Monopsony and Industrial Development in Nineteenth Century Quebec: The Impact of Seigneurial Tenure

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Abstract

We argue that the system of seigneurial tenure used in the province of Quebec until the mid-nineteenth century – a system which allowed significant market power in the establishment of plants, factories and mills, combined with restrictions on the mobility of the labor force within each seigneurial estate – is best understood as a system of regionalized monopsonies in the non-farm sector. Seigneurs had incentives to reduce their employment in those sectors to reduce wage rates. We use the fact that later, with the Constitutional Act of 1791, all new settled lands had to be settled under a different system (British land laws). This fact lends itself efficiently to a regression discontinuity design. Using wages contained in the 1831 census, we find strong evidence that the monopsonist features of seigneurial tenure depressed wages and industrial development.

Keywords: Canadian Economic History, Monopsony, Labor Coercion, Economic Development

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1 Introduction

At the forefront of the recent economics literature is an attempt to explain alternative labor institutions that have existed throughout history and how they contributed to setting development paths. Prominent in this literature are studies of labor arrangements that involved a wide spectrum of coercive measures to compel workers into particular relationships (Alston et al., 2009; Dell, 2010; Acemoglu and Wolitzky, 2011; Bobonis and Morrow, 2014; Naidu, 2010; Naidu and Yuchtman, 2013; Dippel et al., 2015; Buggle and Nafziger, 2017; Gupta and Swamy, 2017; van Waijenburg, 2018; Poyker, 2018). The goal of such arrangements is to confer a greater level of market power to employers in ways that allow them to redistribute income from workers to themselves. Even the lesser "shades of coercion" (Naidu and Yuchtman, 2013, 107) can have significant noxious effects. In this paper, we propose to study the case of seigneurial tenure in the predominantly French-speaking province of Quebec in Canada – an institution which fits into the "lighter" shades of coercion.

Seigneurial tenure was established in the French colony of Quebec in the early seventeenth century. The British, upon conquering the colony in 1760, preserved the institution but froze its boundaries in 1791 and maintained it until 1854. This system of land tenure imposed *de jure* and *de facto* restrictions on mobility (in ways that amplified existing constraints facing households), imposed substantial taxes that did not go toward the production of public goods, imposed taxes on capital asset transfers, and created legal monopolies on the establishment of mills and other activities for the *seigneurs* (the landlords who possessed these estates known as *seigneuries*). While the institution cannot be labelled as "coercive" or as "unfree" (Russell, 2012, 83), its features bestowed a stronger bargaining position for landlords. These features are best understood if seigneurial tenure is presented under a monopsony model. There are two reasons for this proposition. Firstly, by virtue of the *de jure* and *de facto* constraints imposed by the system, mobility was greatly reduced; this is a crucial condition for monopsonies. Secondly, the landlords either had full monopoly (e.g. over flour mills), or had the ability to set up significant entry barriers against other industrial activities in which they themselves engaged (i.e. in activities where they were employers). This increased their market power. As a result, landlords could control wage rates within their estateseven on the non-farm labor market.

Compared with other labor arrangements meant to increase the ability of employers to redistribute income from workers to themselves, Quebec's system of seigneurial tenure appears relatively benign. However, historians and economists who study Canadian economic history have long been going back and forth on the topic of the institution's role in retarding the economic development of Quebec (Jones, 1942, 1946; Phillips, 1974; Altman, 1983; Armstrong, 1984; Altman, 1987; Dépatie et al., 1987; Percy and Szostak, 1992; Altman, 1998; Grenier, 2012; Russell, 2012). Given that Quebec has historically been quite poorer than the rest of Canada, and the rest of North America (Inwood and Irwin, 2002; Altman, 2003; Arsenault Morin et al., 2017; Geloso, 2018), the role of seigneurial

tenure should be considered. Our efforts here are meant to study the impact of a mildly restrictive institution on economic development and to provide a resolution to the debate on seigneurial tenure's role in Canadian economic history.

To test this hypothesis in the Canadian context, we rely on the Constitutional Act of 1791 which lends itself efficiently to a regression discontinuity (henceforth RD) design (Imbens and Lemieux, 2008; Lee and Lemieux, 2010; Dell, 2010; Angrist and Pischke, 2014). Following the conquest of the colony by the British in 1760, the seigneurial system was maintained. However, the Constitutional Act of 1791 froze it to the areas where it had already been conceded. All lands newly settled after 1791 were subject to the rules of British freehold tenure. Within already conceded seigneurial estates, settlement could continue, but moving beyond the boundaries of a concession meant shifting to freehold tenure – a system which possessed none of the features existing under seigneurial tenure. Until 1854, the two legal systems cohabited side-by-side. The boundaries between the two systems are considered as the discontinuity whereby on one side (the British-tenure side) there was a freer and more competitive labor market than on the other (the French-tenure side).

With the use of the wages and wheat prices reported for the different sub-districts of Lower Canada (as Quebec was known then) in the census of 1831, we find an important discontinuity in the form of an increase in nominal wages (wages in monetary terms) and real wages (wages expressed as a ratio of the local price of a bushel of wheat in order to capture purchasing power parities) once the line is crossed into the British-tenure side. This discontinuity is large (between 21% and 47%) and is sufficient to explain the majority of the differences in wages between Quebec and other Canadian colonies. To confirm these results, we also test whether or not there is a similar discontinuity with regards to the demand for non-farm labor as proxied by the numbers of industries relative to population in a given sub-district. This allows us not only to assess the robustness of our results, but also to use the census of 1851 which, although it did not report wages and prices, did report the number of industries in a sub-district. As in the case of wages, there is a discontinuity in industrial activities as soon as the line is crossed.

In Section 2, we review the literature on seigneurial tenure and Quebec's economic history, highlighting our notion of the institution as a monopsony and situating it relative to other restrictive labor institutions that have been subjected to the attention of economists. In Section 3, we outline our empirical strategy of an RD and the datasets we used. Section 4 presents the estimates of the effects of seigneurial tenure on wages in 1831, while Section 5 does the same for industrial activity. Section 6 presents robustness checks using industrial activity data contained in the census of 1851. Section 7 concludes. This paper is accompanied by two appendixes (A and B) which includes validity checks on the data using a wide array of complementary information that could not be included in the paper.

2 Seigneurial Tenure and Economic Development

2.1 The Institution of Seigneurial Tenure

The institution of seigneurial tenure was established in Quebec in the early decades of French colonization. The details of the legal nature of the institutions abound.[1] When they conquered the colony in 1760, the British preserved the institution and in fact co-opted the landlords into the colonial government. However, with the influx of American loyalists following the Revolutionary War (1775-1783), the British adopted the Constitutional Act of 1791. As the new settlers were contemptuous of living under French land tenure, the new constitution froze the boundaries of seigneurial tenure. Any areas conceded prior to 1791 would remain seigneurial and all newly conceded areas would be under freehold tenure. The two institutions co-existed until 1854 when seigneurial tenure was abolished.

Under this system, a landlord (*seigneur*) who obtained or bought an estate (*seigneurie*) had to concede land freely to peasants (*censitaires*). The *censitaires* would have to meet several obligations in order to occupy the land. First, they would pay the *cens et rentes* which were relatively light duties determined by the amount of land held rather than the amount of land actually farmed.[2] Once established, the *censitaire* had a *de jure* obligation not to leave his land. This *de jure* obligation was combined with a *de facto* limitation on his mobility in the form of the *lods et ventes* which was a tax on the mutation of land assets. A *censitaire* had to give his *seigneur* 8.5% of the proceeds of the sale of his land. This tax would have acted as a limitation on mobility. The *censitaire* also had to provide two to three days of work per year in exchange as *corvée* to the *seigneur* or pay a certain amount for each day not worked (at a rate two to three times the average daily wage rate for unskilled workers). Compounded with these burdens were ancillary taxes which depended on a *seigneurie*'s particular features (for example fishing duties or taxes for accessing common pastoral grounds).[3] For his part, the *seigneur* had to provide milling services at the fixed price of one fourteenth of all grains brought to the mill. Additionally, the *seigneur* had monopoly rights over the establishment of mills and access to waterways on which mills could be built. Peasants were not allowed to use grist mills in neighboring *seigneuries*, even if those were physically more accessible to them.[4] Moreover, the *seigneur* had the right to tax everyone on his estate, which acted as a tax on opening plants and factories not operated by the *seigneur* himself. Finally, a *seigneur* was able to reserve to himself the timber within his estate.

[1] Succint descriptions of the system can be found in Altman (1983, 1987, 1998), Coates (2003), Dépatie et al. (1987), Desbarats (1992), Dickinson (1974, 1982), Geloso and Lacombe (2016), Grenier (2007, 2012), Harris (1984), Harris (2009), Munro (1907, 1915), Ouellet (1972) and Percy and Szostak (1992). While there are some finer details of interest, we have only described the broad traits that are relevant to the present paper.

[2] Thus, they should be construed as taxes on capital assets rather than taxes on output.

[3] See the work of Lalancette (1987) for such cases.

[4] The seigneurs aggressively defended this prohibition and their monopoly rights and frequently sued offending parties. Geloso and Lacombe (2016, 184) highlight a few important legal cases in which seigneurs protected their rights. McQuillan (1997, 47) and Pronovost (1998, 158) provide further examples.

2.2 Seigneurial Tenure and Economic Development

In the face of economic theory, it is hard to see how restrictions on mobility, taxes on assets and monopoly rights could have favored economic growth. As Quebec appeared to have been poorer than the rest of Canada when the earliest income estimates are produced (Raynauld, 1961; McInnis, 1992; Egnal, 1996; Inwood and Irwin, 2002),[5] some scholars have tied the institution to this relative poverty (Munro, 1915; Dechêne, 1974; Phillips, 1974; Altman, 1983; Greer, 1985; Altman, 1987; Geloso and Lacombe, 2016) However, this view is not a consensual one. A younger historiography emphasizes that while the institution did not foster growth, its impact was somewhere between minimal and irrelevant (Courville, 1990; Desbarats, 1992; Altman, 1998; Grenier, 2007, 2012; Percy and Szostak, 1992; Russell, 2012).[6] They argue that the causes of Quebec's relative poverty are to be found elsewhere.

