{2}, \quad m = (1 + p - \frac{2}{n}) \sqrt{\frac{1-a}{f}} - \frac{a}{2} \\
  f_1 &< f \leq f_2, \ 0 \leq n < n'_{d=g} : d < g, m = 1 \\
  B &= np + \frac{n^a}{2}, \quad d = np + n - \frac{n^a}{2} - n \sqrt{f(1-a)} \\
  f_1 &< f \leq f_2, \ n'_{d=g} \leq n < n_{m=1} : d = g, m = 1 \\
  B &= g - n(1-a) + n \sqrt{f(1-a)} \\
  f_1 &< f \leq f_2, \ n_{m=1} \leq n < n_{\text{max}} : d = g, m > 1 \\
  B &= np + \alpha (g - np) - \frac{n \alpha \sqrt{f(1-a)}}{2}, \quad m = (1 + p - \frac{2}{n}) \sqrt{\frac{1-a}{f}} - \frac{a}{2} \\
  f > f_2, \ 0 \leq n < n''_{d=g} : d < g, m = 1, B = (1-a)np + ad \text{ (i.e. } Q_B = 0) \\
  d &= np + n - n \sqrt{\frac{f}{1-a}} \\
  f > f_2, \ n''_{d=g} \leq n < n_{m=1} : d = g, m = 1 \\
  B &= g - n(1-a) + n \sqrt{f(1-a)} \\
  f > f_2, \ \text{Min}\{n_{m=1}, n_{\text{max}}\} \leq n < n_{\text{max}} : d = g, m > 1 \\
  B &= np + \alpha (g - np) - \frac{n \alpha \sqrt{f(1-a)}}{2}, \quad m = (1 + p - \frac{2}{n}) \sqrt{\frac{1-a}{f}} - \frac{a}{2}
\end{align*}
\]

(12)

with \( B_d = d - n \sqrt{f(1-a)} \), and where

\[
\begin{align*}
  n_{d=g} &= \frac{g}{p+\frac{1}{2}+\frac{n}{\sqrt{f(1-a)}}}, \quad n'_{d=g} = \frac{g}{p+1-\frac{n}{2} - \sqrt{f(1-a)}} \\
  n_{m=1} &= \frac{g}{p+1-(2+\alpha)\sqrt{\frac{n}{f(1-a)}}}, \quad n_{\text{max}} = \frac{g}{p} \\
  f_1 &= \frac{1-a}{9}, \quad f_2 = \frac{1-a}{4} \text{ and } f_{\text{max}} = \frac{8+4(2-\alpha)\sqrt{(1-a)^3-\alpha(24-\alpha(29-\alpha(17-4\alpha)))}}{(8-\alpha)(1-4\alpha)^2} \quad (\text{used below})
\end{align*}
\]

There are five distinct solutions, depending on which constraints that bind, and the cases for which \( d = g, m > 1 \) and \( d = g, m = 1 \) are repeated for presentation purposes. The larger is \( n \), the larger will be the intermediary fee, such that the constraint on \( d \) will bind above a certain \( n \)-threshold. The \( m = 1 \)-threshold binds, for small \( n \), above \( f = f_1 = \frac{1-a}{9} \), but is relaxed for larger \( n \). The constraint of \( Q_B = 0 \) binds, for small \( n \),
above \( f = f_2 = \frac{1-\alpha}{4} \), but is relaxed for larger \( n \).\(^{19}\) For each of the three \( f \)-intervals in (12), we refer to the solutions as either small-\( n \) (when \( d < g \)), or large-\( n \) (when \( d = g \) binds).

The entry cost level \( f_2 = \frac{1-\alpha}{4} \) is an important cutoff level for small \( n \). For small \( n \), with profits linearly increasing in \( n \), profits in the bribe and intermediary model, and in the bribe only model, are equal. This can be seen by plugging in \( f_2 \) in the expressions for \( B_d \) and \( d \) above. We get \( B_d = B = np + \frac{np}{2} \) and \( d = np + \frac{7}{2} \). The individual with \( A_i = \frac{1}{4} \) is indifferent between the regular bureaucracy, bribing and using an intermediary (hence noone bribes), and, because \( B_d \) also equals \( B \) from the small-\( n \) solution in section 3, profits must be equal. Above \( f_2 \), profits are larger in the bribe only model.\(^{20}\)

### 4.2. Intermediary only model

When bureaucrats accept bribes only through intermediaries, the problem set-up follows the same logic as in the previous analyses.\(^{21}\) Choosing between the regular bureaucracy and intermediaries, individuals prefer the latter option if

\[
g - d \geq g - (np - nA_i) \quad \text{i.e. if} \quad A_i \geq \frac{d - np}{n} \quad (13)
\]

such that demand for intermediaries is \( 1 - \frac{d - np}{n} \). Using the same reasoning as in section 4.1.2 in solving the intermediary profit maximization problem, the expressions that determine \( m \) and each intermediary’s pricing rule \( d \) become:

\[
m(B, B_d) = \frac{d(B_d) - B_d}{nf} \times \left(1 - \frac{d(B_d) - np}{n}\right) \quad \text{where} \quad d(B_d) = B_d + n\sqrt{f} \quad (14)
\]

Finally, bureaucrats maximize profits \( \Pi^I \) from indirect bribes (where index I indicates the intermediary only case) subject to the constraints on \( m \) and \( d \), hence solving

\[
\text{Max}_{B_d} \Phi^I = (B_d - np) \times \left(1 - \frac{d(B_d) - np}{n}\right) \quad \text{s.t.} \quad d(B_d) \leq g, \ m(B, B_d) \geq 1 \quad (15)
\]

---

\(^{19}\)Note that for each level of \( f \), profits will be negative for \( n \) close enough to \( n_{\text{max}} = \frac{2}{f} \) (this results from the existence of entry costs). For large enough entry costs (\( f > \frac{1-\alpha}{(2-n)^2} \), which is larger than \( f_2 = \frac{1-\alpha}{4} \)), profits will be negative also for small \( n \). However, the solution in (12) never applies when profits are close enough to zero, because profits in the bribe only model are always positive. A similar reasoning as in this footnote also applies to the solution in section 4.2.

