Taxation Mechanisms and Growth, in Medieval Paris

Al Slivinski[*] and Nathan Sussman[†]

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Public finances and their interaction with political institutions have emerged as an important causal factor in recent growth literature. We explore a unique source – the *tailles* levied on Paris by Philip the Fair. The method according to which direct taxation took place in the commune of Paris during the commercial revolution is consistent with a community responsibility system, an institution that facilitated exchange, enhanced the enforcement of property rights and contributed to the cohesive action of the community in the face of attempts of ruler to infringe on it rights. We model the mechanism used by the city of Paris to collect the *taille* and show it was efficient and effective. We demonstrate that a simple alternative tax collection mechanism can deliver similar results but has certain drawbacks that undermine the commune's cohesiveness. Quantitative evidence presented here suggests that the mechanism used resulted in de facto progressive taxation. We also show that Paris was a well integrated and cosmopolitan city – the largest in the medieval West and with the highest relative growth rates, evidence which is consistent with the well functioning of the community responsibility system. .

[*] The University of Western Ontario

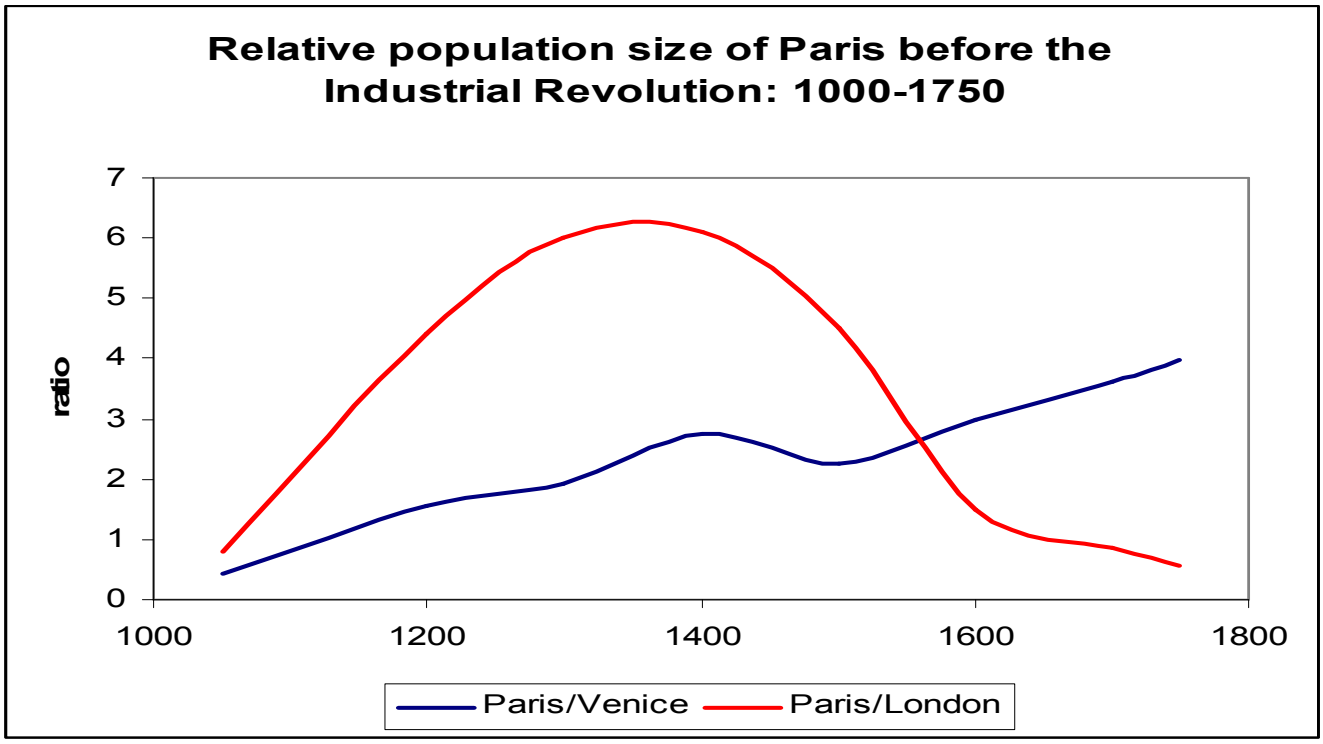
[†] The Hebrew University, Jerusalem and the University of Western Ontario. Sussman would like to thank Merav Avrahami, Karine Gabay, Anna Gutgarts, Nimord Hagiladi for their valuable assistance in coding the data The author would also like to thank the Israeli Science Foundation, the Maurice Falk Institute and Minerva for supporting this research.

Introduction

Public finances and their interaction with political institutions have emerged as an important causal factor in recent growth literature. North and Weingast, (1989) stressed the constraints on government that foster commitment and the resulting access to cheaper sovereign borrowing. Epstein, (2000) and O"Brien (2001) put more emphasis on the development of administration and its ability to tax efficiently. In particular, some recent papers have attempted to focus more narrowly on the growth of cities (De Long and Shleifer, 1993 and Stasavage (2007)), suggesting that free cities experienced more growth (borrowed at lower rates) than those cities under princely rule.

Data on population of major European cities (Bairoch et Al, 1988) place Paris at the top of the list in Europe from the thirteenth to the end of the seventeenth century. While a capital of a large kingdom, it was significantly larger than any free Italian city state. Figure 1 shows the relative population size of Paris compared with Venice, the most populous Italian city state and London, its historical rival. One can see that population growth in Paris was much faster than that of London and Venice until 1400. The period of rapid growth lasted from 1000 to 1300 when Paris reached a population size of six times that of London. The corresponding annual population growth rates were 1% until 1200 and 0.6% during the thirteenth century. This remarkable growth can be attributed to some extent to the growth of the king's bureaucracy, however, by 1300, the size of the French court was still very small by later standards.

Figure 1



This remarkable economic expansion of a princely city merits an explanation. In their paper, De Long and Shleifer (1993) classify French cities as free cities[1]. They acknowledge that this is a disputable classification, that to some extent helps them derive their desired result that free cities grew faster than those controlled by an absolute monarch. Stasavage (2007) classifies French cities as state controlled cities after 1400, acknowledging that before 1400 representative assemblies had more power in France.