The main issue that has caused this divide is the identification of a channel through which the institution hindered growth. Most of the attention has gone to the taxation aspect of the institution. Dechêne (1974) and Harris (1984) point to the fact that taxes imposed by the *seigneurs* constituted somewhere between 10% and 14% of farm incomes. This, it is argued, would have limited the ability to make productivity-enhancing investments and thus reduced both the level and the growth of output per capita. However, it is countered that these estimates are based on hypothetical scenarios and that peasants often "passively" resisted and delayed payments to their seigneurs who also often accepted lower payments (Percy and Szostak, 1992, 53; Coates, 2003, 48; Grenier, 2012). It is also argued that some of the taxes, such as the *cens et rentes*, were equivalent in levels to rents in non-seigneurial areas.[7] This is why some scholars like Percy and Szostak (1992, 56), representing the view dismissive of the institution's role, state that "the negative effects of seigneurial tenure on the economy appear to have been exaggerated." Drawing on the work of Robert Allen (1988; 1992) regarding the effects of enclosures on farming productivity in Britain, Percy and Szostak (1992, 56–57) point out that the disincentive effects that these exactions had cannot be large enough to explain the relative poverty of Quebec. To bolster their claim, they rely on a paper by Lewis and McInnis (1980) showing small differences in total factor productivities in farming across ethnic lines with the census of 1851, which Percy and Szostak assume extend along institutional lines.[8] This allows them to dismiss the disincentive effect.

[5] Egnal (1996) placed incomes per capita in Quebec below those of the poorest states (North Carolina and South Carolina) in the United States in 1851.

[6] Altman features in both camps. In his earlier articles (1983; 1987), he argued that seigneurial tenure implied a regressive redistribution of income which depressed the demand of farm households (which was oriented at local industries) and increased that of richer households (which constituted a smaller base and consumed imported products), which meant that industrial development in Quebec was altered. However, in his later article, he argued that the taxes paid by *censitaires* did not constitute a substantial share of incomes and that they could not explain the relative poverty of seigneurial areas.

[7] A *censitaire* would obtain the land freely and could not be expelled easily. The *cens et rentes* were basically perpetual rents for freely obtaining the land at first.

[8] It is worth pointing out that using slightly different output computing techniques, Altman (1998) found larger differences between ethnic groups but he refuses to ascribe them to institutions.

However, these proposed mechanisms for the institution's role in slowing down development are nearly exclusively focused on farming. While Lower Canada was a predominantly agrarian society, farming was not the sole source of income. The 1831 census inquired about the "number of families earning their subsistence by agricultural employments" and placed that figure at 50,824 families. Given that there were 82,437 households enumerated in the census, this places the agricultural population at slightly above 61% of all households (House of Assembly of Lower Canada, 1832a, unpaginated).[9] This leaves a substantial share of the population earning income by different means.[10] More importantly, farm income was not the sum of all incomes for farm households. Farming tied workers to their farms to some extent, but reliance on markets for other products to complement income was crucial. In their comments concerning the economy of Upper Canada at mid-century, Davis and Engerman (1999, 14) pointed out that in "the absence of a second source of farm income, workers would not have chosen to migrate [to farming] even if, in the long run, farm income would have been more than three times the nonfarm alternative." However, when a second source of income became available, farming became a viable alternative when the "nonfarm income was as high as one half of long-run farm income" (Davis and Engerman, 1999, 14).[11] Complementary income through pluri-activity was thus a crucial determinant of living standards and it would be improper to assume that farming income represented a constant share of total income in all areas of the colony. It follows that there must have been risks in relying solely on agricultural income.

2.3 Seigneurial Tenure as Monopsony

There are reasons to believe that the taxation aspect of the institution is not the most important one and that farming productivity should not be the object of so much attention. Three features are more important than the taxes that *seigneurs* exacted. The first relates to mobility. Once settled, there was a *de jure* restriction against the abandonment of their farms by *censitaires*. They had to sell their farms in order to relocate which meant that there was a need to find a buyer with sufficient capital to acquire the farm - a daunting proposition in a world of imperfect capital markets (i.e. one has to rely largely on his savings to make investments) (Lewis, 2001). As the proceeds of any sale were taxed under the *lods et ventes* (at one twelfth of the value), these elements suggest important *de facto*

[9] A working paper by the Programme de Recherche en Démographie Historique (PRDH) at the University of Montreal, which compiled the microdata of the entire 1831 census, found that, for the districts with surviving rolls, 56% of known occupations by household heads were categorized as farmers (49.6% when including the ambiguous [1.9%] and unknown [11.8%]) (Programme de Recherche en Démographie Historique, 2018, 59).

[10] While the proportion may seem low, it is not far out of line with the estimate of the population living in villages and cities. At the end of the eighteenth century and especially after 1815, villages began to appear throughout the colony (Courville, 1990, 34) such that the urban population increased from 17.01% to 23.63% (Courville, 1990, 95) between 1815 and 1851.

[11] Marr and Paterson (1980), in their economic history of Canada, also allude to this crucial point. Serge Courville (2008, 148) also highlights the economic relevance of pluri-activity.

restrictions on mobility reinforcing the *de jure* prohibition.[12] In combination with these restrictions were the obligations to provide days of work for free to the *seigneur* - a duty known as the *corvée*. The *corvée* was a right that the *seigneurs* did not use in the early days of the colony. However, in the early 19th century, they began to make greater use of it. It was frequently used to help maintain the roads within a *seigneurie* (Ouellet, 1980b, 329) or work for some of the *seigneur*'s enterprises. The *censitaire* could avoid the duty if he paid his *seigneur*. Initially, that payment was around twice the daily wage rate. However, by the early 19th century, the payment to be made was more three times the daily wage rate.[13] In addition to the mandatory *corvée*, the *seigneurs* also sometimes requested that payments for arrears on their other duties (the *cens et rentes* etc.) be made in kind by providing labour (Shulze, 1984, 142). As such, there was a certain amount of direct coercion (the *corvée* and via the payment of the duties set by the *seigneur*) and indirect coercion (the restriction of mobility).

The second relates to entry in the market for non-farm products which landlords could control. If an entrepreneur wanted to open any factory on a *seigneur*'s estate, he had to pay taxes such as the *cens et rentes* which, although it would not alter marginal costs,[14] could affect the decision to enter the industry. The *lods et ventes* also applied if the hypothetical entrepreneur opted to sell his business which constituted a tax on capital investment. However, if a *seigneur* chose to operate his own factory, he did not have to pay these taxes. This meant that *seigneurs* could impose barriers to entry to competitors.[15] We must also include the activities over which the *seigneur* had a legally consecrated monopoly such as the milling of flour. The role of the *lods et ventes* as a deterrent to industry is often mentioned in the literature (Courville, 1987, 242–43) and would have been especially burdensome in urban areas where the *cens et rentes* and *lods et ventes* were known to be substantially higher (Courville, 2008, 132–133).[16]

The third, and most important, reason is that the *seigneurs* held a monopoly right to the timber within their estates (Ouellet, 1980a, 345; Bernier and Salée, 1995, 89–93; Courville, 2008, 132–133). Fueled by foreign demand (Lower, 1973; Sager and Panting,

[12]The *de facto* restraint was made stronger by the fact that a *seigneur* could seize the proceeds of the sale of a farm by arguing that the *censitaire* lied about the price. As Bernier and Salée (1995, 93) point out, the *seigneurs* often made use of this right. This would have added uncertainty for *censitaires* which would ultimately have reduced mobility.

[13]The wages we collected here suggest an average daily wage rate of 1.90 shillings for the whole sample and 1.77 shillings for the seigneurial areas. In her work, (Noël, 1992, 44) points to a fine of 5 shillings per day.

[14]The *cens et rentes*, as a tax determined by land holdings, is a tax that is constant regardless of production. Only fixed costs are affected.

[15] Courville (1993, 93) put it best when he stated that *seigneurs* "imposed on those who were not *seigneurs* restrictions which tended to limit their profits or force them to buy a seigneury or to join in partnership with *seigneurs*". Some *seigneurs* did so in roundabout ways. Edward Ellice, the *seigneur* of Beauharnois managed, in 1833, to commute his estate to freehold tenure. However, Ellice commuted only the areas that he had not yet conceded and which had yet to be settled. All lands already settled remained under seigneurial tenure. As the French tenure system prevented a *seigneur* from selling portions of his land, the partial commutation allowed Ellice to sell entry rights into the timber market. Ellice also operated his own saw mills in the region. (LaRose, 1988, 2013).

[16]This is consistent with economic theory as well. Urban areas are more productive and thus, the rent to be extracted by the *seigneur* would have been greater - see also the work of (Courville, 1990, 43-44).

1990) and helped technological innovation (Pronovost, 1998, 167–182), the timber and potash industries of Canada became important growth sectors.[17] The different *seigneurs* became heavily involved in these trades opening saw mills, potash and pearl ash factories (Courville, 1990, 2008).[18] The *seigneurs* attempted to reserve to themselves the right to the wood within their estates, even the portions that were part of concessions to *censitaires* (Ouellet, 1980a, 345). Very active in the timber market, notably through the operation of saw mills and potash factories (Pronovost, 1998, 167–182) which constituted the largest non-farm industries in the colony, the legal right of reserve of *seigneurs* on the timber within their estate gave them the ability to prevent competition to a large extent (Noël, 1987, 577). In some *seigneuries*, such as those owned by Gabriel Christie, the seigneur reserved himself the exclusive right to transport timber out of the estate, which forced the *censitaires* to bring the trees they felled to the seigneurial saw mills (Noël, 1987, 577). In some places, the *seigneurs* argued that the monopoly right they possessed on flour mills extended to saw mills and other types of activities (Ouellet, 1980b, 471).[19]

This combination of factors gave the *seigneurs* a certain level of control over labor demand for non-farm labor. More precisely, they had strong market power over demand for labor in the non-farm sectors on their estates. They would thus have determined wage levels by determining the quantity of labor they wanted to employ. Tied to their farms, workers seeking to complement their income in the non-farm industries could hardly move far away. If workers wanted to relocate to more auspicious areas, the costs were considerable, either through punishment for abandonment or taxation of sale proceeds through the *lods et ventes*. The ability of the *seigneur* to set entry barriers in the non-farm labor market and monopolize certain sectors of activities allowed him to extract the benefits of reducing the mobility of his *censitaires*. This is a straightforward fit to the standard labor market monopsony model (Manning, 2003; Barr and Roy, 2008; Blair and Harrison, 2010). As such, the effects of seigneurial tenure would have influenced the labor market for non-farm labor. Although, like Russell (2012, 83), we believe that it would be

[17] Timber requires little explanation: the sector grew largely as a result of the demand from shipbuilders, construction firms and urban markets (see footnote 10). However, the latter group of products requires some explanations. Potash and pearl ash, which come from wood ashes, served largely for bleaching cloth, the making of soap and the manufacturing of glass. Until the late eighteenth century, Britain (the main export market for Quebec) had tended to rely on Spanish imports and Scottish production for its supply. This was also known to be of greater quality than that of Quebec. However, a technological breakthrough in the manufacturing of potash and pearl ash made the issue of quality moot and the cheaper potash from Quebec became an important competitor (Pronovost, 1998, 167).

[18] Courville states that for "the *seigneur* who wished to make his seigneury profitable", the "most usual and lucrative avenue was the timber industry and the saw mills, around which would emerge other kinds of industries (fulling or carding mills, tanning, breweries, distilleries, glassworks, soap or nail factories etc. created by the *seigneur himself*, the *seigneur* and a partner, or a merchant to whom the *seigneur* conceded a right to water power)" (1993, 51). Pronovost (1998, 159) adds that whatever non-seigneurial entrepreneurs could be found existed as "tributaries of the good will" of the seigneurs.