\(^{20}\)For small \( n \), and \( f < \frac{1-\alpha}{4} \), we get \( Q_B > 0 \) and \( d < g \), i.e. direct bribing and use of intermediaries coexist, and the choice of \( B \) and \( B_d \) is not constrained by the optimal intermediary fee equaling \( g \), its maximum level. As a result, the bribe level \( B = np + \frac{np}{2} \) is the same as in the bribe only model. This stems from the fact that individuals can always choose to use the regular bureaucracy and bureaucrats therefore face the same profit trade-off with respect to changes in \( B \) in both models. (The same property was pointed out by Hasker and Okten [20], studying the effects of anti-corruption policies in a model with intermediaries).

\(^{21}\)One difference from 4.1 is that individuals now compare the net gain of using an intermediary, with the regular procedure only. In the bribe and intermediary model, when the \( Q_B = 0 \) constraint was binding, bureaucrats still set a direct bribe \( B \). This means that demand responds differently to changes in \( d \) in the two models.
The solution is below. It displays a small-$n$ region, where $d < g$, and a large $n$-region, much as above. The cutoff level $f = \frac{1}{9}$ is where the $m = 1$-constraint starts binding, for small $n$.

\[
\begin{cases}
  f \leq \frac{1}{9}, & 0 \leq n < \frac{9}{p + \frac{1}{2} + (1+\sqrt{f})^2} : d < g, m > 1 \\
  d = np + \frac{n}{2} + \frac{\sqrt{f}}{2}, & m = \sqrt{\frac{1}{f} - \frac{1}{2}} \\
  f \leq \frac{1}{9}, & \frac{9}{p + \frac{1}{2} + (1+\sqrt{f})^2} \leq n < n_{\text{max}} : d = g, m > 1 \\
  m = (1 + p - \frac{2}{n})\sqrt{\frac{1}{f}} \\
  f > \frac{1}{9}, & 0 \leq n < \frac{9}{p + 1 - \sqrt{f}} : d < g, m = 1 \\
  d = np + n - n\sqrt{f} \\
  f > \frac{1}{9}, & \frac{9}{p + 1 - \sqrt{f}} \leq n < n_{\text{max}} : d = g, m > 1 \\
  m = (1 + p - \frac{2}{n})\sqrt{\frac{1}{f}} \\
  \text{with } B_d = d - n\sqrt{f}
\end{cases}
\] (16)

4.3. Bureaucracy profits and existence of intermediaries

The final step in solving the problem is to compare profits from sections 4.1 and 4.2 to profits in the bribe only model (section 3), which determines whether intermediaries exist or not. Proposition 4, in which $0 < f_1 < f_2 < \bar{f} < f_{\text{max}}$ for all $\alpha \in (0,1)$, and where all $f$-thresholds are functions of $\alpha$ only, characterizes the solution to the full problem.

**Proposition 4.** For $f$ and $\alpha$ such that

$0 \leq f \leq f_2$, $0 < \alpha < 1$, bureaucrats choose the bribe and intermediary option for small procedure lengths (below a threshold-$n$), and the bribe only option for large procedure lengths (above the threshold-$n$);

$f_2 < f \leq f_{\text{max}}$, $0.42 \leq \alpha < 1$,

$f_2 < f \leq \bar{f}$, $0 < \alpha < 0.42$,

$\bar{f} < f \leq f_{\text{max}}$, $0 < \alpha < 0.42$,

bureaucrats choose the bribe and intermediary option for intermediate procedure lengths, and the bribe only option for small- and large procedure lengths;

$\bar{f} < f \leq \bar{f}$, $0 < \alpha < 0.42$, bureaucrats choose the intermediary only option, and the bribe and intermediary option, for a lower- and upper- intermediate range, respectively, and the bribe only option elsewhere.

**Proof.** See the appendix. \qed

Figures 3 and 4 display the solution graphically, for "typical" parameter values, for
which the intermediary only solution is never optimal. In figure 3, three sets of graphs are shown, with a different entry cost $f$ for each set of graphs (and with $g$, $p$, $\alpha$ kept constant). The upper panel in each set shows bureaucracy profits in the bribe and intermediary model (solid), and the lower panel shows $m$, the size of the intermediary sector (panels A-F). In each profit graph the profits from the bribe only model is also shown (this curve, dashed, remains the same in all three panels). In each $m$-graph the profit comparison is explicitly taken into account in that, for each $n$, bureaucrats optimal choice will be whichever of the two settings (bribe and intermediary, or bribe only) that delivers the highest profits. Intermediaries will only exist if profits in the model with intermediaries are higher than in the bribe only case.

There are three critical threshold values for $f$ in the model, $f_1$, $f_2$ and $f_{\text{max}}$, all given in (12). For low entry costs, $0 \leq f \leq f_1$, as depicted in panels A-B, the constraint on $m$ never binds and the intermediary sector is large. The size of the sector is constant for small $n$ because increases in $n$, which always imply larger time saving for individuals when bribing/using intermediaries, result in bureaucracy bribes, an intermediary fee and bureaucracy and intermediary profits that increase linearly in $n$. As also entry costs increase linearly in $n$, the size of the intermediary sector is constant. For larger $n$, where the $d = g$-constraint binds, the number of intermediaries increases with the length of the bureaucratic procedure. The mark-up in the intermediary sector increases linearly in $n$, but as $d$ is constrained to equal $g$, the benefit of using an intermediary, and consequently demand for intermediaries, increases, which allows more intermediaries to enter (from 10).

As $f$ increases, with $f_1 < f \leq f_2$, the constraint on $m$ will bind for small sizes of the bureaucratic procedure, but is relaxed for larger $n$ (panels C-D). For small $n$, and as in panels A-B, bureaucracy profits are always larger with intermediaries, assuring the existence of the sector for such license procedures. Profits are lower than in panels A-B however, the intermediary sector is smaller and does not exist for as high $n$.