This paper analyzes the institutions of the *taille* – a direct tax - in Paris around the turn of the 14th century[2]. At that time, the city of Paris contracted with the king to deliver a set amount of tax

[1] De Long Shfleifer (1993), p. 13.
[2] The system prevailed in other cities in Northern France.

revenue per year in return for immunity from royal indirect taxes. The main problem facing the collection of direct taxes was acquiring information about tax payers wealth or income. The small medieval bureaucracies made this a formidable task that was rarely attempted. We construct a formal model of the *taille* and show that it generates a subgame perfect equilibrium where tax payers truthfully report their wealth or income. The mechanism delivers the required tax revenue with certainty and efficiency. Emerging under an institutional setting which can be classified as a community responsibility system - CRS (Greif 2006), we argue that the mechanism used yielded fair and progressive taxation. We show that a simple alternative tax mechanism can yield an equilibrium of truthful reporting of wealth. However, it may leave some uncertainty regarding the amount collected. Furthermore, it relies on the tax authority providing taxpayers with specific incentives to report any fellow taxpayers who cheat, which is in some contrast to the CRS. Making use of the tax rolls of the *tailles* levied by Philip the Fair between 1292 and 1300 in order to finance his war in Flanders, we show that despite very high inequality, Paris was a well integrated prosperous city with little civil strife and unrest. The evidence is consistent with a well functioning commune, an achievement that became quite rare at that time in the more famous cities of Tuscany and Flanders (Greif 2006).

Few previous studies have made use of tax assessment data to make inferences about income or wealth distribution in early modern Europe. The most important study is of the famous Florentine *catasto* of 1427. (Herlihy (1967) and Herlihy Klapisch (1978)), which is available in machine readable form. French data have been, on the other hand, little explored. Favier (1970), has utilized tax rolls from Paris for the years 1421, 1423 and 1438 to provide a comprehensive analysis of occupations and wealth. The data include only the wealthy citizens comprising in total about 2,400 people. The tax rolls analyzed in this paper have been studied by Bourlet

(1992) mainly for the purpose of an antroponominic study and Herlihy (1995) who analyzed the 1292 and 1313 tax rolls and briefly addressed issues related to immigration, occupations and gender differences. However, probably owing to his premature death, Herlihy did not provide more than few summary statistics and did not computerize the data set.

The paper is organized as follows: we begin, in Section II by describing the data source used in this paper, in section III we describe the taxation principle and its relations to the community responsibility system. Section IV provides a formal model of the Parisian *taille* mechanism. Section V provides main summary statistics that provide a glimpse into of the society and economy of Paris and relates them to the method of taxation. Section VI concludes.

II. The Parisian *Tailles* of Philip the Fair – the source.

Our data is extracted from the tax rolls of the *Taille* imposed by Philip the Fair on Paris in 1292. There are seven existent rolls: 1292, 1296,7,8,9, 1300 and 1313. The first six correspond to the same imposition totaling 100,000 *livres parisis* to be paid in installments. The last tax roll, of 1313, was earmarked to pay for the knighting of the prince, the future king Louis X. The tax was levied on the citizens of Paris and excluded the privileged tax exempt classes of the nobility, clergy, students and professors. Who was classified a citizen – 'burgher' is open to debate. According to Duby only those that enjoyed the privileges of citizens that were related to residency requirements paid these taxes. The tax rolls differ in coverage, (Table 1) the first - 1292 - being the largest, including all segments of the taxable population: The rich (*gros*) the poor (*menus*), the Jews (who were expelled in 1305) and the Lombards (Italians). The tax roll of

1296 is missing the tax roll of the poor. All the subsequent tax rolls did not include some of the neighborhoods outside the city walls. The tax roll of 1313, which records the lowest amount of tax payers, has fewer parishes included in it than the previous tax rolls.

The tax rolls are essentially a list of tax payers recorded according to residency. Besides the tax payer's name we often find information about his or her occupation and place of origin. Separate lists were drawn for Jews, Italian bankers (Lombard) and the dead. Sometimes the poor appeared in a separate list, again according to place of residence. The tax rolls of 1292 (Geraud, 1837) , 1296, 1297 and 1313 (Michaelsson, 1951, 1958 and 1962) were extracted from the archives and are available in printed form. The remaining rolls – those of 1298, 1299 and 1300 are available only in their original manuscript form and are in the process of being entered manually into the database.

The classification of tax payers according to occupation and origin was done with help of the indices compiled by Geraud and Michaelson and by using contemporary geographical dictionaries[3]. Furthermore, all occupations were classified into three capital and three skill categories: Skill: a) unskilled, b) skilled and c) skilled and general education. Capital: a) no capital, b) circulating capital, c) productive capital. Occupations were also divided into major categories and major industries. Finally, for some observations we have an exact status identification: masters apprentices and day labor. The data also allow for the use of record linking, as many tax payers and their offspring or spouses appear in the various years. Once completed, it will be possible to update some of the identifiers that appear in one tax roll but not in others. More importantly it will also allow us to conduct a dynamic study of the evolution, over a generation, of wealth and status.

[3] Places of origin that were not readily identified were coded separately.

For comparison, we also applied a similar procedure to a smaller dataset based on tax rolls from London for 1292 and 1319, published by Ekwall (1951), which to our best knowledge has not been utilized by economic historians either. [4]

Table 1

Number of tax payers in Parisian tax rolls

Year	Number of persons
1292	14566
1296	5703
1297	9930
1313	6352
Total	36551

III. The Parisian *Tailles* of Philip the Fair – the method of taxation

The institutional details of the *tailles* studied in this paper are unfortunately shrouded in secrecy. The documents provide some indirect clues as to the taxation method, but no direct explicit evidence. The reason for the lack of information on the taxation procedure is in itself evidence of the autonomy of the city's public finances. According to Descimon (1989), who analyzed a similar Parisian tax roll of 1571, the Parisian city government kept these tax rolls secret from the crown and carefully guarded the detailed information about their tax payers. Descimon suggests that tax rolls were burnt after the taxes were delivered.

[4] Ekwall's data are not fully compiled as of yet, and only summary statistics are reported in this version.

Nevertheless, from tax rolls that survived in other cities over the early modern period – scholars have been able to generalize the principles of this tax. The following account is based on the summary provided by Wolfe(1972) in appendix G to his book. The *tailles* were taxes raised by the cities of France in response from demands from the king. According to the history of the *tailles* studied here, it was the city of Paris who chose to commute a sales tax (*aide*) into the *taille*. The city negotiated with the crown on the amount to be delivered and the crown left it to the city's government to assess and collect the tax.