[19] The *seigneur* was able to restrict entry in other ways, notably by his ability to reserve to himself waterway improvements (Gilles, 2010, 934). Rights to the waterways were not "always legal" (Courville, 1993, 49) but they did help secure a seigneur's sawmills (Pronovost, 1998, 158). Another method of restraining competition was that the *seigneur* possessed the right to seize, without compensation, six *arpents* (5.07 acres) for the construction of a mill operated by himself. This allowed him to reserve the best spots (Bernier and Salée, 1995, 92).

inaccurate to label these features as "unfree," they fit within the literature on "coerced labor" since the goal was clearly to allow the seigneur a greater level of market power which redistributed incomes from the worker to himself. In addition, the population of Quebec grew at a very brisk pace, and claims that seigneurial estates were overcrowded are often made (Ouellet, 1980b).On top of the restrictions on mobility, a rapidly increasing supply of labor would also have redounded to the seigneur's advantage.[20] The greater the population growth, the greater the ability to depress wages.[21]

3 Empirical Strategy and Data

There is a way to operationalize the notion of seigneurial tenure as a monopsony. In 1791, the British government - after the waves of American loyalists hostile to French seigneurial tenure arrived in Canada – adopted the Constitutional Act of 1791. This act froze the boundaries of seigneurial tenures: all new settlements would have to operate under British freehold tenure, while all lands conceded pre1791 would remain under seigneurial tenure. By 1854, the two institutional regimes had co-existed for more than six decades.[22] In the years soon after the passage of the Act, there were few settlements under different tenure systems which neighbored each other. However, by the 1830s the pace of settlement had increased the population of areas under freehold tenure (henceforth townships) and the backcountry of the seigneuries, which had been more or less uninhabited in 1791, started to fill up. As such, there were large numbers of institutionally-different neighbors in close proximity to one another. In addition, while the initial wave of settlement in townships had exclusively been made by English-speakers, they had started to become ethnically mixed by the time of the census of 1831, and even more so by the censuses of 1844 and 1851. Within those institutional-border areas, both ethnic groups were observing each other and could learn from each other. Finally, they were located in areas of roughly similar land quality and settled at roughly the same time.

For this set of reasons, the boundary imposed by the Constitutional Act of 1791 offers a

[20]Moreover, Bernier and Salée (1995, 91 point out that during the 1820s and 1830s, *censitaires* complained that *seigneurs* increased the burden of the duties at the pace of population growth. If this is correct (there is limited systematic evidence of the evolution of the wide range of duties which existed, but the literature agrees that it went up in real terms), then the barriers to entry that *seigneurs* erected were getting higher.

[21]It is also worth noting that the *seigneurs* were a tightly knit group (Grenier, 2007) through their longstanding association with the British colonial rulers after 1760 (Bernier and Salée, 1995), and many of them were members of the colony's executive council which was the equivalent of a ministerial cabinet supporting the colonial governors. This allowed them to coordinate efforts in order to preserve the institution. Percy and Szostak (1992) argue that such coordination was at play during the final abolition of the system in 1854.

[22]In the intervening period, there existed the option to engage in voluntary commutation to shift from seigneurial tenure to freehold tenure. Some requests were presented to the colonial legislative assembly, but they were partial requests. The requests affected less than 10% of the seigneuries. Those who petitioned merely wanted to convert some portions of their estate into freehold tenure so they could sell the plots of land for timber exploitation. Under seigneurial tenure, an estate could not be portioned (Bernier and Salée, 1995, 84). Voluntary commutation, made available after 1825, was never widespread (Percy and Szostak, 1992).

setting suitable for an RD.[23] In figure 1 below, we show what the institutional layout looked like at the time of the 1831 census. Every area contained in the census of 1831 is marked by its centroid point. Figure 2 does the same for the 1851 census. As can be seen, there are large numbers of areas located on the borders. The validity of an RD requires that there be a treatment line which divides the sample between the treated and the untreated. In the present instance, the demarcation line set by the Constitutional Act of 1791 constitutes the treatment line. The distance to the line is then used to distinguish areas according to their proximity to the treatment. If there is to be an effect of seigneurial tenure, it should manifest itself at the demarcation line with a substantial discontinuity in favor of non-seigneurial areas having higher wages and more industrial development. This possibility is given credence by the fact that contemporary observers recognized that there existed significant wage differences as soon as one changed institutional regime. For example, it was noticed that wages in Lower Canada tended to be below those in Upper Canada "except in the Eastern Townships [settled under freehold tenure] (Montgomery Martin, 1836, 331), something which is echoed in Parliamentary papers (House of Commons, 1842, 229). Modern scholars also note the same when they indicate that there were more flour mills of greater quality in the areas under freehold tenure (Deschênes, 2009, 148), and that industrial activity beyond grain milling – in spite of being far removed from the port cities of Montreal and Quebec – was more intense than in seigneurial areas (Harris, 2009, 275).

[Figure 1 here]
[Figure 2 here]

The data needed to operationalize an RD design are found in the censuses of 1831 and 1851. The latter census has generally been used by historians and economists studying the economy of Quebec during the nineteenth century, largely because it offers rich data regarding acreage by types of crop and the volume harvested (Lewis and McInnis, 1980, 1984; Little, 1986; Altman, 1998). For its part, the census of 1831 was long the object of scorn by historians (Dechêne, 1986, 189–90) mainly because it did not offer equally rich agricultural data. However, a number of historians and economists have in recent years rehabilitated the census of 1831 by documenting its flaws (and the remedies) and its strengths (Courville, 1990; Courville et al., 1995; Courville, 2008; Geloso et al., 2017). One of the notable strengths is that the enumerators were asked to report the local prices of wheat[24], the local daily wage rates for farm hands and the local monthly wage rate

[23] In any case, an OLS approach would be problematic because the areas under seigneurial tenure were settled first because they offered the best access to markets, the best soils and, by the time of the 1831 census, would have been the longest settled. The areas deepest inside the non-seigneurial zone possessed poorer soils, poorer access to markets and were lightly populated. This is why we prefer a stronger method to arrive at a causal statement.

[24] Geloso et al. (2017, 173–175) were able to use the local prices of wheat to create regional price baskets to measure the actual farmgate value of farm output (in order to measure total factor productivity) at a time when local markets were not perfectly integrated and prices differed heavily across the colony. However, the prices weights used were at the level of "counties". The colony was divided into four large districts (Quebec, Trois-Rivières, Montréal and Gaspésie). Each district contained certain counties (which

for servants. As such, the census provides us with a cross-section of wages that can be geo-coded and used for a spatial RD. More importantly, the local prices for wheat permit the computation of "grain wages" which, by dividing the wage rate by the price of a unit of wheat, provides us with an adjustment for purchasing power parities in an economy that was not fully integrated.[25] Accordingly, we can test whether or not there was a jump in wages at the boundary between the two institutions. Unfortunately, only the census of 1831 provides wage rates.[26] The census of 1851, while it is rich in agricultural data, does not provide local prices either. However, both censuses provide us with a complementary piece of information suited for an RD design: industrial activities (Courville et al., 1991). The enumerators were asked to report the number of mills, plants and factories of different types in each sub-district. The enumerators were asked to report the number of mills, plants and factories of different types in each sub-district. As explained above, the *seigneur* could control entry into industrial activities (either through claiming legal monopoly, or through the erection of barriers to potential competitors). As such, if seigneurial tenure were to have an effect as a monopsony, the level of demand (as proxied by industrial activities relative to population) should be, all else being equal, inferior in seigneurial areas. That the *seigneurs* who were in close proximity to townships, where such barriers to entry and monopolies did not exists, were those who felt most threatened by competition (Noël, 1987, 577) supports this idea. We can therefore use the industrial activities per capita as a proxy for non-farm labor demand. If a monopsony effect exists, one should find a discontinuity at the demarcation line with industrial activities per capita jumping on the non-seigneurial side.

Moreover, an RD design allows us to circumvent a frequently made claim that the French-Canadians exhibited a lesser economic rationality than the English-Canadians. That claim, which has been promoted in different forms by Fernand Ouellet (1966; 1972; 1980b) and Gérard Bouchard (1996), is largely the fruit of sociologists and historians who shun economic theory and econometrics. However, cliometric research has thrown cold water on this theory by showing, with and without the use of econometrics, that there was no evidence of cultural differences in farming efficiency (Lewis and McInnis, 1980; McInnis, 1982; Lewis and McInnis, 1984; Armstrong, 1984; Altman, 1998; Geloso et al.,

more or less matched the electoral counties for the legislative assembly). The counties were then divided in local sub-districts (parishes, villages, townships and Indian missions). It is wages and prices at the latter level that we will use in this paper.

[25] As we document in the appendix to this paper, prices for wheat were less aligned at the level of the whole colony (as proxied by the coefficient of variation). However, when we move down to the larger districts (the counties contained in the Montréal district, Trois-Rivières district and Quebec district), the price differences are smaller. We believe this highlights the value of not using only the nominal wage rates.

[26] The census of 1842 also provides wage rates, but most of that census was lost and it was never fully completed (Curtis, 2002, 55), largely because the legislature failed to appropriate the proper funds for its operations (Curtis, 2002, 55–56). Only some districts were surveyed. It was retaken in 1844. Some of the rolls of the 1842 census survived, but only the aggregate county-level of 1844 census survives. However, the 1842 census is not without value. Olson and Thornton (2002, 339) argue that it can be used in "highly controlled exercises." In appendix A, we show that the 1842 census data, which contains prices and wage rates, can be used to broadly confirm the existence of differences across institutional lines and thus, these are not a fluke of the 1831 census.

2017). Nevertheless, at the border between both regimes, households of different ethnic groups would have been able to observe each other and pick up the best practices to improve efficiency. As such, the RD would capture the effect of the institution between neighbors who observed each other. Secondly, and even more rhetorically important, the historians who ascribe irrationality to the French-Canadians farmers do not ascribe that behavior to the seigneurs, whom they do describe as economically rational in the sense that they had "capitalist mentalities" (Ouellet, 1966, 1972; Young, 1986; Courville, 1990, 1993; Bernier and Salée, 1995; Courville, 2008). Thus, the institutional settings would have led them to propose the economically rational course of action (i.e. lowering wages and employment), because of the monopsonist features of seigneurial tenure. This circumvents the cultural argument. Finally, another advantage of this design with the 1831 census is that by 1831, there had been migration of French-Canadians to non-seigneurial areas on the border between the seigneurial and non-seigneurial system (Ouellet, 1980b). By 1851, when we do our robustness check, there had more migration of French-Canadians to the bordering non-seigneurial counties so that there is no extreme cultural break (in the form of *de facto* ethno-linguistic segregation) at the border that coincides with the institutional change.