As $f$ increases further, with $f_2 < f < f_{\text{max}}$, large entry costs make the existence of intermediaries too costly for bureaucrats for small $n$, i.e. setting $B_d$ (and $B$) such that at least one intermediary can enter is less profitable than operating without intermediaries. There is still a middle-range of $n$, however, with the bribe and intermediary solution. As bribing only allows individuals a time saving of a fraction $\alpha$, it implies that increases in $n$ will make bureaucracy profits start decreasing at a smaller $n$, as compared to the bribe and intermediary case. As $f$ approaches $f_{\text{max}}$, the range over which there are intermediaries shrinks to zero.

\[^{22}\text{The intermediary only option is only profit-maximizing for a narrow range of entry costs, for intermediate values of } n, \text{ and only when } \alpha \text{ is small. For small } n \text{ (i.e. when } d < g), \text{ we have that whenever the bribe and intermediary solution is unrestricted } (f \leq f_1), \text{ or when (only) the } m = 1 \text{-condition binds, for both models, } (f_1 < f \leq f_2, f > \frac{1}{2}), \text{ profits are higher in the bribe and intermediary model. It can also be proven that profits are higher in the bribe and intermediary model when } (f_1 < f \leq f_2, f \leq \frac{1}{2}), \text{ i.e. when the } m = 1 \text{-constraint binds in the bribe and intermediary model but not in the intermediary only model. Even though profits in the intermediary only model are higher for large enough } f, \text{ at these entry costs the bribe only profits are instead higher. The only parameter range where the intermediary only solution will give the highest profits is therefore when the small-$n$ solutions of the intermediary only, and bribe and intermediary, models apply, but the bribe only profits have passed its peak and start declining (which happens for smaller values of } n, \text{ the smaller is } \alpha). \text{ In the appendix, all relevant profit comparisons are made.}\]
Figure 4A displays the solution in \((n, f)\) - space, for given values of \(\alpha, g\) and \(p\). As depicted above the intermediary sector exists for small \(n\) as long as \(f\) is not too large, the \(m = 1\) - constraint binds as \(f\) becomes high enough and, given an entry cost, the intermediary sector ceases to exist for large enough \(n\). Furthermore, it is in the middle-range of \(n\) that the highest entry costs in the intermediary sector can be sustained, where individuals' time saving and willingness to pay for bribing/intermediation is high, yet the costs \(np\), unavoidable for bureaucrats, are not too high. For the parameter combination used in figure 4 it is clear that the solution where \(Q_B = 0\), i.e. where \(B\) is set such that there is no direct bribing, holds only over a very limited parameter space. Intermediaries should thus be expected to coexist with direct bribing.\(^{23, 24}\)

A final note in this section relates to entry costs. If such costs had been specified as constant, rather than as a function of the complexity of the bureaucratic procedure, there would never be intermediaries for the smallest \(n\), as entry costs cannot be recovered by intermediaries. For large enough \(n\), we would get one intermediary, and then an increase in \(m\) for increasing \(n\), over the range that intermediaries exist. The results of the paper with respect to endogenous license lengths and individuals' gain from licensing would not change with this alternative specification.

4.4. Endogenous red tape and individuals' gain from licensing

We now turn to bureaucrats' optimal choice of \(n\).\(^{25}\) As may be guessed from the profit graphs in figure 3, the procedure length that maximizes bureaucracy profits, \(n^*\), is always larger in the model with bribes and intermediaries, than with bribes only.

In the bribe and intermediary model, profits are always maximized in the large-\(n\) region, in which \(d = g\) binds, and, depending on \(f\), we can have either \(m > 1\) or \(m = 1\). Above a certain threshold level of \(f\), bureaucrats prefer the bribe only solution. Panel E of figure 3 was constructed such that profits are equal in the two models, hence above the corresponding \(f\)-value the bribe only solution is preferred. Not surprisingly, the size of the intermediary sector will be smaller, and hence less competitive, at the profit maximum, the larger is \(f\). In addition, the aggregate individual gain is always smaller when the bribe and intermediary model determines bureaucrats' optimal choice of \(n\).\(^{26}\)

\(^{23}\)The papers by Hasker and Okten [20] and Bose and Gangopadhay [7] modeled intermediaries that help circumvent rules and regulations, rather than the time saving aspect. In such a setting there may be additional incentives for bureaucrats to channel corruption through intermediaries, not present in our model.

\(^{24}\)Other values of \(\alpha\) give a similarly small area over which \(Q_B = 0\) binds. An increase in \(\alpha\), which implies that the difference in time saving between using an intermediary and bribing goes down, gives a similar-shaped curve as in figure 4A, but compressed towards zero, as smaller entry costs can now be sustained in the intermediary sector. A reduction in \(\alpha\) gives the opposite effect. For \(0 \leq \alpha < 0.42\) the intermediary only solution is optimal over a very limited parameter space, which is the area indicated in gray in figure 4B. The other areas of the solution are as in figure 4A. A technical detail of the model, which adds little additional insight and therefore is placed in the appendix, is that the derivation of the \(n\)- and \(f\)-thresholds between which the bribe and intermediary solution (and the intermediary only solution) apply, varies somewhat depending on the shape of the profit curves, in particular for \(f > f_2\) as in panel E-F in figure 3.

\(^{25}\)The intermediary only solution never generates the highest profits when \(n\) is endogenous (see proof to proposition 5 below), this discussion thus concerns the comparison between the bribe only and the bribe and intermediary models.

\(^{26}\)Because \(d = g\), meaning that individuals using intermediaries have zero net gain from the license, we can still use definition 1 for the gain calculations (always applying the appropriate thresholds.)
These assertions are summarized in proposition 5, in which $0 < f^* < f^{**} < f_{max}$ for all $\alpha \in (0, 1)$, $p \geq 0$, and illustrated in figure 5.