It appears that this taxation mechanism was mutually advantageous for the bourgeoisie and the crown. The crown was assured a given revenue which reduced fiscal uncertainty and minimized on collection costs, whereas the city maintained its public finance independence. In 1382, an attempt to collect taxes from the city directly by the kings agents resulted in violent riots. The small scale of the king's bureaucracy and his limited political and military powers, resulted in a preference for farming out tax collection – the *taille* was no exception. The main difference between the tax farm and the *taille*, was in the motivation: the city opted for this arrangement to protect its independence, rather than to maximize profit[5]. The high degree of fiscal autonomy of the city suggests that, at least for the period until the late sixteenth century, France can not be characterized as an absolute monarchy. Moreover, the ability of the city to deliver taxes at a low cost to the crown turned the *taille* into a coercion constraining institution (CCI – Greif, 2005). It limited the power of the crown by deterring it from abusing the city' property rights, because the city's retaliation (not delivering the *taille*) would be very costly to a crown with limited tax collection capacity. The *taille* also fulfilled an essential feature of CCI's, according to Greif (2005), which is the bargaining that is an integral part of the institution.

[5] One potentially profitable motive was to use fiscal independence to issue low interest debt in the form of rents – Luchaire (1911).

On the downside, from a macroeconomic point of view – the *taille* was an unfavorable pro-cyclical fiscal mechanism: during an economic recession, in order to deliver the pre-agreed tax payment, tax rates had to be increased, whereas during an economic boom, tax rates were lowered.

The *tailles* in France were divided into two sorts – the *taille reele* and the *taille personelle*. The former was a property tax often called *'fougae'* - hearth tax - and was levied mainly in the *midi* and the south of France. The latter was a tax on personal wealth that included also moveable wealth and income, it was levied in the north of France. The Paris *tailles* were therefore, a tax on all wealth and income from labor and capital.

The most important feature of *taille personelle* was what Wolfe terms an "impot de repartition." Recall that the city negotiated a lump sum tax to be delivered to the king – it therefore turned the tax allocation and collection process into a zero-sum game, whereby a tax payer who evaded taxation by either falsely declaring his taxable wealth and/or income, or by not paying his assessed tax, fell as a burden on other tax payers. Unlike modern taxes, where the government sets tax rates and is therefore, the residual claimant of the tax assessment and collection process, the medieval monarchy made sure that taxpayers internalize the costs of tax evasion.

The zero-sum game property of this taxation scheme, is perfectly consistent with a self reinforcing community responsibility system (CRS) which characterized many medieval institutions (Greif (2005)). Extending Greif's analysis from merchants to the city's citizens at large, the CRS enabled merchants (citizens) to learn the communal and personal identities of their (otherwise unknown) partners in taxation. Indeed, an important feature of the tax rolls was the detailed collection of personal information on the tax payers by their peers. Greif (2006)

argues that CRS would be hard to enforce in large cities, such as Genoa or Venice. However the division of the city of Paris into smaller tax units based on the parish church made it possible to rely on this mechanism in a city that may have totaled 200,000 people. The nature of the *taille* instituted a measure of joint liability of all the citizens to fulfill the contract with the crown. The community, through its courts, would enforce the contract and discipline those that attempted to violate it. Indeed, the community would in effect operate a multilateral punishing strategy.

The *taille* system, then, provided an institutional dynamism that according to Greif (2005) is likely to contribute to economic growth. It prevented the crown from acquiring coercive power which it might then have used to abuse the city's property rights and it solidified the community by fostering a CRS which increased the level of solidarity and community responsibility of the city's merchants. This situation was different than in the 'free' cities of northern Italy – in those cities, the merchant elites controlled the city and contract enforcement through impersonal exchange emerged and dominated. CRS mechanisms, there, were less effective (Greif 2006) and remained, at best, at the guild level bringing about, perhaps, less solidarity than in French cities.

An essential feature of CRS highlighted by Grief (1993), is the social underpinning of these institutions. In the by now classic example of the Maghribi traders, the religious and family relationships provided the glue that bonded the institution, which was otherwise based on economic incentives. In a similar way, the zero-sum game property of the *taille*, made the use of a CRS natural from an economic point of view. However, to lower the costs of creating and maintaining this CRS – the commune adopted a number of measures that made compliance with the contract (with the crown), information gathering and enforcement much cheaper or self-enforcing. This was done by adopting two principles; the first, highlighted by Wolfe (1972) was

the principle that in taxes based on repartition "Le fort portent le faible." – the wealthy must carry the poor. Because the total tax to be delivered to the crown was fixed, any shortfall, due to negative income shocks to the taxpayer, was borne by those more fortunate. This principle may be characterized as a 'progressive' taxation scheme and helped to solidify the community at large. Since most of the tax burden was effectively borne by a smaller group of the more wealthy, it made it easier to enforce.

The second principle was that all citizens had to pay (participate) in this game. Everyone had to pay – the city elites, the poor and the dead. The records of the Paris *taille* show that in 1297 – 4350 poor taxpayers paid less than five percent of the total tax. Imagine the costs of assessing and collecting taxes from these poor individuals. The wealthy taxpayers could have easily absorbed their share at a relatively low cost. At the other end – we found that all the Parisian political elite (*prevot de marchands, echevins, elus*, etc…) are all accounted for in the tax rolls – they did not exempt themselves or their families. Indeed, Bouve (2004) in his study of the wealthy elites in Paris, compared the tax assessments of the wealthy individuals and families before and after assumption of political power and shows that privilege did not favor tax assessments: the assessments did not decline with taking office.

Finally, the adoption of a wealth and income tax, with some progressive provisions in itself helps to solidify the community. After all, the elites could have issued debt (to themselves) to pay the crown and choose to levy and collect indirect taxes to pay for the loans. These regressive measures were taken in Florence, for example and in other Italian city states. While no doubt contributing to the development of financial markets, they served to polarize the communes and may have, Greif (2005), negatively affected long term growth.

The successful implementation of the principles outlined above depended on the city government's ability to a) allocate the tax burden in a way consistent with the progressive principle, b) to extract the information necessary on each taxpayer and c) to enforce the collection of the tax. The first stage involved the setting of tax rates to ensure the city can provide the requested lump sum tax within the taxation principles. The second stage involved dividing the city into smaller fiscal units whereby information and collection costs were minimized.

We know very little about the first stage and the information historians have is derived from a few rare examples which survived – none from Paris. The actual tax schedules used in these tax rolls are unknown and could have varied between the various years. Similar *tailles* were usually levied according to the following principle: the very poor paid a poll tax, the very wealthy, above a certain (variable) cutoff paid a proportional wealth tax that normally ranged from one to ten percent. Most tax payers paid a proportional income tax[6]. As we show later, it is reasonable to deduce from the data that taxation of the poor was indeed a poll tax and for higher incomes it was proportional to wealth or capital. For the purpose of the analysis of inequality the medieval principle of proportionality is accepted throughout this paper.