Additionally, the work of Geloso et al. (2017) provides us with a rich set of control variables that include growing season, land quality, number of recent immigrants to Lower Canada, postal zones (determined by postal fees according to mileage) and distance to the closest urban center (as a proxy for market development). Tables 1 and 2 below provide the descriptive statistics from the data harnessed with the 1831 census for the whole sample and the two institutional sub-samples separated. Appendixes A and B provide more details about the censuses.1[27]

[Table 1 here]
[Table 2 here]
[Table 3 here]

The key assumption behind an RD design is that the relevant control variables do not change at the boundary, otherwise the quality of the treatment is lessened (Dell 2010). So there is a need for all relevant factors to vary smoothly independent of the treatment line. Given the history of settlement in the colony, we believe that this is not an issue. The areas that were first settled were along the banks of the Saint-Lawrence River where the land is fertile and in proximity to the port cities which indicates an easy access to markets. From these bases, settlement proceeded further inland where land quality is inferior and market access is more limited. As the demarcation line of 1791 was placed where the pace of concessions stood at that time, and that colonization continued after this according to the same pattern, we should not expect the control variables to suddenly change at

[27]In the appendix to the 1831 census, we also provide comparisons with other wage sources to test the proximate quality of the 1831 census data.

the demarcation line. Other control variables such as post offices and distance also vary smoothly (see Appendix A).

4 Results: Wages in 1831

The institutional setup allows us to make a few testable predictions. First, as discussed in Section 2, we expect both wages and industrial activity to be lower on average in regions under seigneurial land tenure. More importantly, we expect the effect on daily wages to be inferior to those on monthly wages. This is because the daily wage rate would capture only one margin of the effect of a monopsony power by the *seigneurs*. Indeed, it would only capture the wage effect. The monthly wage, because it embeds the rate and the labor supplied in a month, will capture at least a part of the change in the quantity of labor contractedthus getting us closer to the total income effect. Second, we expect the effect on wages and industrial activity to be stronger for regions deep within the seigneurial tenure zone. This is because laborers in regions under seigneurial tenure who lived close to a district were likely to face a lower cost to either travel to, or move to, the region under freehold tenure, assuming that the rules of seigneurial tenure could not be perfectly enforced. If this effect is indeed present in the data, districts with freehold tenure that had neighbors under seigneurial tenure might also have faced lower wages than districts with freehold tenure surrounded by other districts under freehold tenure. We will test these predictions in this section for wages in 1831 and in Sections 5 and 6 for industrial activity in 1831 and 1851, respectively.

For all the measures used, wages are higher in townships (the non-seigneurial areas) than they are in *seigneuries*. The effect on daily wages is weaker than the effect on monthly wages, though this effect is mostly driven by districts with a small population. Results are similar for nominal wages, or grain wages. The larger effect on monthly wages is also consistent with the theoretical argument that we assembled. Indeed, the monthly wages probably capture the effect on total income because, unlike daily wages, they capture the effect of the monopsony model on the quantity of work provided. Graphically, figure 3 provides a representation of wages for all districts within 50 km of the boundary with second-degree polynomial estimates. Negative values on the x-axis indicate regions under seigneurial tenure with the value on the x-axis being the distance from the boundary between freehold and seigneurial districts. Figure 4 provides the same results with a sample restricted to areas whose population exceeded 500. In Appendix C, we also provide the same results using a linear fit and show that the discontinuity remains.

[Figure 3 here]
[Figure 4 here]
[Table 4 here]

Tables 4 presents the quadratic fits generated. Wages in townships are 21% to 47%

higher on average than they are in districts under seigneurial tenure.[28]For all measures, we observe a discontinuity around the border with the wage being lower for sub-districts under seigneurial tenure. The patterns for monthly wages are consistent with the predictions discussed earlier in this section: wages are at their lowest for regions deep into seigneurial tenure, and at their highest for regions deep into freehold tenure. And they increase monotonically. For daily wages, we do not have monotonicity, but the wages are still notably higher in regions under freehold tenure, and the polynomial estimates are lower at the highest point in the seigneurial region than they are at the lowest point in the freehold tenure region. Table 5 presents results from a regression of wages on an indicator variable for freehold tenure and controls. Our controls include access to the postal network (a proxy for communication), distance to urban markets, recent immigration and measures of land quality (the Canada Land Inventory survey as produced by Agriculture and Agri-Food Canada [1998] and the length of the growing season as measured by Centre de Référence en Agriculture et Agroalimentaire du Québec [2012]).[29] While we used two measures of land quality as a robustness check, we report here the results based on the length of the growing season which is arguably more exogenous than the land quality categories.[30] Table 6 presents the sample restricted to areas with more than 500 inhabitants, The effect of freehold tenure is positive and significant at the 5% level for all four wage measures. This effect is consistently around 30% of the average wage for all measures. When significant, all controls have the expected sign. As such, the effect on wages appear robust regardless of the design we use.

[Table 5 here]
[Table 6 here]

5 Results: Industrial Activity in 1831

Results for industrial activity in 1831 are also consistent with our theory. As contemporary and historical sources highlighted, the seigneurs were eager to use their ability to set up entry barriers to competitors whom, especially when in close proximity to non-seigneurial tenures, they feared would erode their rents. These sources also highlighted that the seigneurs were particularly eager to restrict entry to the timber trade, suggesting that there is a need to break down industries into certain categories. As the census of 1831 asked questions regarding a very large number of industries (inns, taverns, grist mills,

[28]In appendix A (see "Wages and Prices in the Census"), we also provide tables of results with a different data-entry rule with regards to wages and prices. The results are unchanged in their direction and the amplitudes vary from 13% to 39%. In appendix C, we generated the equivalent of table 4 with a linear fit instead (see table 20). The results are similar and range from 18% to 39%.

[29]The control variables are described in appendixes A and B.

[30]Soil quality is measured during the 20th century by which point past soil uses will have affected quality. We thank Kris Inwood for making us aware of this issue. The results with the land quality survey (where we used the top three classes as a share of all land in the area) are reported in appendix C.

saw mills, oil mills, fulling mills, carding mills, iron plants, iron foundries, distilleries, pearl ash potash factories, and all others), it would be proper to attempt to distinguish by groupings of similar industries. For example, iron plants and foundries were few in number and were established in long-settled districts (the oldest factory dated to the early eighteenth century). These industries also required heavy investments to start with, so much so that barriers to entry imposed by seigneurial tenure would have minimal by comparison. More importantly, industries such as iron manufacturing and oil mills would have required a relatively skilled workforce, and the wage rates we use here do not speak to that workforce. As such, we believe it necessary to create different levels of aggregation of industrial activities: one that we label "broad" (saw mills, carding mills, fulling mills, potash pearl ash factories), and one that we label "core" (saw mills and potash pearl ash). The definitions speak to light industries that would have been easy to enter into, meaning that the barriers imposed by seigneurs would have been important factors in industrial activity levels. They are also industries that could have hired unskilled workers seamlessly, and thus they are those that are most, practically-speaking, in line with the wage rates we use in this paper. In Table 7 below, the definitions are presented. We also highlight the definitions that will be used with the 1851 (see section 6). Most important, these industries were the most important of the colony (in raw numbers) The number of industries is expressed per 1,000 inhabitants in a sub-district.

[Table 7 here]

Given what the historiography discusses, we expect the effect to grow stronger as we move towards the core definition that relies only on the timber industry. This is where, given the rising demand for Canadian timber products in Britain (the main market for these products) (Lower, 1973; Vallières and Desloges, 2008), we expect the seigneurs to have expended most of their efforts to raise entry barriers and protect their rent-extraction. Figure 5 shows, using a quadratic fit, the discontinuity that emerges once the demarcation is crossed. As in the previous section, there are discontinuities for every measure used. Regions under freehold tenure have a higher number of industries per 1000 residents than regions under seigneurial tenure. The local polynomial estimates are monotonically increasing between -50 (50 km inside the boundary) and 20 (20 km outside the boundary) for every measure used. They increase monotonically everywhere for both definitions of industrial activity (core and broad). In the top panel of table 8, we shows the descriptive differences and large discontinuities can be observed. In table 8, we only report the differences for areas with a population of 500 or above. However, even without the population restriction the discontinuity remains (not shown, results available on demand). The choice of fit also does not affect the results: in C we show the same results with a linear fit instead of a quadratic fit.

The results for areas with more 500 inhabitants are pretty large (in the low 70%), which appears well beyond what the literature suggests. This is because one important

township, that of Hemmingford in the county of Beauharnois (highlighted), is an outlier in the sense that a sizable number of potash factories were located there.[31] While this could affect the results, its exclusion as an outlier does not alter the direction of the results (see bottom panel of table 8) even if the range of effects now falls in the range between 30% and 36% (which appears more in line with the statements made by historians).[32]

In table 9, we also provide the same regressions we ran in the previous sections (and we also report only the results with the length of the growing season as our measure of land quality, the results with the land survey are reported in appendix C). The effect is positive and significant at the 5% level for all industrial measures when the sample is restrained to areas with a population of 500 and above (columns 5 through 8). Columns 7 and 8 show the effects of removing the Hemmingford outlier. Without population restrictions (columns 1 through 4 where columns 3 and 4 are without the Hemmingford observation), there are no statistically effects of being non-seigneurial when running the regression with a quadratic fit. However, in appendix C, we report that same regression with the linear fit instead of the quadratic fit yields statistically significant results. To place the results in proprotions for areas with more than 500 inhabitants, the numbers we find imply that non-seigneurial areas have almost twice as many industries per 1000 residents than the average region under seigneurial tenure. As we highlight in Appendix A (see "Industrial Activities"), this is a conservative assessment as it neglects differences in the "quality" of industrial activity which historians acknowledge was superior in freehold areas (see notably Deschênes [2009, 148] for an example).

[Figure 5 here]
[Table 8 here]
[Table 9 here]

6 Results: Industrial Activity in 1851

In Appendix A we highlight that the census of 1831, previously an object of scorn, was rehabilitated in the 1990s by the efforts of a series of scholars. In view of this, one potential reply to the results in our last two sections would be to assert that the dataset is driving the results by its flaws. One additional reply is that 1831 appears to have been a particularly good year with regards to economic activity (see notably Ouellet 1966). Unfortunately, no other census provides us with as wide an array of wages and prices as the census of 1831. However, the census of 1851 (see Appendix B to this paper) does provide researchers

[31] This is not a fluke of data entry by the census compilers, the area was known for this. As the maps provided by (Filion et al., 2000, 132) make clear, the sub-districts just at the border of the seigneurial in the county of Beauharbois (Godmanchester, Hichinbrooke, Dundee, Hemmingford) all had large numbers of potash factories, pearl ash factories and saw mills - especially when compared with the neighboring districts.