**Proposition 5.** The procedure length $n^*$ that maximizes bureaucrats’ profits is

$$n^* = \begin{cases} \frac{g}{\sqrt{(p+1)(\sqrt{f(1-\alpha)+p})-\frac{g}{2}}} & \text{if } 0 \leq f < f^* \\ \frac{g}{\sqrt{(p+1)(p+1-\alpha)(\sqrt{f(1-\alpha)})+f(1+\alpha)}} & \text{if } f^* \leq f < f^{**} \\ \frac{g}{\sqrt{(1+p)(1+p-\alpha)}} & \text{if } f^{**} \leq f < f_{max} \end{cases}$$

In the first two intervals, i.e. for $f$ such that $0 \leq f < f^{**}$, bureaucrats’ optimal choice of $n$ is given by the bribe and intermediary option. Bureaucracy profits are strictly larger, the bureaucratic procedure $n^*$ is strictly longer and individuals’ aggregate gain from the license is strictly lower than when the bribe only option is optimal, which is the case for $f^{**} \leq f < f_{max}$. For $0 \leq f < f^*$, increases in $f$ result in shorter bureaucratic procedures, $\frac{\partial n^*}{\partial f} < 0$, higher aggregate gain, $\frac{\partial G(n^*)}{\partial f} > 0$, and a smaller intermediary sector $\frac{\partial m(n^*)}{\partial f} < 0$; for $f^* \leq f < f^{**}$ increases in $f$ has an ambiguous effect on $n^*$ and $G(n^*)$, and $m = 1$.

where:

$$f^* = \frac{4(1-\alpha)(1+p)(14+18p-5\alpha-6\sqrt{(1+p)(5+9p-5\alpha)})}{(4+5\alpha)^2}$$

$$f^{**} = \frac{(1-\alpha)(1+p)(2+2p-\alpha-2\sqrt{(1+p)(1+p-\alpha)})}{\alpha^2}$$

**Proof.** See the appendix. □

The negative derivative of $n^*$ with respect to $f$, over $0 \leq f < f^*$, can be understood as follows. For $0 \leq f < f^*$, we have the large-$n$ solution with $d = g, m > 1$ at the profit maximum. The bribe level is $B = np + \alpha(g - np) - \frac{na\sqrt{f(1-\alpha)}}{2}$, which is decreasing in $f$. As bureaucrats are bound by $B_d = g - n\sqrt{f(1-\alpha)}$, larger entry costs $f$ will have a direct negative effect on indirect bribe profits. This affects the optimal choice of $B$ which is reduced in order to channel individuals to direct bribing instead. In making this choice, a larger fraction of bureaucrats’ profits now stem from direct bribes, which gives individuals a time saving of $\alpha$. The possibilities for bureaucrats to raise $n$ are reduced, as the time-saving service offered is less valuable to the aggregate of individuals.

Figure 5 shows optimal bureaucracy profits (panel A), the aggregate individual gain (panel B), the optimal procedure length (panel C) and the size of the intermediary sector (panel D), as a function of $f$, for constant values of $g, p$ and $\alpha$ (solid lines). The dashed line corresponds to the bribe only model. The figure shows that bureaucracy profits are higher, procedures are longer and individuals are worse off, when the bribe and intermediation solution is optimal. In addition, for $0 \leq f < f^*$, lower entry costs into intermediation results in a larger intermediary sector, higher bureaucracy profits, longer procedures and less gain from licensing.

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5. Discussion

This paper suggests a theory of bureaucracy intermediaries, which are common in many developing countries. In a model where the bureaucracy intermediary sector is endogenous and arises, if at all, from bureaucrats maximizing rents from a license procedure, the paper addresses a topic with very few previous studies. A first straightforward result of the analysis is that if entry costs to become an intermediary are low, the intermediary sector is large, competitive, and exists for both short as well as longer license procedures. If entry costs to become an intermediary are instead high, if the intermediation activity is restricted, made more difficult, or is better controlled, the intermediary sector should then only be expected to emerge, if at all, for longer license procedures (as opposed to the shortest ones). A second result is that, for almost all combinations of license procedure lengths and entry costs, bureaucracy intermediaries should be expected to coexist with direct bribing, rather than as the only option to speed up processes and grease the wheels. Figures 3 and 4 capture these predictions of the model.

How should such entry costs to become an intermediary be interpreted, however? One straightforward interpretation is that it is costly to learn and understand how a license procedure works, what documents are required at each step, how to fill them in, etc. It may require legal training to understand the intricacies of procedures and different cases that can arise in the handling of applications. If there are different authorities involved in a license procedure, different documents/certificates/stamps required at each step, combined with many exceptions to rules, loopholes and workarounds, it seems reasonable to assume that entry costs are a function of the complexity of procedures. However, it is not a priori clear how such costs would differ between countries with equally long procedures, say.27

Another interpretation is that $f$ represents some aspect of policy, perhaps rules and regulations, at the government offices, that restrict the possibilities of intermediaries to represent individuals and firms at the bureaucracy, or more effective corruption controls. If enforcement vis-a-vis the sector is correlated with (country) income, with high-income countries having more enforcement/regulations/restrictions, we should expect less of bureaucracy intermediaries in richer countries, and if at all, only for longer procedures (as opposed to shorter ones). The reading of the available literature that discusses bureaucracy intermediaries, summarized in section 2, suggests that bureaucracy intermediaries are very common in many developing countries, and much less common in richer countries. In this paper, some evidence of the mode of operation of the sector in Latin America, and in Brazil in particular, is presented. However, data collection and empirical studies on the prevalence of intermediaries in different countries, and for which government authorities/license procedures/services such bureaucracy intermediaries are most common, and how intermediaries typically operate, is needed to provide a fuller picture.

In many parts of Latin America tramitadores are neither legal nor strictly illegal, but their presence and ability to operate outside and inside many government offices means that there is a de facto acceptance and/or lack of enforcement towards the intermediation

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27 In addition, low entry costs for intermediaries, due to clear and transparent procedures, would probably also imply low costs for individuals (which in the present model could be modeled as a compression of the $A_i$-distribution towards zero).
activity. This suggests that bureaucrats and tramitadores operate in close connection, and that bureaucrats facilitate the intermediation activity ("f is low").