The extraction of information and enforcement of collection was achieved by dividing the city into parishes (some parishes further divided into wards). To ensure that the principles that operated at the city level would also carry through at lower levels, in particular the invocation of a CRS, the lump sum levied on the city was divided into quotas for each parish. The division was probably the outcome of a bargaining process at the city council level. The bargaining process was constrained by the zero-sum game constraint which ensured that a multilateral reputation

[6] Boutaric (1861) p. 261. Desportes (1977)

system operated to ensure a fair allocation based on ability to pay. Once an allocation was arrived at – each Parish was faced with the task of assessing individuals and collecting the tax .[7]

The fact the rolls are constructed according to residence – by the taxpayer's address - alludes to the way the assessment was conducted; through a house to house canvas. Since the property of the zero sum game prevailed for every parish and ward, it was in the best interest of neighbors to make sure that assessors had as much information as could possibly be obtained (given that the assessed knew that, they had an incentive to truthfully report their wealth and income). In the congested living conditions of the medieval city there was little opportunity to hide.

The inclusion of the lists of dead taxpayers in the rolls highlights the nature of the process: Since the planning of the tax assessment was based on living taxpayers, a taxpayer that died during the tax year could not be readily absolved. If the dead taxpayers were to be dropped from the list, their burden would have to have been picked up by surviving ones. Since death rates were not very low – a provision for collecting taxes from the survivors of deceased taxpayers had to be formulated.

In the following section we model formally the *taille* mechanism and contrast it with an alternative simple mechanism that can achieve similar objectives, such as truthful reporting and non collusion. However, the alternative mechanism does not rely on the principle of the CRS and can not remove the uncertainty that the *taille* mechanism removes. Moreover, it could be more costly to implement and assuming some reasonable behavioral assumptions, may not produce the desired results.

[7] See discussions in Farr (1989) and Desportes(1977) for Dijon and Reims respectively.

IV. A formal model

1. A mechanism implementing the *taille*

We analyze the use of the *taille* in a particular parish, and start from the point at which an amount P has been assessed on the parish, and the task at hand is to collect that. We assume for simplicity that the parish consists of two individuals; the generalization to more than two parishioners is straightforward. The informational assumptions are key; thus, it is assumed that each parishioner's wealth is a random variably w_i drawn from a distribution f_i, with support $[a_i,b_i]$. Further assume that (f_i, $[a_i,b_i]$) for all i is common knowledge, and that while the parishioners know the realizations of each w_i, the tax collector does not. (It will be apparent from what follows that in a multi-person parish, it is necessary only that for each parishioner i there is at least one other parishioner who knows the realization of w_i.)

The *tailles* mechanism operates in two stages. In Stage I, each parishioner reports his wealth, and we denote that report as r_i. These reports are then made public, and at stage II, each parishioner makes a further report c_i, which takes a value of 0 or 1. A report of c_i=0 is interpreted as `silence', whereas a report of 1 indicates that the parishioner is *challenging* the income report of the other parishioner. (Again, in a multi-person parish, each parishioner would choose a *list* of such reports c_{ij} on every other parishioner.) It is assumed that any such report of 1, which we will henceforth refer to as a *challenge*. It is assumed that a challenge triggers a thorough and costly audit of the challenged parishioners wealth, which reveals the actual realization of his w_i. The key feature of the *taille* is that the set of reports and challenges is used to determine the two parishioner's tax liabilities as:

$$T_i = \frac{s_i P}{\sum_j s_j}$$

where s_j is the value of *j*'s wealth used by the tax collector: r_j, if *j*'s report goes unchallenged, and w_j if there is a challenge and an audit. The first important property of this tax assessment is that it is always true that the sum of the individual assessments results in exactly *P* being collected. The second key property is that any reduction in the s_j used for parishioner *j* reduces *j*'s tax burden, but increases the tax burden of every other parishioner. This second property implies that the *tailles* has a built-in incentive for any parishioner who knows that another parishioner is under-reporting his wealth to challenge that report. The mechanism needs to be complicated slightly beyond this, however, in order to insure two further important properties:

i) that a parishioner who is found in an audit to have under-reported suffers some cost sufficient to dissuade such behavior, allowing the tax collector to avoid costly audits, and

ii) that a parishioner who challenges the report of a parishioner who is found to have been truthful also incurs a cost sufficient to dissuade such behavior, for the same reason.

Thus, the full *tailles mechanism* is specified by saying that the payoff to each parishioner is as follows:

$$V^t{}_i = w_i - T_i(r, c \mid w, P) + h\left(c_{-j}(w_j - r_j)\right) + c_j f\left(w_{-j} - r_{-j}\right)$$

Where

$$T_i(r, c \mid w, P) = \frac{G_i(r_i, c_{-i} \mid w_i)P}{\sum_j G_j(r_j, c_{-j} \mid w_j)}$$

and

$$G_i(r_i, c_{-i} \mid w_i) = (1 - c_{-i})r_i + c_{-i} \max\{w_i, r_i\}$$

$f(a) = 0$, if $a<0$, and $f(a)=b<0$, if $a \geq 0$, and finally,

$h(a)=0$, if $a \leq 0$, and $h(a)=d<0$, if $a>0$.

Throughout the above expressions, '*-i*' refers to any parishioner other than *i*.

The function T_i is the tax-assessment for i, and G_i captures the fact that i's assessment is based on his report if there is no challenge, but is based on the larger of his report or his true income if there is a challenge and audit, which is assumed to reveal the truth. The function h inflicts a cost of $d<0$ on i *only if* his report is challenged and he has in fact under-reported, while the function f inflicts a cost of $b<0$ on i only if he challenges another tax-payer and the ensuing audit reveals the other parishioner was in fact honest. These costs can be either financial or a loss in utility, and they can be arbitrarily small.

The meaning of the claim that the *taille* 'works' is given by the following result, a proof of which is not difficult, and can be found in a theoretical paper companion to this one.

Proposition 1: *The unique sub-game perfect equilibrium of the game in which parishioners simultaneously choose reports r_i at Stage I, observe these reports and then simultaneously choose challenges c_i at Stage II, and have the payoff functions V_i^t specified above, has each parishioner choose $r_i=w_i$ at Stage I, and at Stage II uses the strategy: $c_i=1$ if and only if $r_{-i}<w_{-i}$.*

A further important feature of the *taille mechanism* is its sequential nature, which reflects the reality of the way information was disseminated when it was used. That is, it is important that parishioners were told the assessments of their fellow parishioners before the final tax burdens were determined. This feature is revealed by the following further result.