[32] In appendix C, we show that this holds regardless of whether we use the linear fit or if we use land quality as a control variable instead of the more exogenous length of the growing season.

with information regarding industrial activity in Lower Canada so that we may recreate the same design as in Section 5 of this paper, but twenty years after the 1831 census. This generates a robustness check on the validity of our results. One advantage of using the 1851 census as a robustness check is that in the intervening period, the number of subdistricts increased significantly so as to generate a near-doubling of the sample size (460 usable sub-districts as opposed to 259 usable sub-districts). The downside is that there are some minor alterations in the industries considered, notably that potash and pearl ash factories were not surveyed in the 1851 census (see "Industrial Activities" in Appendix B). The descriptive statistics for all areas in 1851 are presented below.

[Table 10 here]

Nevertheless, as can be seen from figure 6, the same graphical patterns appears as in figures 3, 4, and 5: a monotonically increasing effect as we move towards the demarcation border and as we move further into the non-seigneurial zone. Tables 11 12 show the descriptive differences and the regression fit (both with a second order polynomial embedded). These tables are lighter than those for 1831 because there are no extreme outliers such as Hemmingford. In 1831, no areas exceeded more than 15 industries per 1,000 inhabitants with the exception of Hemmingford (which stood at nearly 30). In 1851, no areas exceeded 15 per 1,000. The results are also very similar. Even if the crucial component of potash and pearl ash factories (a key industry) are absent in 1851, there is a statistically significant effect of being a township for the regression with a second order polynomial with no population restrictions. With a linear fit, which can be seen in appendix C, the statistically significant effect is found in all settings. This reassures us as to the quality of our results.

[Figure 6 here]
[Table 8 here]
[Table 9 here]

7 Conclusion

Seigneurial tenure in Quebec was not the most coercive of institutions. It did not generate an "unfree" labour market (Russell, 2012, 83). It was not serfdom, nor was it anywhere close to the systems that existed in Latin America (Dell, 2010), let alone the plantation systems of the Caribbean (Dippel et al., 2015). Yet, it was not a free labour market either. Its features were subtle enough to allow *seigneurs* a level of monopsony power that allowed them to extract rents. These features were the combination of the abilities to restrict mobility and to erect entry barriers in non-agricultural sectors of activity in which they were involved so as to reduce wage rates and labor employed. Using the particularities of the Constitutional Act of 1791, which froze the boundaries of the institution and allowed British freehold tenure to emerge alongside seigneurial tenure, we were able to employ an

RD approach to assess the causal effects of the institution. The amplitude of the difference in wage rate is not negligible. As we indicated, the quadratic results shown above suggest that wages were inferior by between 21% and 47%. Given the wage differences highlighted by Geloso and Macera (2018) between Ontario, and Quebec circa 1830, this effect is enough to wipe out between a fourth and a half of the gap between Quebec and Ontario with respect to grain-wages, and enough to boost Quebec ahead of some American regions for which we have wage data (such as Vermont and Maryland). Given the income differences reported by McInnis (1992), this is enough to equalize incomes in Quebec with those in Ontario which would bring Quebec in line with the rest of North America. This lighter shade of coercive institution did have a non-negligible effect in terms of living standards. Our robustness check based on the industrial activity headings of the censuses of 1831 and 1851 reinforces our confidence in our assessment of the role of the institution.

Our results also help solve a puzzle in Canadian economic history. In the past, most of the attention regarding seigneurial tenures effects went to the topic of farming efficiency (Percy and Szostak, 1992; Russell, 2012). When small (to nonexistent) effects on farming efficiency were found, many were left perplexed given the insistence of *seigneurs* on the preservation of the institution, or on generous compensation if abolished. Farming efficiency margin was the wrong margin to consider in terms of explaining the reasons why *seigneurs* resisted the abolition of the institution for so long.

Given the rich demographic and census evidence that exists for Canada from the seventeenth to the nineteenth centuries, there is room in the future to consider the many adverse channels that even this modestly coercive institution could have caused. One obvious course of action open to scholars would be to use the same methodology as ours, but for farming efficiency. Other courses of actions could involve testing the effect of the institution on human capital formation, since a monopsonist would also have depressed the returns on investing in this form of capital Barr and Roy (2008). Answers to these questions could also help move forward some discussions regarding divergence within the Americas as Quebec was roughly as poor as Latin America in the era (Abad et al., 2012; Allen et al., 2012; Engerman and Sokoloff, 2012; Arsenault Morin et al., 2017; Geloso, 2018). Regardless of the course of future research, it seems that even the mild forms of coerced labor may have appreciable effects on living standards.

FIGURES AND TABLES

Figure 1: Map of Lower Canada with Institutional Demarcation Line, 1831

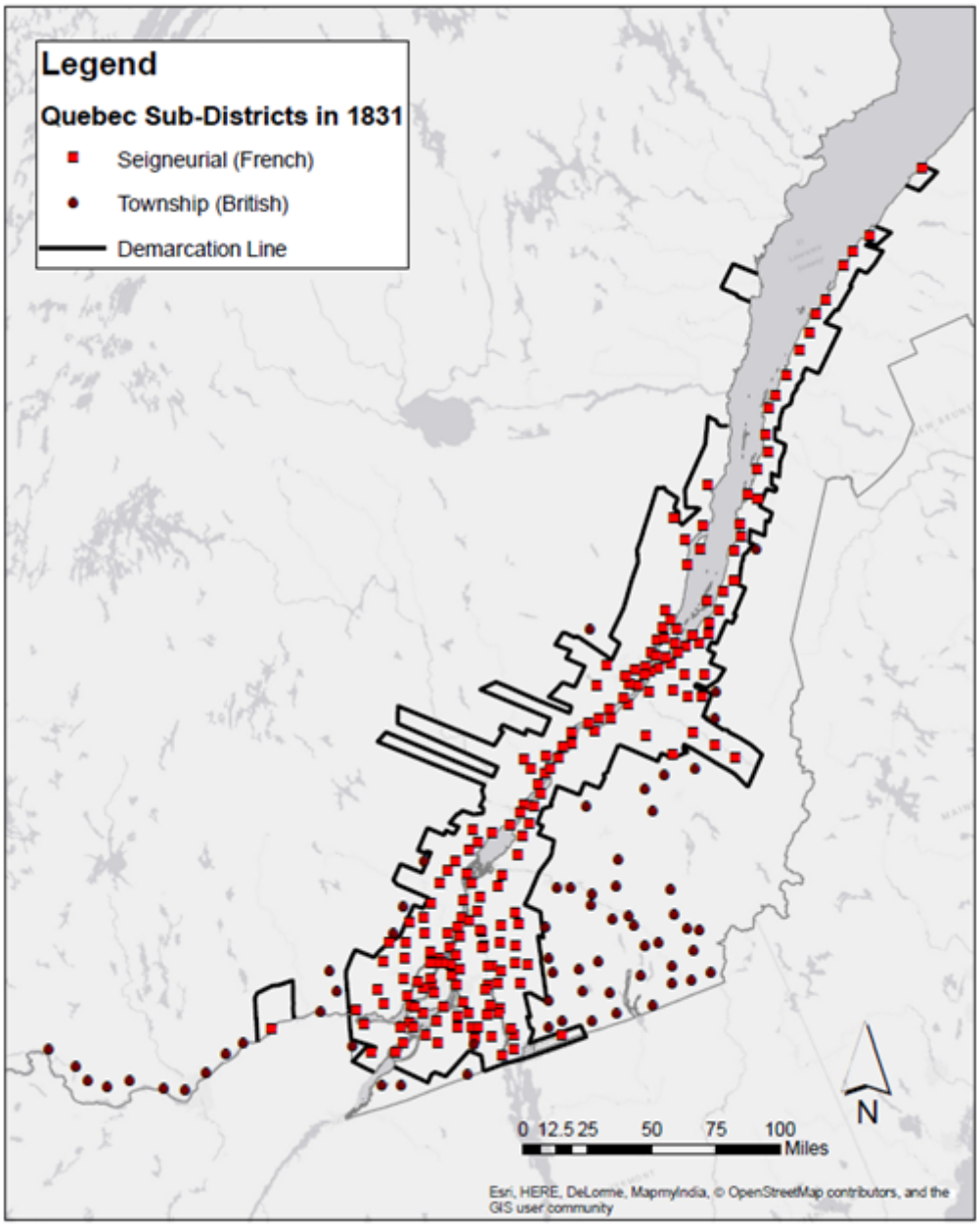

Figure 2: Map of Lower Canada with Institutional Demarcation Line, 1851

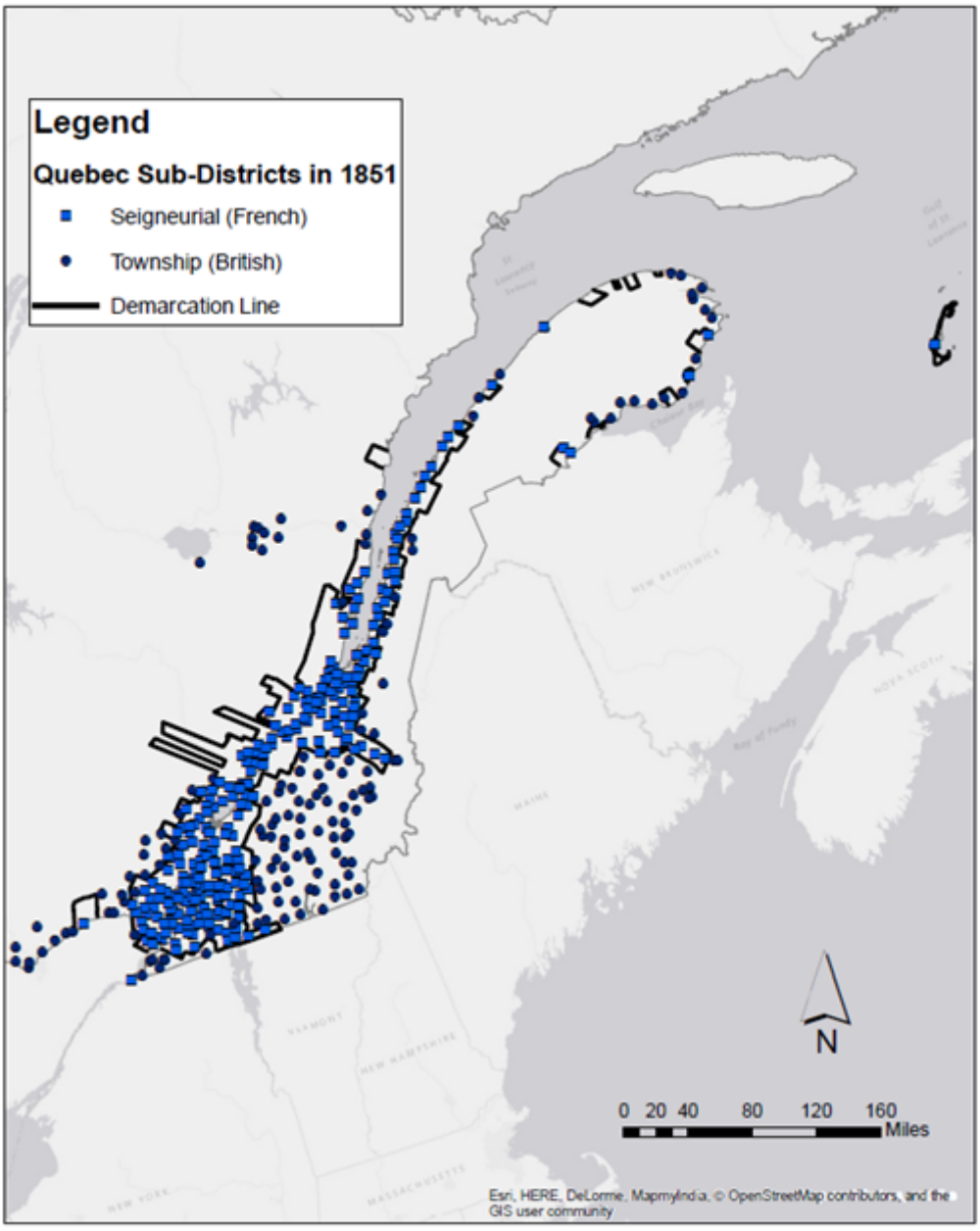

Figure 3: Effects of seigneurial tenure on wages, local polynomial estimates, second order, 50km