In Brazil, despachantes are recognized as a professional category, formalized training exists, there are trade unions and despachantes have the right to formally represent citizens and to operate inside some government bureaucracies. An example is the above mentioned department of transport, DETRAN, in São Paulo, and in other Brazilian states. Traditionally, buying, owning and selling vehicles is something for which citizens in Brazil face a large number of legal requirements, and, consequently, interactions with the government bureaucracy. This is costly, money- and time-wise. However, the existence of despachantes, the recognition of such intermediaries to handle vehicle matters at the bureaucracy, their preferential access at the authorities, and other aspects of the bureaucracy-intermediary interaction, are there to simplify.

If we view the license procedure as exogenous, such intermediaries and supporting institutions de facto simplify and make citizens better off, as compared to going through the regular procedure. This is the essence of proposition 1. If we instead believe the procedure is endogenously determined, the paper suggests a theory for how an institutional setting, with a large and complicated bureaucracy, many intermediaries, and close bureaucracy-intermediary interaction with a right for intermediaries to represent citizens and preferential access at the bureaucracy, has emerged. Propositions 3 and 5 establish the negative effects on individuals’ licensing gain from such endogenous red tape.

The mutually beneficial cooperation between bureaucrats and intermediaries may also involve other professions such as notaries public and potentially accountants, benefiting from a cumbersome regulation. Reforms of the government bureaucracy typically meet fierce resistance from such groups. As a Brazilian example of such reform resistance, in addition to the citation in section 3, trade unions of despachantes have lobbied vis-à-vis politicians to limit, delay or hinder bureaucracy simplification reforms such as the government "one stop shop" PoupaTempo in the state of São Paulo, a reform which is likely to have reduced the use of despachante services over the past decade (for examples of articles concerning such lobbying efforts, see Lima [30, 31]; for a presentation of PoupaTempo, see Annenberg [2] and Paulics [35]). In Peru, notaries public have opposed and attempted to reverse simplifications in land titling and property rights registration ([ILD [25]]).

A data collection on the prevalence and use of intermediaries in different countries could potentially allow for a validation of the endogenous red tape argument presented in this paper, but also complement studies such as the Doing Business study at the World Bank [46], in that de facto procedures that citizens use may differ much from de jure legal procedures (de Soto, [14]).

Reforms such as PoupaTempo, which physically co-locate many government authorities at the same location, provide a possibility to test the relevance of the theory of

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28The magazine "Despachante em foco" (Despachante in focus) from the trade union of "Despachantes documentalistas" in the state of São Paulo is a publication discussing issues of concern to the bureaucracy intermediary sector in São Paulo. Among the issues brought up are efforts of the union to get access for its members to the computerized registries of the transport authorities, technical changes to this system, the opening of a "Central de atendimento ao despachante" (Despachante service desk) in conjunction with a DETRAN building, to change the classification of the profession in the Brazilian Occupation Classification (CBO in its Portuguese acronym) and to revoke a law that makes control of the profession a state- (as opposed to a federal-) matter [39].
intermediaries presented in this paper. As opposed to recent papers on bureaucracy intermediaries [20, 7], which focus on intermediaries’ role in facilitating rule-breaking, this paper stresses the time-saving aspect. In the PoupaTempo example, citizens can access the different authorities required to get a license, at the same physical location. Care has also been taken so that the citizen should be able to visit the different authorities within the same day. The procedure to get the license per se however, i.e. the rules and regulations that the individual has to fulfill, have not changed. They are the same as if the citizen uses the traditional procedure (which still exists). Ceteris paribus the reform thus reduces the incentives to use an intermediary for time saving purposes, but for individuals that cannot fulfill rules and regulations the incentives to use an intermediary do not change. With data on intermediary usage pre- and post reform, for treatment and control groups, implementations such as PoupaTempo present a possibility to learn more about which functions intermediaries primarily perform.

The literature on intermediaries is scarce, and this paper aims at providing a contribution to the field. It is worth mentioning the work of Brazilian anthropologist Roberto DaMatta, with studies of the Brazilian social hierarchy [12, 13]. The importance of personal contacts with bureaucrats in order to get things accomplished can be interpreted as a potential determinant of entry costs to become an intermediary. Intermediaries need to cultivate such contacts in order to be able to effectively handle license applications on behalf of individuals. In societies where the bureaucracy is characterized by a rules-based treatment and impersonal contacts between users of the bureaucracy (individuals, firms) and neutral officials, it is probably more difficult for a sector of intermediaries to emerge. This description would correspond to a "high f". Obviously, there may be deeper underlying explanatory factors for the importance of personal contacts and the prevalence of bureaucracy intermediaries. Notwithstanding, and as discussed in section 2, it is interesting to note that Latin America, the region of the world where senior management of firms spends most time with government regulation, a proxy for the amount of contact with bureaucrats, is also a region where bureaucracy intermediaries are common.

In his characterization of citizens’ contact with public authorities in Brazil, Roberto DaMatta describes the citizen-bureaucrat interaction, much different from the “Weberian” case [13]. In brief, simplifying a comprehensive account but still following the author closely: A citizen arriving at the government bureaucracy is “someone who is no-one” (alguém que é ninguém), or just "some individual" (indivíduo qualquer), and solving his errand is "not possible" (não pode). However, it might be that a personal link between the bureaucrat and the individual is discovered (having studied at the same institution, being from the same city, having the same favorite team, having religion in common, etc), which might facilitate a "fix" (jeitinho) in order to solve the errand. Such personal ties are not always there however, and the citizen may resort to a despachante. This intermediary, which has arisen as a result of the mismatch between the law and daily life, is the specialist in entering in contacts with the public offices, in resolving issues and in obtaining a jeitinho from the authorities. DaMatta thus argues that personal ties are important, and even though some or most citizens do not have them, there is room for specialists in such personal ties to bureaucrats to develop, which will then act as mediators in the hierarchy between the law/bureaucracy and ordinary citizens.
5.1. Conclusion

This paper presents a model of bureaucracy intermediaries, where the sector arises endogenously as a result of bureaucrats’ maximization of rents from a license procedure. The paper provides one explanation why license procedures tend to be long in developing countries. Evidence on the mode of operation of bureaucracy intermediaries is presented, and an empirical study that can potentially distinguish the theory presented here, from other theories of intermediaries, is discussed.

Appendix A.