Proposition 2: *Consider a game in which all parishioners simultaneously choose a pair (r_i,c_i), but have the same payoffs as in Proposition 1. This game has no Nash Equilibrium in pure strategies.*

This simultaneous-move game certainly has Nash Equilibria, but Proposition 2 implies that they must all involve mixed strategies; parishioners will randomize over truthful income reports and over challenges, implying that there will be audits (some of which reveal under-reporting, and some of which are wasteful) and under-reporting of wealth with positive probability in equilibrium. Thus, although the simultaneous-move version of the *taille* would still collect the

required *P*, the collectors would have to incur the costs of the audits, and it seems likely that the collection would be seen as less legitimate, as some parishioners would get away with under-reporting their wealth, and others would find themselves being investigated even if they had been truthful.

2. An alternative mechanism

These results do not imply that the *taille* is in any sense optimal, of course, and so for purposes of comparison, we consider another taxation mechanism which one can imagine the city leaders might have used, and which is closer to modern taxation systems.

Suppose then that the approach to collecting the amount agreed on with the King was to assess a proportional tax on each citizen at a rate determined ex-ante, which we will refer to as τ. If the city leaders have a good assessment of total wealth in Paris, then they can in principle determine an appropriate value for τ. If they do not, then an immediate problem they face is that, even if they successfully collect the desired proportion of total wealth, they may collect too little to satisfy their contract with the King, and if they collect too much they will have failed to minimize the cost to the city as a whole of carrying out the contract. Here, we focus on the question of the relative ease of implementing such a system, and note that if this were the mechanism used, then it is immediate that the tax burden for parishioner *i* in any parish is τs_i. This in turn means that one's tax burden does not depend in any way on the reports of other parishioners.

Thus, the tax collectors must devise appropriate incentives, and a mechanism in which the parishioner payoffs are as follows includes such incentives.

The payoff to parishioner *i* is specified as:

$$V^{\tau}{}_i = (1-\tau)r_i - c_{-i}[\sigma \max\{0, w_i - r_i\}] + c_i\left[(\sigma-\tau)(w_{-i} - r_{-i})\right] + h\left(c_{-i}(w_i - r_i)\right) + c_i f\left(w_{-i} - r_{-i}\right)\right)$$

where the functions *f* and *h* are as defined previously, and play the same roll, and $\sigma > \tau$ is a 'penalty tax rate'. The two new features required in this mechanism are to be found in the second and third terms in this payoff function. The second imposes a financial penalty on parishioner *i,* in the amount $\sigma(w_i - r_i)$, in the event he under-reports and is audited. The reason this must be done is that – as formalized in the third term of the payoff function – a parishioner who challenges another parishioner's wealth report must be compensated, as the method of taxation itself provides no incentives to challengers. In this formulation of the mechanism, this is the use to which is put the penalty collected from the under-reporter.[8]

This 'tau' mechanism also works, in the same sense as does the *taille*, as indicated by the following result.

Proposition 3: *The unique sub-game perfect equilibrium of the game in which parishioners simultaneously choose reports r_i at Stage I, observe these reports and then simultaneously choose challenges c_i at Stage II, and have the payoff functions V_i^{τ} specified above, has each parishioner choose $r_i=w_i$ at Stage I, and at Stage II uses the strategy: $c_i=1$ if and only if $r_{-i}<w_{-i}$.*

An immediate implication of this result is that use of this mechanism implies that parish tax collections in equilibrium will be $\tau \sum_j w_j$, emphasizing the fact that to hit any tax revenue target for the parish requires setting τ correctly.

[8] It need not be that the entire penalty collected from the under-reporter goes to his challenger, of course. Some portion could go to defray the cost of the audit, but what is unavoidable is that the challenger be given some reward, as the mechanism includes no other incentives to challenge, and this reward must come from somewhere.

To answer the question: why did the Leaders of Paris choose the *tailles* mechanism over the *tau*, one might turn to informational considerations. It has been assumed here that the city leaders know the realization of aggregate income in each parish before they set the fixed tax rate τ so as to be sure of collecting the agreed-on sum for the king. In reality the city leaders could be expected to know only the distributions from which the incomes are drawn. Therefore, there is a positive probability of collecting insufficient funds and not meeting the tax targets, and this uncertainty can only be relieved by setting a tax rate τ so high that the tax target is fulfilled with high enough probability, which necessarily also implies collecting more taxes than required with high probability, negatively effecting the welfare of the tax payers.

An additional consideration is that the τ mechanism relies on taxpayers' willingness to turn in their misreporting neighbors in return for a monetary reward. From a behavioral standpoint, our model assumed that people are indifferent between turning in a neighbor for a reward and turning in a neighbor that inflicted a direct cost on them. Anecdotal evidence suggests that social norms do favor the former and sanction the latter. Finally it is not unreasonable to assume that the city leaders chose the *taille* system which is consistent with the community responsibility system as it ensured social order within the city and contributed to its prosperity, from which the city elite benefited directly.

V. Inequality and integration in medieval Paris[9].

1. Parishes, wealth and taxpayers

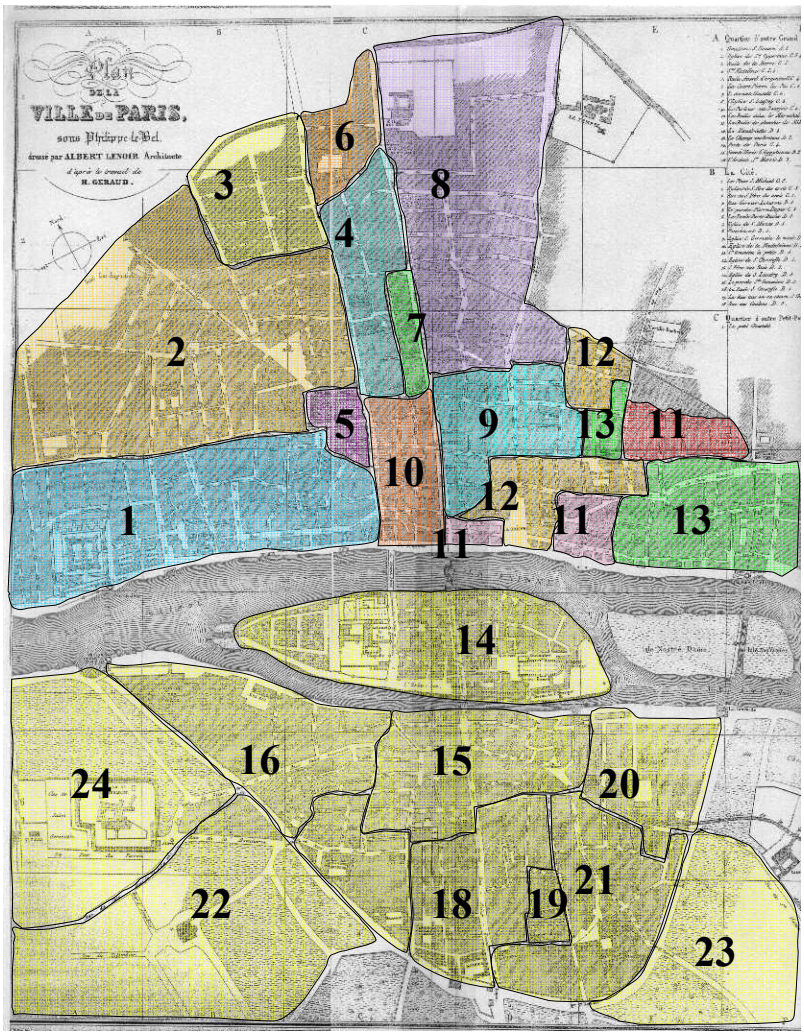
[9] This section builds on Sussman (2006).