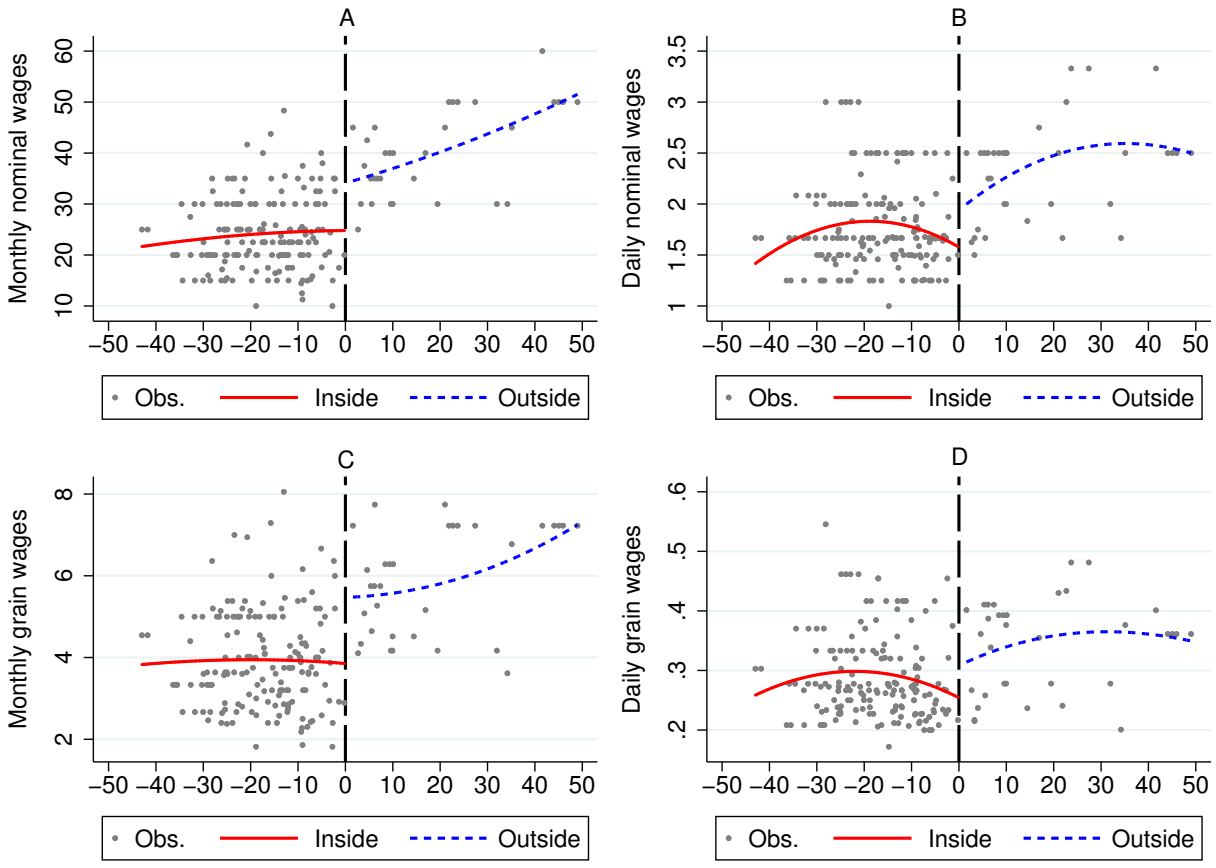

Figure 4: Effects of seigneurial tenure on wages, local polynomial estimates, second order, 50km and 500 pop

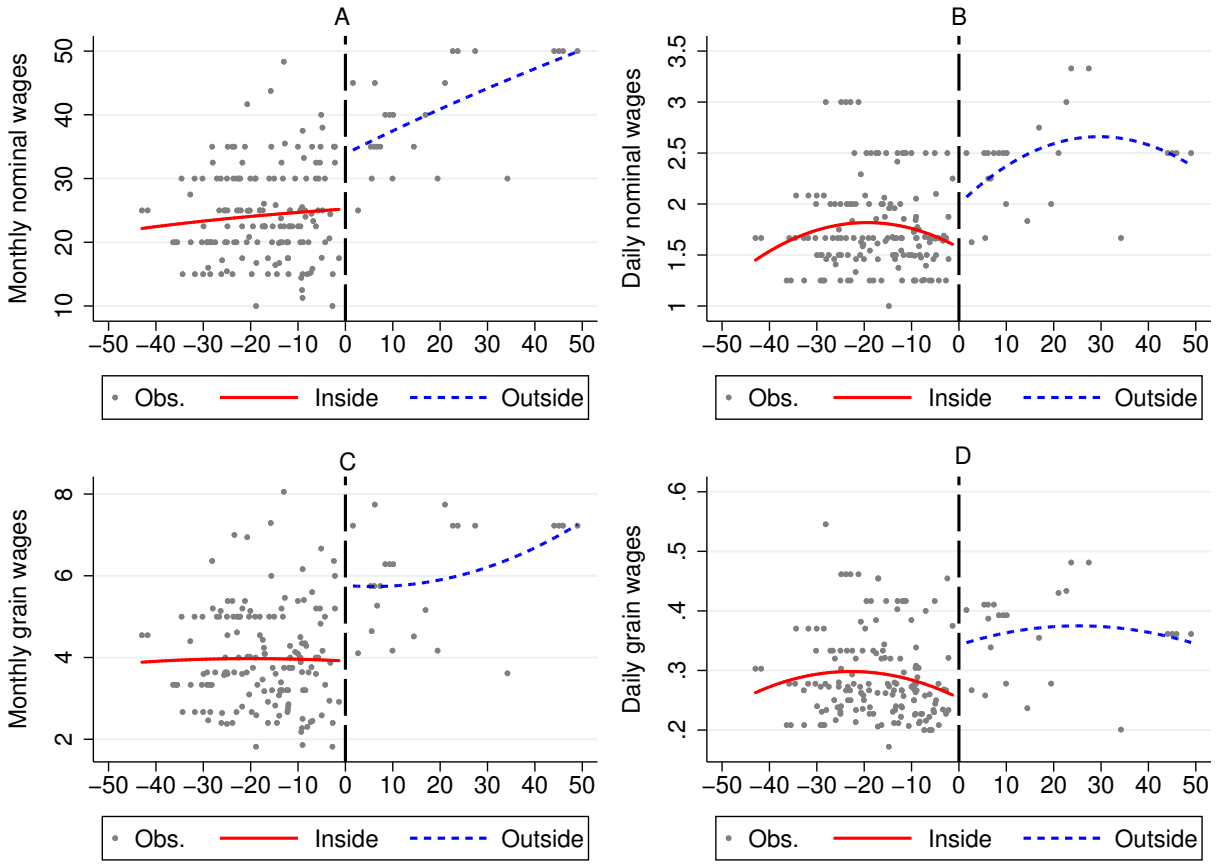

Figure 5: 1831 Industrial activities, 50km and population above 500, quadratic (A and C) and linear (B and D).

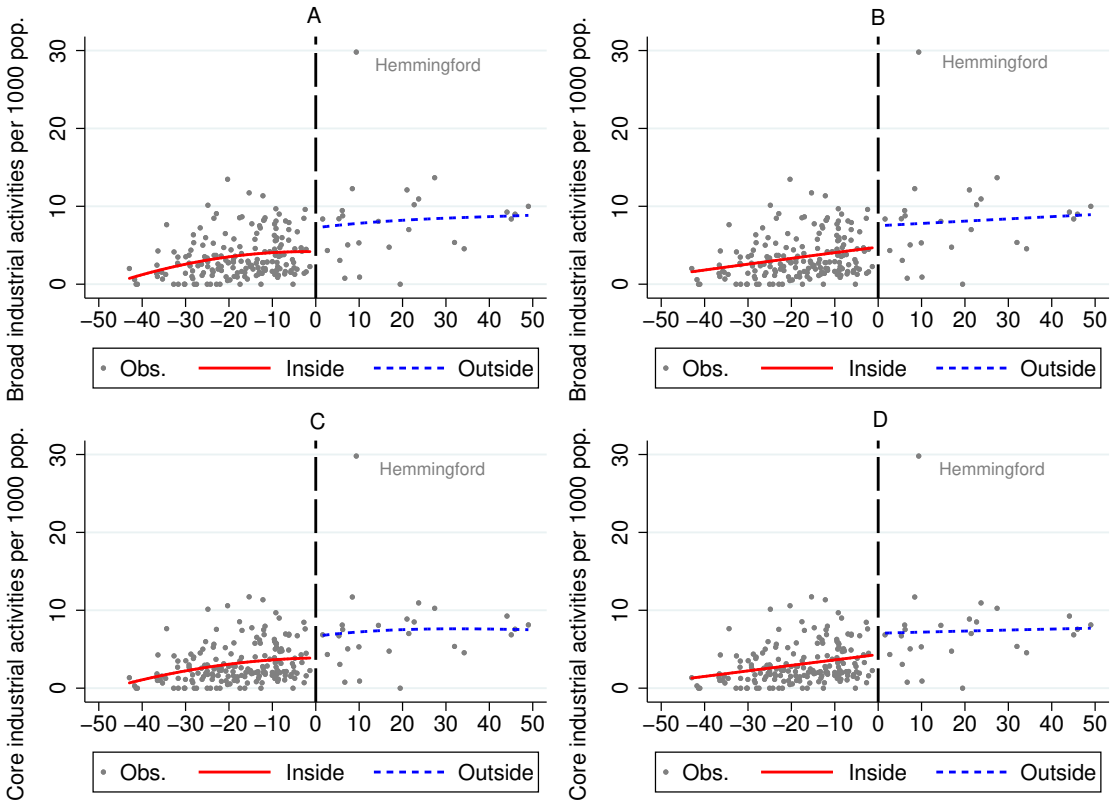

Figure 6: 1851 Industrial activities, 50km and population above 500, quadratic (A and C) and linear (B and D).