Proof of Proposition 4. We use the solutions in expressions 4 (bribe only), 12 (bribe and intermediaries) and 16 (intermediary only). We first establish, in the first two paragraphs below, the comparison between the solutions in (4) and (12). The n-thresholds referred to, but not stated in the text, are given below.

For small n, profits in the bribe only case is \( \pi_s = \frac{a_n}{n} \). With bribes and intermediaries, for small \( n \), profits are \( \Pi_s = \frac{a}{n}(1 + f - 2\sqrt{(1 - \alpha)}) \) for \( f \leq f_1 = \frac{1-a}{9} \) and \( \Pi_s = n(\frac{a_n}{2} - 2f - \sqrt{(1 - \alpha)}) \) for \( f_1 \leq f < f_2 = \frac{1-a}{4} \). Both are larger than \( \pi_s \) in their respective f-ranges, with equality at \( f_2 = \frac{1-a}{4} \). The large-n solution for \( 0 \leq f < f_2 = \frac{1-a}{4} \), for which \( m > 1, d = g \) (from 12), has profits \( \Pi_{l,m>1} = \frac{g-np(n+np-g)}{4} + \frac{a_n f}{4} - (n+np-g)\sqrt{f(1 - \alpha)} \) which equal large-n profits with bribes only, \( \pi_1 = \frac{a(g-np)^2}{4n} \) (from 4), at \( n = n(\pi_1=\Pi_{l,m>1}) \), which is thus an upper crossing between the profit curves. For \( f < f_2 \), we thus have bribe and intermediaries for \( 0 \leq n < n(\pi_1=\Pi_{l,m>1}) \) and bribe only for \( n(\pi_1=\Pi_{l,m>1}) \) ≤ \( n < n_{\text{max}} = \frac{q}{p} \).

For \( f \geq f_2 \), small-n profits with bribes and intermediaries is \( \Pi_s = n(1 - \alpha^2 - \frac{a_n}{n}f) \), which is smaller than \( \pi_s \). For \( n \leq n^*_1 = \frac{q}{p+1-\frac{a_n}{2}} \) (from 4) we thus always have the bribe only solution when \( f \geq f_2 \). Higher entry costs will cause the bribe only, and bribe and intermediary profits, to cross at \( n > n^*_1 \) (there is thus a lower, and an upper, crossing between the profit curves). In the middle-n region, from (4), the lower crossing point is at \( n(\pi_1=\Pi_s) \) for \( f_2 \leq f < \frac{(1-\alpha^2+2\alpha^3-2\alpha^2\sqrt{(2-\alpha)(2\alpha-5+4\alpha)})(3-2\alpha)}{2(2-\alpha)^3} \) and, above \( n^*_2 \) (from 4), for larger \( f \) (up to \( f_{\text{max}} = \frac{8+4(2-\alpha)\sqrt{(1-\alpha)^2-(2-\alpha)(2\alpha-5+4\alpha)}-(2\alpha-5+4\alpha)}{(8-\alpha(1-4\alpha))} \)), at \( n(\pi_1=\Pi_s) \). Finally, the \( m = 1 \) constraint binds at the upper crossing between bribe profits \( \pi_1 \) and bribe and intermediary profits with \( m=1, \Pi_{l,m=1} = \frac{g-n(1-\alpha^2+p)(n+np-g)}{4} + \frac{(2\alpha-5+4\alpha)(n+np-g)}{\alpha} - \frac{n(1-\alpha)}{2} \), for \( f > \frac{4(1-\alpha)}{(4-\alpha)^2} \) (which is always larger than \( f_2 \)), such that the upper crossing is then \( n(\pi_1=\Pi_{l,m=1}) \). For \( f_2 \leq f < f_{\text{max}} \), we thus have bribe and intermediaries for an intermediate-n range, where the n-thresholds depend on whether the bribe only, and the bribe and intermediary, profit functions intersect in the middle- or large- region of the bribe only problem, and on whether the \( m = 1 \) constraint binds or not at the (upper-) intersection where profits are equal.

We now compare with expression 16, i.e. the intermediary only case, first proving that, for small \( n \), this solution will never generate the largest profits. For \( f < \frac{1}{5} \), interme-
primary only profits are \( \Pi'_I = \frac{2}{3}(1 + f - 2\sqrt{f}) \), and for \( f \geq \frac{1}{3} \) profits are \( \Pi'_I = n(\sqrt{f} - 2f) \). These profits, as all other small-\( n \) profits, increase linearly in \( n \). We compare these profits with the above established \( \Pi_s \) for \( f \leq f_1 \) and \( f_1 \leq f < f_2 \), respectively. Solving for the entry cost \( f \) that gives equality between each relevant pair, the \((f, \alpha)-\)parameter space where \( \Pi'_I \geq \Pi_s \), always falls outside the parameter space where the respective solutions apply. This holds up and above \( f = f_2 \). Comparing \( \Pi'_I \) with bribe only profits \( \pi_s \), for \( f < \frac{1}{3} \), gives \( \Pi'_I > \pi_s \) only in an \((f, \alpha)-\)parameter space where the bribe and intermediary solution applies and has a larger profit, comparing \( \Pi'_I \) and \( \pi_s \) for \( f \geq \frac{1}{3} \) yields the same result. We have thus established that the intermediary only case never applies for small \( n \).

Solving for equality between \( \Pi'_I = n(\sqrt{f} - 2f) \), which holds above \( f = \frac{1}{3} \), and \( \Pi_s = n(\sqrt{\frac{f}{1-n}} - \frac{\sqrt{\alpha}}{1-n} f) \), which holds above \( f \geq f_2 \), we get \( f = \tilde{f} \equiv \frac{2 - 2\sqrt{1 - \alpha}}{\alpha} \), which is always larger than \( f_2 \). Because bribe only profits start decreasing at a smaller \( n \) than profits with intermediaries only, there can thus exist an interval (i.e. for \( f \geq \tilde{f} \), above \( n_1^\dagger \)) in which \( \Pi'_I \) holds, is larger than \( \Pi_s \), and is also larger than \( \pi_l \). This is discussed in the next and final paragraph of the proof. Because intermediary only profits start decreasing at a lower \( n \) than profits with bribes and intermediaries, we can conclude that, for \( 0 \leq f < \tilde{f} \), the intermediary only solution is never part of bureaucrats’ optimal choice, for any \( n \). Such a solution was illustrated in figures 3 and 4A. The same is true for \( \tilde{f} \leq f < f_{\text{max}} \), where \( \tilde{f} \) is defined below.