The Parisian tax rolls allow us to construct some summary statistics for Paris at the turn of the 13th century. The 1292 tax roll was used by Geraud (1837) to construct a map of Paris during the reign of Philip the Fair (Map 1).

Table 2 lists the Parishes of Paris and shows large variations in income (as measured by average tax) and population[10]. The city was roughly divided along income lines: the *rive droite*, had higher incomes than the *rive gauche,* and the center had larger incomes than neighborhoods outside the walls of the city[11]. As today, the commercial center was on the *rive droite* and the university and the major monasteries and abbeys were on the *left bank*. Since students, faculty and clergy were exempt from taxation, the population of taxpayers is significantly lower on the *left bank.*

[10] Since the tax was proportional and excluded the poorest citizens, the selection bias produces a positive correlation between average tax and population size, for given area taxed.

[11] Even in parishes that spanned across the walls, such as St. Germain Le'Auxerrois, the wards outside the walls had a significantly lower wealth than central wards (9s compared with the average of 21s).



Map 1

Paris during the reign of Philip the Fair – division to parishes based on the records of the *Taille*

Legend:

1. St. Germain L'auxerrois **2**. St. Eustache **3**. St. Sauver **4**. St. Leu – St Gille **5**. St Innocent – St, Opportune **6**. St. Laurent **7**. St. Josse **8**. St. Nicolas des champ **9**. St. Merri **10**. St. Jacques de la boucherie **11**. St. Gervais **12**. St. Jean **13**. St. Pol **14**. La Cite **15**. St. Séverin **16**. St. André des arts **17.** St. Cosme **18**. St. Benoît **19**. St. Hilaire **20**. St. Nicolas de Chardonnay **21**. Ste Geneviève **22**. Notre Dame des champs **23**. St. Marcel **24**. St. Germain des Près

Table 2

Wealth and taxed population size - Parisian parishes

Parish	Location	Number of hearths	Average tax per capita (solidous parisis)	Maximum tax
St. Germain L'auxerrois	rive droite, center	2328	19.3	800
St. Eustache	rive droite, center	1306	17.7	1100
St. Sauver	Rive droite, outside wall	230	6.1	58
St. Leu – St Gille	rive droite,, outside wall	437	8.8	440
St Innocent – St, Opportune	rive droite, center	82	11.9	140
St. Laurent	rive droite, outside wall	213	7.6	70
St. Josse	rive droite, center	73	11.6	90
St. Nicolas des champs	Rive droite, outside wall	844	10.3	1080
St. Merri	rive droite, center	1426	13.2	290
St. Jacques de la boucherie	rive droite, center	1429	24.2	1080
St. Gervais	rive droite, center	938	14.3	480
St. Jean	rive droite, center	807	22.4	1650
St. Pol	rive droite, center and outside wall.	913	8.9	200
La Cite	Center	1208	19.6	1880
St. Séverin	rive gauche, center	664	9.8	200
St. André des arts	rive gauche, center	146	6.5	80
St. Cosme	rive gauche, center	59	7.3	50
St. Benoît	rive gauche, center	219	14.4	200
St. Hilaire	rive gauche, center	20	8.0	18
St. Nicolas de Chardonnay	rive gauche, center	79	5.7	58
Ste Geneviève	rive gauche,center	405	8.4	120
Notre Dame des champs	rive gauche,outside wall	62	5.5	40
St. Marcel	rive gauche,outside wall	231	4.0	120
St. Germain des Près	rive gauche,outside wall	383	12.2	300

2. The Rich Carry the Poor - evolution of tax returns over time

How did wealth assessment evolve over time? In table 3 we provide average tax payment in the various samples. Since the samples are not of even size, the average tax based on the wealthiest 5,000 tax payers is provided. The evidence presented lends support to the behavior according to the dictum that the wealthy carry the poor. From 1292 to 1296 the poorest tax payers were dropped. The category of people paying 1 penny was eliminated. In 1313 the same tax burden was shared amongst fewer tax payers raising the average tax burden significantly. There is little variation in the average tax paid by the 'top 5,000' because the exemptions for the poor did not affect the tax burden significantly owing to the initial very small total contribution of the poor to the tax base. Nevertheless, it is known that grain prices were high around 1313 and the period was one of economic hardships (monetary disorder), the fact that the average tax for the 'top 5000' increased by ten percent underscores the rising relative burden of these taxpayers because their assessments increased in a bad year. (Jordan, 1996). We can therefore conclude that the data support the notion that taxation was progressive.

Table 3

Average tax and total tax receipts: 1292-1313

Year	Number of persons	Average tax *Soldi parisis*	Average based on Top 5000 *Soldi parisis*	Total tax receipts *Livre parisis*
1292	14566	16.9	43.9	12286.8
1292*	12080	20.1		
1296**	9771	21.2	39.2	9958.2
1297	9930	20.9	38.3	10372.1
1313***	6352	34.1	41.3	10393.6

Notes: * the 1292 *taille* included more than 2000 poor who paid 1 penny, dropping from the calculation to make the 1292 more comparable with those that followed raises the average to the level of subsequent *tailles*. ** the 1296 *taille* is missing the poor. The totals from the poor of 1297 were added to the 1296 totals. *** In 1313 the *livre parisis* was debased by 30 percent. The sums reported were deflated from the originals: 44.2, 53.7, and 13511.7 respectively.