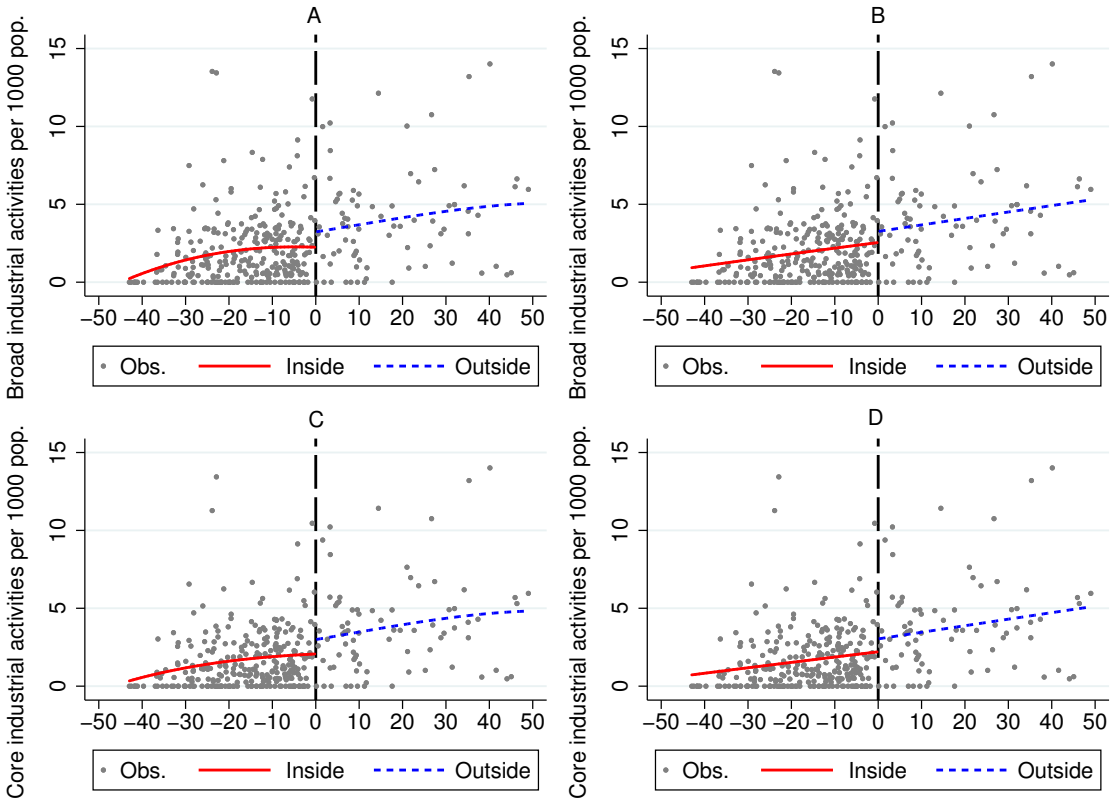

Table 1: Descriptive statistics for all areas in 1831

Variable	Mean	SD	Min	Max
Broad industries per 1000 pop.	4.78	5.82	0.00	57.00
Core industries per 1000 pop.	4.41	5.74	0.00	57.00
Monthly nominal wage (diff)	28.54	11.47	10.00	60.00
Daily nominal wage (diff)	1.91	0.49	1.00	3.00
Monthly grain wage (diff)	4.51	1.65	1.80	9.00
Daily grain wage (diff)	0.30	0.07	0.20	1.00
Monthly nominal wage (all)	28.52	11.53	10.00	60.00
Daily nominal wage (all)	1.90	0.49	1.00	3.00
Monthly grain wage (all)	4.50	1.66	1.80	9.00
Daily grain wage (all)	0.30	0.07	0.20	1.00
Township	0.24	0.43	0.00	1.00
Length of growing season	199.56	11.29	171.80	212.00
Share of land (13 category)	0.44	0.31	0.00	1.00
Distance to closest urban center	67.19	62.84	0.00	362.00
Postal office	0.29	0.45	0.00	1.00
Emigrants per 1000 pop.	37.02	102.16	0.00	796.00
N	258			

Note: The notes (diff) and (all) refer to the data-entry rule we used to transcribe the wages and prices. The two rules are explained in appendix A. In the appendix, we also show that the selection of a rule has no effect on the results. We present the two data entry rules in the table above for readers to see that the differences are not large .

Table 2: Descriptive statistics for seigneurial areas in 1831

Variable	Mean	SD	Min	Max
Broad industries per 1000 pop.	3.60	3.09	0.00	14.00
Core industries per 1000 pop.	3.24	2.91	0.00	14.00
Monthly nominal wage (diff)	24.12	6.95	10.00	50.00
Daily nominal wage (diff)	1.78	0.43	1.00	3.00
Monthly grain wage (diff)	3.94	1.17	1.80	8.00
Daily grain wage (diff)	0.29	0.07	0.20	1.00
Monthly nominal wage (all)	24.09	7.07	10.00	48.00
Daily nominal wage (all)	1.77	0.43	1.00	3.00
Monthly grain wage (all)	3.93	1.19	1.80	8.00
Daily grain wage (all)	0.29	0.07	0.20	1.00
Length of growing season	198.86	12.18	171.80	212.00
Share of land (13 category)	0.46	0.32	0.00	1.00
Distance to closest urban center	55.53	61.80	0.00	362.00
Postal office	0.28	0.45	0.00	1.00
Emigrants per 1000 pop.	16.80	50.95	0.00	411.00

Note: The notes (diff) and (all) refer to the data-entry rule we used to transcribe the wages and prices. The two rules are explained in appendix A. In the appendix, we also show that the selection of a rule has no effect on the results. We present the two data entry rules in the table above for readers to see that the differences are not large .

Table 3: Descriptive statistics for non-seigneurial areas in 1831

Variable	Mean	SD	Min	Max
Broad industries per 1000 pop.	8.42	9.64	0.00	57.00
Core industries per 1000 pop.	8.04	9.60	0.00	57.00
Monthly nominal wage (diff)	44.26	10.54	25.00	60.00
Daily nominal wage (diff)	2.35	0.43	1.50	3.00
Monthly grain wage (diff)	6.51	1.54	3.60	9.00
Daily grain wage (diff)	0.35	0.07	0.20	0.00
Monthly nominal wage (all)	44.26	10.54	25.00	60.00
Daily nominal wage (all)	2.35	0.43	1.50	3.00
Monthly grain wage (all)	6.51	1.54	3.60	9.00
Daily grain wage (all)	0.35	0.07	0.20	0.00
Length of growing season	201.73	7.64	175.00	212.00
Share of land (13 category)	0.40	0.28	0.00	1.00
Distance to closest urban center	103.30	51.59	0.00	246.00
Postal office	0.32	0.47	0.00	1.00
Emigrants per 1000 pop.	99.62	172.83	0.00	796.00

Note: The notes (diff) and (all) refer to the data-entry rule we used to transcribe the wages and prices. The two rules are explained in appendix A. In the appendix, we also show that the selection of a rule has no effect on the results. We present the two data entry rules in the table above for readers to see that the differences are not large .

Table 4: Descriptive differences in wages between seigneurial and non-seigneurial areas, quadratic fit, 50km window

	Quadratic estimate		Difference	
Wages	Tenure	Township	Units	in % to tenure
50 km window				
Monthly Nominal	24.8053	34.0982	9.2930	37.46%
Daily Nominal	1.5774	1.9392	0.3618	22.94%
Monthly Grain	3.8533	5.4706	1.6173	41.97%
Daily Grain	0.2543	0.3082	0.0539	21.22%
50 km and population above 500				
Monthly Nominal	25.2283	33.8762	8.6479	34.28%
Daily Nominal	1.5727	1.9990	0.4263	27.11%
Monthly Grain	3.9170	5.7633	1.8463	47.13%
Daily Grain	0.2538	0.3427	0.0889	35.02%

Table 5: Effect of seigneurial tenure with regression fit and second order polynominal, 1831 wages, no population restriction and 50 km window

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	7.659**	1.301**	0.386	0.0556
	(3.420)	(0.568)	(0.234)	(0.0412)
(1-T) x distance to line	0.139	0.00798	-0.0216*	-0.00359
	(0.212)	(0.0342)	(0.0124)	(0.00220)
(1-T) x distance to line sq	-0.000984	-0.000331	-0.000592**	-8.62e-05*
	(0.00488)	(0.000806)	(0.000285)	(5.16e-05)
T x distance to line	0.347	0.0193	0.0389	0.00396
	(0.342)	(0.0572)	(0.0262)	(0.00414)
T x distance to line sq	0.000695	0.000408	-0.000559	-6.60e-05
	(0.00628)	(0.00105)	(0.000494)	(7.65e-05)
length of growing season	0.128**	0.0319***	-0.00271	0.000288
	(0.0618)	(0.0108)	(0.00354)	(0.000582)
distance to closest urban center	-0.0228	-0.00230	-0.000900	-1.02e-05
	(0.0182)	(0.00307)	(0.000824)	(0.000133)
postal office	0.139	0.130	-0.0369	0.000909
	(0.976)	(0.164)	(0.0617)	(0.0107)
emigrants per 1000	-0.00885**	-0.00189***	-0.000288	-6.70e-05*
	(0.00421)	(0.000571)	(0.000271)	(3.89e-05)
constant	2.587	-2.047	2.219***	0.204*
	(13.08)	(2.257)	(0.707)	(0.116)
Observations	200	196	201	197
R-squared	0.490	0.388	0.239	0.107
Adjusted R-squared	0.466	0.358	0.204	0.0642

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Effect of seigneurial tenure with regression fit and second order polynominal, 1831 wages, population greater than 500 and 50 km window