The intermediary only solution applies over a narrow parameter range for \( f \geq \tilde{f} \). Solving for equality between \( \Pi'_I = n(\sqrt{f} - 2f) \) and \( \pi_l \), we get the lower \( n \)-threshold \( n_{(\Pi'_I = \pi_l)} \), which must be smaller than \( \frac{9}{p+1-\sqrt{f}} \) (from 16), in order for \( \Pi'_I \) to apply. \( n_{(\Pi'_I = \pi_l)} \) is the only relevant crossing point, the crossing between \( \Pi'_I \) and \( \pi_l \) occur outside of the region where \( \Pi'_I \) applies. Equality of \( n_{(\Pi'_I = \pi_l)} \) and \( \frac{9}{p+1-\sqrt{f}} \) gives that entry costs can be no larger than \( f = \tilde{f} \equiv \frac{8 - 6\alpha + 9\alpha^2 + 4(2 - \alpha)\sqrt{(1 - \alpha)(1 - 2\alpha)}}{(8 - 7\alpha)^2} \) (which is always less than \( f_{\text{max}} \)).

The \( \tilde{f} \) threshold, in turn, is only larger than \( \tilde{f} \) for \( \alpha < 0.42135 \approx 0.42 \), which is thus the largest \( \alpha \) for which the intermediary only solution applies. In the interval \( \tilde{f} \leq f < \tilde{f} \) we will have an intermediate-\( n \) interval with the intermediary only solution. The upper \( n \)-threshold depends on the curvature of the three profit curves, and there are two cases. For \( \tilde{f} \leq f < \tilde{f} \) it holds between \( n_{(\Pi'_I = \pi_l)} \) and \( n_{(\Pi'_I = \pi_l)} \), where the latter threshold solves \( \Pi'_I = \Pi_s \). The profit curves never intersect in the large-\( n \) region of the bribe and intermediary case. For \( \tilde{f} \leq f < \tilde{f} \) the intermediary only solution holds between \( n_{(\Pi'_I = \pi_l)} \) and \( n_{(\Pi'_I = \pi_l)} \), which solves \( \Pi'_I = \pi_l \), and where \( \tilde{f} \) solves \( n_{(\Pi'_I = \pi_l)} = n_{(\Pi'_I = \pi_l)} \).

To summarize, for \( \alpha < 0.42 \), there is a narrow \( f \)-range, \( \tilde{f} \leq f < \tilde{f} \), with \( f_2 < \tilde{f} < \tilde{f} < f_{\text{max}} \), for which intermediary only profits are largest in an intermediate-\( n \) range. There are two cases. With \( \tilde{f} \leq f < \tilde{f} \), for increasing \( n \), the solution is bribe only, intermediary only, bribe- and intermediary, then the bribe only solution up to \( n_{\text{max}} \). With \( \tilde{f} \leq f < \tilde{f} \), for increasing \( n \), the solution is bribe only, intermediary only, bribe only, bribe- and intermediary, then the bribe only solution up to \( n_{\text{max}} \). Figure 4B displays the solution, when the intermediary only solution applies, in \((n, f)\)-space.
where:
\[ n(\pi_m=\Pi_s) = \frac{2(1-\alpha)g}{(1-\alpha)(2(1+p)+\alpha-\sqrt{(-1+\alpha)(\alpha(-1+\alpha+4f-4\sqrt{1-\alpha})+4(-2f+\sqrt{1-\alpha}))})} \]
\[ n(\pi_1=\Pi_l) = \frac{\alpha g}{\alpha p+2\sqrt{\alpha((1-\alpha)f+\sqrt{1-\alpha})}} \]
\[ n(\pi_1=\Pi_l,m>1) = \frac{(4-3\alpha)g}{p+\sqrt{1-\alpha}(2(1-\alpha)\sqrt{f}+(2+3p)\sqrt{1-\alpha}-4(2-\alpha)\sqrt{f}(1-\alpha)+\alpha^2 f+4(1-\alpha)(1+f))} \]
\[ n(\pi_1=\Pi_l,m=1) = \frac{(2-\alpha)^2 g/4}{(1-\alpha)((1+p)-\alpha(1+\alpha)\sqrt{f})(1-\alpha)((7-\alpha)(1-\alpha)-f-2(2-\alpha)\sqrt{f}(1-\alpha))} \]
\[ n(\Pi_1^s=\pi_1) = \frac{g}{p+2\sqrt{(1-\alpha)(\sqrt{f}-2f)/\alpha}} \]
\[ n(\Pi_1^s=\pi_l) = \frac{g(2(1-\alpha)(1+\sqrt{f})+(4-3\alpha)p+2\sqrt{(1-\alpha)(1-\alpha)(1+f)-(2-\alpha)\sqrt{f})}}{4(1-\alpha)(1+p)\sqrt{f}+p(4(1+p)-\alpha(4+3p))} \]
\[ n(\Pi_1^s=\Pi_s) = \frac{2g}{1+2p+\sqrt{f}+(9-3\alpha)f/(1-\alpha)-4\sqrt{f}(1-\alpha)} \]

\[ \Box \]

**Proof of Proposition 5.** First note that the intermediary only solution will not be a part of the solution when \( n \) is endogenous. Maximal profits, over the range that this solution applies, will be at \( n = \frac{g}{p+1-\sqrt{f}} \) (i.e. up to the \( n \) for which the small-\( n \) solution, with \( m = 1 \) applies, see the proof above and 16). For this \( n \), profits \( \Pi_s = (\sqrt{f}-2f) \) are always smaller, for the relevant \( f \), than maximum profits in the bribe only model.