3. Paris a cosmopolitan metropolis – evidence for communal cohesiveness.

It is evident from the tax rolls that the Parisian economy attracted many migrants and foreigners. Unlike the privileges received by foreign nationals in other commercial centers (notably in the East), foreigners residing in Paris were not exempt from the *taille* and our records indicate that a few hundred of foreigners were recorded as having paid the *taille*. Their inclusion in the regular *taille* lists, with the exception of the Jews and Italian Bankers, suggests that they were an integral part of the commune of Paris and benefited from the positive effects of the Parisian community responsibility system – a feature that could have made Paris an attractive destination for foreign migration. Moreover, the tax lists record the name of most foreigners in their French transcription, which can be interpreted as further evidence for their social integration. Conversely it can be argued that the exclusion of the Jews and Lombards from the general tax roll as a signal that they were not part of the CRS, made them, as the historical record shows, more susceptible to abuse by the crown as their abuse was not considered a breach of the implicit contract between the crown and the city.

Table 4

Contributions of foreign born residents to the *tailles*

	Number of foreigners	Share of foreigners in tax receipts	Average tax

1292	884	17%	47.2
1296	419	16%	75.8
1297	591	14%	48.8
1313	357	6%	44.7

In table 4 we can see that foreigners accounted for roughly 6% of the taxpayers and contributed between 14 and 17 percent of total tax receipts until 1313. In 1313 we see a marked decline in the number of foreigners and in their relative tax contributions. Earlier we showed that the smaller tax rolls of 1296 and 1313 are the result of the economic crisis prevailing at those years. In these years, the tax burden shifted to the more affluent. Thus, in 1296 we see that though their numbers drop by more than a half, foreigners contribute, roughly the same share of the *taille* as they did in 1292. However, in 1313 we observe an opposite trend of a decline in numbers *and* wealth of foreigners. Analysis of the tax records indicates that most of the drop can be explained by the expulsion of the Jews in 1305 (though they already disappear from the tax records in 1297) and the large decline in the numbers of wealthy Italians.

It is tempting to attribute the decline in the lure of Paris for foreigners to the general economic decline of the 1310s, which was accompanied by monetary disorders (debasements). This was hardly an attractive economic environment for foreign merchants and bankers. Moreover, Phillip the Fair engaged in campaigns against the Jews and Templers – the bankers and money lenders of the time – which probably frightened Italian bankers out of Paris, as they were potentially the next victims on the crown list. While indirect, this evidence suggests that economic crisis and institutional disorder - infringing on the property rights of minorities and bankers drove some of the wealthiest tax payers out of Paris. By 1313, Paris seems to have lost its lure.[12] This finding

[12] Herlihy () shows that not only did foreigners leave Paris, but that immigration to Paris from the south of France also decline by 1313. Tests of these hypotheses will be performed once all the data set is complete.

supports claims that relative economic decline in Western Europe set in before the Black Death of 1346/8.

Where did foreigners reside? Did they concentrate in one or two parishes or were they dispersed between neighborhoods? Table 5 presents the distribution of foreigners in the various parishes, listed in order of declining wealth, compared with the distribution of the native population. With the exception of the Jews, all foreigners were dispersed throughout the various neighborhoods, according to their wealth. However, foreigners tended to concentrate in the more affluent parishes. For example, 9.9 percent of taxpayers lived in the wealthiest parish of St. Jacques de la boucherie, whereas it was home to almost 20 percent of the Italian community of Paris. Almost half of all Italians resided in the three wealthiest parishes. Half of the Flemish and Germans resided in the top four parishes by income and the English and Scots in the top five parishes. This phenomenon is different from the traditional tendency of foreign merchants to live in enclaves or communes such as those that prevailed in the Levant. Paris was indeed a cosmopolitan city where foreigners could reside next door to the local population without the need to resort to living in closed quarters to protect themselves. The exception to this rule was the Jews who congregated in only two parishes[13]. Finally, the large concentration of Italians and Jews in the parish of St. Merri suggests that this Parish was the home of moneylenders.

Table 5

Residences of foreigners in Paris - 1292

Parish	Share of total population	Share of Germans	Share of English	Share of Flemish	Share of Italians	Share of Scots	Share of Jews
St. Jacques de la boucherie	9.9%	15.8%	11.7%	13.5%	19.8%	10.2%	
St. Jean	5.6%	8.8%	4.3%	7.7%	3.6%	1.7%	17.1%

[13] The heart of the Jewish community is, to date, in the Marais – their place of residence in the middle ages.

La Cite	8.3%	9.6%	12.7%	4.8%	26.3%	13.6%	
St. Germain L'auxerrois	16.1%	13.2%	11.3%	24.0%	3.6%	20.3%	
St. Eustache	9.0%	8.8%	10.7%	5.8%	9.0%	18.6%	
St. Benoît	1.5%	1.8%	2.3%	1.9%		1.7%	
St. Gervais	6.5%	1.8%	5.3%	6.7%	2.4%	3.4%	
St. Merri	9.8%	5.3%	8.7%	5.8%	16.8%	3.4%	82.9%
St Innocent – St, Opportune	0.6%	1.8%	0.7%				
St. Germain des Près	2.6%		2.0%	2.9%	6.0%		
St. Josse	0.5%		1.3%	1.0%	0.6%		
St. Nicolas des champs	5.8%	1.8%	6.7%	1.9%	5.4%	6.8%	
St. Pol	6.3%	4.4%	7.0%	7.7%	8.4%		
St. Leu – St Gille	3.0%	1.8%	1.7%	2.9%	1.8%	1.7%	
Ste Geneviève	2.8%	3.5%	4.3%	3.8%	0.6%	3.4%	
St. Hilaire	0.1%			1.0%			
St. Cosme	0.4%		0.3%				
St. Laurent	1.5%		1.3%	1.9%			
St. Séverin	4.6%	14.0%	6.0%	5.8%	1.2%	6.8%	
St. André des arts	1.0%	7.0%	1.3%	1.0%			
St. Sauver	1.6%		0.3%		0.6%	8.5%	
St. Nicolas de Chardonnay	0.5%			1.0%			
Notre Dame des champs	0.4%		0.3%				
St. Marcel	1.6%	0.9%	1.7%	1.9%			

4. Community responsibility system and inequality

The findings reported by Van Zanden (1995) point to a very high measure of inequality during the Renaissance and the early modern period. The Parisian tax rolls extend these findings to a much earlier period. Table 6 provides Gini inequality coefficients for the four Parisan *tailles* analyzed in this paper and two, previously unused, contemporary tax lists from London and more recent data on Florence and Zwolle taken from Van Zanden (1995). The similarity of the statistics reported over such a long period suggests that very high inequality prevailed in European cities for centuries. Pre-industrial urban economies were all characterized by high polarity: few very rich citizens, a small affluent middle class and large masses of relatively poor, but nevertheless taxable, citizens.

Table 6

Comparative inequality measures: 1292-1750

City	Year	Number of hearths	Gini coefficient	Top 1%	Top 5%
Paris	1292	14509	0.75	26	52
Paris	1296	5661	0.61	17	38
Paris	1297	9916	0.69	20	44
Paris	1313	6108	0.79	25	55
London	1292	791	0.70	15	43
London	1319	1600	0.76	34	57
Florence	1427	10000	0.79	27	67
Zwolle	1750	2438	0.67	?	?

The finding of very high inequality in Paris, which at the same time maintained a functioning community responsibility system and communal cohesiveness, may seem puzzling given what we know about other cities in Europe at the time (Grief 2006). One reason may be related to the fact that unlike in independent city states, the elites of princely cities benefitted more from the CRS when dealing with the crown than by appropriating wealth from their poorer citizens. Communal solidarity made it costly for the king to abuse the property rights of the Parisian elites – as the riots of 1382 exemplify.

A complimentary explanation may be found by a closer examination of the inequality measures: was the high inequality as captured by the Gini coefficient the outcome of inequality between social groups or does inequality prevail even within subgroups of the population. Analysis of the data, presented in table 7 shows that any stratification of the tax payers, by place of residence, occupation, skill and capital shows that most of the inequality was within subgroups rather than

between subgroups. Therefore, we do not find evidence for location or occupational segregation. The absence of segregation along residence or occupation suggest that no single parish or occupation would benefit from disassociating itself from the communal responsibility system. Thus the very wealthy lived in neighborhoods that were not homogenous and therefore did not stand to gain from deviating from the commune. The members of occupations – the guilds - were also not homogenous in terms of their wealth or income.

Table 7

Between and within inequality measures

	Residence By Parish	Occupation	Skill*	Capital**
Theil's measure of inequality	1.37	0.87	1.18	0.87
With group inequality	1.26	0.84	1.14	0.84
Between group inequality	0.11	0.03	0.04	0.03

* Skill subgroups: artisans, general education, unskilled
** Capital subgroups: circulating, productive, no capital.

5. Social mobility and the community responsibility system.

Greif (2006) argues that the CRS diminishes when the elites can do better resolving their problems in commercial exchanges with one another rather than by forming stable networks. While it is true that Paris was dominated by a few wealthy families (Bove, 2004), the pooling of the data from the various tax rolls reveals that there was a high degree of mobility within the top percentile of the wealth distribution. Table 8 shows the evolution of the very wealthy. From the 166 wealthiest residents of Paris listed in 1292 only 74 (45%) appeared in subsequent rolls, and only 12 survived the entire period. However, those that survived to 1296 and 1297 were on average wealthier than those that did not survive and were wealthier, on average, than newcomers in 1296 and 1297. Also, the relative standing of the very wealthy changed from 1292 to 1296 and 1297. The Spearman correlation value is low and insignificant which means that there was a lot of wealth mobility in this group of the very rich over the period 1292 – 1296/7. In 1296 over 50% of the very rich were *nouveau riche*, although the new comers had smaller fortunes than incumbents. Moving from 1296 to 1297, the turnover is much smaller – only 25% newcomers. In a year, the ranking among the very rich changed much less than over the four year period from 1292 to 1296. We find a significant, although not very high, Spearman correlation value. Finally, in 1313 the landscape of the elite changed completely – the Italians of course left, but even among the locals, the turnover was high – 80% of the rich were newcomers. To conclude, we can see that the elites (expanding from the 6 or 7 richest families) were very unstable and changed substantially over a generation. This high degree of mobility can also account for the persistence of the CRS system and the particular tax collection mechanism which

built upon it.

Table 8
Transition matrix of the wealthy top percentile, Paris 1292-1313
Average tax and maximum tax payment

Year		Transitions	N	Mean	Max	Spearman correlation
1292	**Total**		166	372	2290	
	One time mention		92	356	1880	
	Repeat mention		74	393	2290	
	Continue to	1296	67	404	2290	0.167
		1297	58	403	2290	0.147
		1313	12	286	480	0
1296	**Total**		148	360	2850	
	One time mention		40	342	770	
	Repeat mention		108	367	2850	
	New comers		76	294	930	
	From	1292	67	413	2290	0.167
	Continue to	1297	96	359	2850	0.369**
		1313	17	256	360	-0.208
1297	**Total**		146	348	1090	
	One time mention		43	370	1090	
	Repeat mention		103	340	1090	
	New comers		38	350	1090	
	From	1292	58	363	960	0.147
		1296	96	343	1090	0.369**
	Continue to	1313	20	267	490	0.388
1313	**Total**		144	535	2308	
	New Comers		120	512	2308	
	From	1292	12	479	1385	0
		1296	17	651	1962	-0.208
		1297	20	625	1962	0.388

Conclusions

In this paper we outlined the mechanism according to which direct taxation took place in the commune of Paris during the commercial revolution. The features of the tax system are consistent with a community responsibility system. According to the theory and qualitative empirical evidence advanced by Greif (2005), the CRS was an institution that facilitated exchange and enhanced the enforcement of property rights, while also contributing to the cohesive action of the community in the face of attempts by the king to infringe on its rights. Quantitative evidence from the Paris tax rolls lends support to this hypothesis – on the one hand they portray Paris as a well integrated and cosmopolitan city – the largest in the medieval West and with the highest relative growth rates. On the other hand, they show that the system of public finance outlined here actually functioned as predicted – the rich carried the burden of the poor and the assessment of taxes was done in an efficient and fair way. The evidence presented shows that the socioeconomic features of the city population may explain why the CRS was able to persist in Paris whereas they have declined elsewhere.

It is tempting to correlate, in a causal way, the remarkable institutional setting with the economic growth we witness. The tax roll may suggest an explanation for the relative decline of the city. The infringement of the crown on the property rights of the Jews, Templers and Italian bankers – who disappear from the tax rolls in 1313 - may have brought about a decline of the city as a financial center and may have thwarted financial intermediation to the detriment of economic growth. Given that the *taille* system was a coercion constraining institution, the crown preferred to infringe on the property rights of those that could not retaliate.

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