We use the notation \( n^* \) for the optimal length of the bureaucratic procedure, irrespective if it is generated by the bribe and intermediary, or the bribe only model. Maximal profits in the bribe and intermediary model are given by maximization of large-\( n \) profits, which in the unconstrained case \((m > 1)\) equal \( \Pi_{l,m>1} \), and in the constrained case equal \( \Pi_{l,m=1} \), both defined in the proof to proposition 4. We get

\[ \frac{\partial \Pi_{l,m>1}}{\partial n} \implies n^* = \frac{g}{\sqrt{(p+1)(\sqrt{f(1-\alpha)}+p)} - \alpha f} \quad (A.1) \]

\[ \frac{\partial \Pi_{l,m=1}}{\partial n} \implies n^* = \frac{g}{\sqrt{(p+1)(p+1-\alpha-2\sqrt{f(1-\alpha)}) + f(1+\alpha)}} \quad (A.2) \]

The former solution is feasible up to the point where the \( m = 1 \)-constraint starts binding, i.e. at \( n_{m=1} = \frac{g}{p+1-(2+\alpha)\sqrt{f(1-\alpha)}} \) (from 12). Solving for equality gives that the unconstrained optimum in (A.1) holds for \( f < f^* \). Above this entry cost level, the constrained large-\( n \) solution in (A.2) applies. This solution, in turn, is optimal as long as profits are larger than in the bribe only case, for which the optimal procedure length \( n^* = \frac{g}{\sqrt{(1+p)(1+p-\alpha)}} \) was derived in (6). Equating optimal bribe only profits from (6), with profits from (A.2), we get \( f = f^{**} \) (both \( f \)-thresholds were given in the main text).

The procedure length that maximizes bureaucracy profits is thus:
\[ n^* = \begin{cases} \frac{g}{(p+1)(\sqrt{f(1-\alpha)}+p)-\frac{\alpha f}{4}} & \text{if } 0 \leq f < f^* \\ \frac{g}{(p+1)(p+1-2\sqrt{f(1-\alpha)})+f(1+\alpha)} & \text{if } f^* \leq f < f^{**} \\ \frac{g}{\sqrt{(1+p)(1+p-\alpha)}} & \text{if } f^{**} \leq f < f_{\text{max}} \end{cases} \]

It is straightforward to check that \( n^* \) with either \( 0 \leq f < f^* \) or \( f^* \leq f < f^{**} \) is strictly greater than when the bribe only solution applies (solve for equality w.r.t. \( f \) and check that the solution falls outside its permitted interval).

With respect to the aggregate gain, individuals who use the regular bureaucracy are always worse off as \( n \) increases. By plugging in the optimal \( n \) in the \( B \)-expressions (for \( 0 \leq f < f^* \), the solution with \( d = g, m > 1 \) and for \( f^* \leq f < f^{**} \), the solution with \( d = g, m = 1 \), and in the expressions for the threshold between bribing and the regular bureaucracy \( (\frac{B-n}{n}) \), one can show that bribes are always larger, and the thresholds are always smaller, than in the the bribe only model. The two effects go in the same direction and reduce the aggregate gain in comparison with the bribe only model. Because \( d = g \), individuals using intermediaries have zero net gain, which is lower than for the corresponding individuals in the bribe only model, the aggregate of individuals must be worse off with bribes and intermediaries.

The derivative \( \frac{\partial n^*}{\partial f} \) is always negative for \( 0 \leq f < f^* \), but can change sign in the middle interval, depending on the values of \( p \) and \( \alpha \). The aggregate individual gain for the large-\( n \) solution with \( d = g, m > 1 \), is \( G = \frac{\alpha n f}{8} + \frac{(g-\alpha p)^2}{2m} \) (using definition 1). Plugging in \( n^* \) and differentiating w.r.t. \( f \) gives \( \frac{\partial G(n^*)}{\partial f} > 0 \) over the relevant interval. Finally, the derivative \( \frac{\partial m|n^*}{\partial f} \) is always negative when \( 0 \leq f < f^* \). \( \square \)
References


Figure 1. Solution as a function of n. The graph displays, for each procedure length n, the amount of licenses awarded (upper solid line), and the distribution of individuals that get the license from the regular bureaucracy, bribe, or that do not get the license at all. The dot-dashed line is the productivity level below which individuals get the license when only the option of the regular bureaucracy is available.

g=1, p=0.1, alfa=2/3
Figure 2. Bureaucracy profits (solid, inverted U), individuals’ aggregate gain (dot-dashed) and sum of profits, gain and time costs (upper solid curve), as functions of n.

g=1, p=0.1, alfa=2/3
Figure 3. Solution as a function of n, for three different entry costs f. Bureaucracy profits (panels A, C, E) and size of the intermediary sector (panels B, D, F). In each profit graph the profits from the bribe and intermediary model (solid), and from the bribe only model is shown (the latter curve, dashed, remains the same in all three panels). The dotted line in panels B and D is m=1.

g=1, p=0.1, alfa=2/3
Figure 4A. Solution in \((n, f)\) – space, for large values of alfa \((\geq 0.42)\). The five areas in the graph corresponds to the \((n, f)\)-parameter space where each of the solutions to the bribe and intermediary model have highest profits. Direct bribing and intermediaries coexist for four of the five different solutions, i.e. \(Q_B=0\) binds only over a very limited parameter space. Outside of the five areas, i.e. above the uppermost curve, the optimal solution is the bribe only solution, i.e. \(m=0\).

\(g=1, \ p=0.1, \ \text{alfa}=2/3\)
Figure 4B. Solution for small values of alfa (<0.42). The small area above f2, marked in gray, is the parameter space for which the intermediary-only solution is optimal. All other aspects of the solution are as in figure 4A.

\[ g=1, \ p=0.1, \ \text{alfa}=1/4 \]
Figure 5. Solution when n is endogenous, as a function of the entry cost f (solid line). Bureaucracy profits (panel A), aggregate individual gain (B), length of bureaucratic procedure (C) and size of the intermediary sector (D). The dashed line shows profits, gain and length of the procedure for the bribe only solution.

g=1, p=0.1, alfa=2/3
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