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	8.425**	1.829***	0.571**	0.114***
	(4.113)	(0.643)	(0.257)	(0.0418)
(1-T) x distance to line	0.204	0.0153	-0.0195	-0.00351
	(0.227)	(0.0373)	(0.0137)	(0.00247)
(1-T) x distance to line sq	0.000586	-0.000160	-0.000518*	-7.93e-05
	(0.00511)	(0.000857)	(0.000307)	(5.62e-05)
T x distance to line	0.370	-0.0101	0.0431	0.00220
	(0.416)	(0.0702)	(0.0281)	(0.00436)
T x distance to line sq	-0.000682	0.000800	-0.000757	-5.34e-05
	(0.00725)	(0.00125)	(0.000503)	(7.83e-05)
length of growing season	0.106	0.0275**	-0.00317	0.000121
	(0.0658)	(0.0119)	(0.00387)	(0.000650)
distance to closest urban center	-0.0334	-0.00428	-0.000924	-5.68e-06
	(0.0221)	(0.00383)	(0.000876)	(0.000155)
postal office	-0.371	0.0352	-0.0759	-0.00618
	(0.976)	(0.172)	(0.0632)	(0.0111)
emigrants per 1000	-0.00974**	-0.00214***	-0.000637**	-0.000130***
	(0.00431)	(0.000563)	(0.000251)	(3.67e-05)
constant	8.106	-0.975	2.324***	0.237*
	(14.10)	(2.506)	(0.771)	(0.129)
Observations	181	177	181	177
R-squared	0.455	0.361	0.262	0.150
Adjusted R-squared	0.426	0.327	0.223	0.105

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Industrial categories for industrial activities reported in 1831 and 1851

Definition	1831	1851
Core	Saw mills, grist mills, potash and pearl ash factories	Saw mills and grist mills
Broad	Core + Carding and Fulling Mills	Core + Woolen, Carding and Fulling Mills

Note: The censuses of 1831 and 1851 do not have the same questions with regards to industrial activity. Potash and pearl ash are not reported in 1851 while woollen factories are not reported in 1831. More details can be found in appendix A and appendix B

Table 8: Descriptive differences in industrial activity (1831) between seigneurial and non-seigneurial areas, quadratic fit, population greater than 500 and 50 km window

	Smoothed estimate		Difference	
Industries per 1000 pop.	Tenure	Township	Units	in % to tenure
All observations				
Broad	4.1745	7.2497	3.0753	73.67%
Core	3.8813	6.6772	2.7959	72.04%
Outlier removed				
Broad	4.1745	5.6584	1.4839	35.55%
Core	3.8813	5.0428	1.1616	29.93%

Restrictions: 50 km and 500 pop.

Table 9: Effect of seigneurial tenure with regression fit and second order polynominal, 1831 industrial activities

Variables	(1) Core	(2) Broad	(3) Core	(4) Broad	(5) Core	(6) Broad	(7) Core	(8) Broad
township (T)	2.167	2.173	1.618	1.639	5.167**	5.775**	3.298**	3.980**
	(1.913)	(2.001)	(1.803)	(1.906)	(2.315)	(2.383)	(1.384)	(1.656)
(1-T) x distance to line	0.113	0.112	0.105	0.104	0.0392	0.0349	0.0275	0.0238
	(0.0891)	(0.0929)	(0.0876)	(0.0916)	(0.0653)	(0.0718)	(0.0644)	(0.0713)
(1-T) x distance to line sq	0.00156	0.00142	0.00147	0.00133	-0.000293	-0.000483	-0.000453	-0.000637
	(0.00195)	(0.00201)	(0.00192)	(0.00199)	(0.00146)	(0.00157)	(0.00145)	(0.00157)
T x distance to line	0.195	0.210	0.163	0.178	0.00937	0.00229	0.0472	0.0387
	(0.152)	(0.171)	(0.141)	(0.164)	(0.125)	(0.156)	(0.115)	(0.155)
T x distance to line sq	-0.00456	-0.00457	-0.00338	-0.00341	-0.000749	-0.000395	-0.000530	-0.000185
	(0.00315)	(0.00356)	(0.00278)	(0.00326)	(0.00221)	(0.00283)	(0.00211)	(0.00286)
growing season	-0.0591**	-0.0673***	-0.0654***	-0.0734***	-0.0557***	-0.0687***	-0.0589***	-0.0718***
	(0.0248)	(0.0259)	(0.0239)	(0.0250)	(0.0196)	(0.0222)	(0.0188)	(0.0214)
distance to closest urban center	0.00124	-0.00117	0.00181	-0.000612	-0.00287	-0.00606	-0.00110	-0.00435
	(0.00613)	(0.00621)	(0.00615)	(0.00622)	(0.00441)	(0.00476)	(0.00402)	(0.00442)
postal office	0.276	0.552	-0.0339	0.250	0.162	0.357	-0.0605	0.144
	(0.487)	(0.510)	(0.378)	(0.414)	(0.416)	(0.451)	(0.347)	(0.393)
emigrants per 1000	-0.00519*	-0.00642**	-0.00431	-0.00556*	-0.00915***	-0.0108***	-0.00718***	-0.00894***
	(0.00309)	(0.00308)	(0.00288)	(0.00289)	(0.00274)	(0.00275)	(0.00198)	(0.00207)
constant	16.29***	18.39***	17.46***	19.53***	15.26***	18.37***	15.70***	18.80***
	(5.117)	(5.299)	(4.961)	(5.141)	(3.995)	(4.466)	(3.853)	(4.321)
Observations	238	238	237	237	206	206	205	205
Outlier excluded			Yes	Yes			Yes	Yes
Retrictions	50 km	50 km	50 km	50 km	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop
R-squared	0.243	0.241	0.250	0.243	0.291	0.309	0.303	0.313
Adjusted R-squared	0.213	0.211	0.220	0.213	0.259	0.278	0.271	0.282

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Descriptive statistics for all areas in 1851

Variable	Mean	SD	Min	Max
Broad industries per 1000 pop.	3.05	4.64	0.00	43.00
Core industries per 1000 pop.	2.79	4.51	0.00	43.00
Township	0.35	0.48	0.00	1.00
Length of growing season	197.34	12.43	169.90	212.00
Share of land (13 category)	0.40	0.31	0.00	1.00
Distance to closest urban center	94.72	112.30	0.00	719.00
Postal office	0.53	0.50	0.00	1.00
Foreign born per 1000 pop.	0.10	0.14	0.00	1.00
N	460			

Note: To keep the article as short as possible, we only report the descriptives for all areas in 1851. In appendix B, we report the descriptives by institutional system.

Table 11: Descriptive differences in industrial activity in 1851 between seigneurial and non-seigneurial areas, quadratic fit, population greater than 500 and 50 km window

	Smoothed estimate		Difference	
Industries per 1000 pop.	Tenure	Township	Units	in % to tenure
All observations				
Broad	2.2435	3.2319	0.9884	44.05%
Core	2.0699	2.9934	0.9235	44.62%

Restrictions: 50 km and 500 pop.

Table 12: Effect of seigneurial tenure with regression fit and second order polynominal, 1851 industrial activities

	(1)	(2)	(3)	(4)
Variables	Core	Broad	Core	Broad
township (T)	4.293**	4.405**	1.368	1.454
	(1.712)	(1.725)	(0.885)	(0.929)
(1-T) x distance to line	0.0335	0.00831	0.0198	-0.00224
	(0.0512)	(0.0555)	(0.0485)	(0.0542)
(1-T) x distance to line sq	0.000715	2.61e-05	0.000125	-0.000487
	(0.00110)	(0.00119)	(0.00102)	(0.00115)
T x distance to line	-0.216	-0.230	0.0621	0.0597
	(0.165)	(0.166)	(0.0917)	(0.0973)
T x distance to line sq	0.00524	0.00563*	-0.000482	-0.000466
	(0.00327)	(0.00330)	(0.00202)	(0.00215)
growing season	-0.0860***	-0.0934***	-0.0667***	-0.0765***
	(0.0191)	(0.0198)	(0.0120)	(0.0136)
distance to closest urban center	-0.00357	-0.00449*	-0.00467**	-0.00579***
	(0.00237)	(0.00238)	(0.00195)	(0.00199)
postal office	-0.112	0.00929	0.150	0.256
	(0.315)	(0.329)	(0.242)	(0.262)
foreign born per 1000	-2.673	-2.228	-0.718	-0.195
	(1.850)	(1.911)	(1.311)	(1.491)
constant	19.47***	21.05***	15.44***	17.54***
	(3.853)	(3.996)	(2.408)	(2.713)
Observations	414	414	358	358
Retrictions	50 km	50 km	50 km and 500 pop	50 km and 500 pop
R-squared	0.223	0.209	0.232	0.211
Adjusted R-squared	0.206	0.192	0.212	0.191

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A The Census of 1831

A.1 Description of the Census as a Source

Two sources were used to extract the data for 1831. The first set of sources if the rolls of the census which are made available both by the Library and Archives Canada (available here at https://www.bac-lac.gc.ca/eng/census/1831/Pages/1831.aspx) and Family Search (available here at https://www.familysearch.org). These two sources allow us to consult the manuscript rolls themselves image by image. However, since some rolls were lost (see more below), we had to complement with the computed sub-districts tabulations made available in the Appendix to the Journal of the House of Assembly (1832a, Appendix O.o). However, the census of 1831 is a source that needs to be properly defended.

When Lower Canada was a French colony (1608-1760), the colonial administration often mandated the completion of richly-detailed censuses of the colony. Although they are not flawless (Lalou and Boleda, 1988), they were of superior quality and more frequent than those that the British took after they conquered the colony. This set the benchmark for future censuses and explains why some historians treat it with scorn. While the French-era censuses asked questions regarding farm output and acreage, the British censuses of 1765, 1784, 1790 and 1825 asked few or no questions about agriculture and were mainly concerned with population numbers. The first government-mandated census to ask a wider array of questions was that of 1831, and the last census whose questions most resembled it was the census of 1739. The large gap between censuses and the difference in quality between those of the French and British eras probably explain why historians have initially scorned the census of 1831 as part of a statistical dark age (Dechêne, 1986, 189-190).

Additionally, few details survive about the instructions given to the census-takers, which fuels some of the skepticism and scorn toward the census. The two best accounts of the indications given are found in the appendixes to the Journal of the Legislative Council (1831, Appendix III) and the Appendix to the Journal of the House of Assembly (1832a, Appendix O.o). These accounts are not direct descriptions of the instructions given, they merely provide us with an understanding of what was broadly asked and what census-takers misunderstood. For example, we know that in the counties of Kamouraska, Orléans, Lotbinière, Montmorency and Québec, the census-takers misunderstood that the columns for males and females below the age of five were meant to be tabulated separately. Instead, they merely reported the total for this portion of the population (Legislative Council of Lower Canada, 1831, Appendix III, Unpaginated). In the predominantly French-speaking districts of lIslet, Saint-Hyacinthe and Saint-Maurice, the census-takers got confused by the translation into French of "factories for iron". The French translation, *fabrique de fer*, can be interpreted as meaning blacksmith shopswhich is what happened (Legislative Council of Lower Canada, 1831, Appendix III, Unpaginated).

However, in his pioneering work, Serge Courville (1983; 1987; 1990; 2008; 1991; 1995) has generated a rehabilitation of the census through the careful documentation of its flaws and limitations. While this rehabilitation began before Courvilles efforts (Ouellet, 1972,

1980b) and continued afterwards (Geloso et al., 2017), the bulk of it was accomplished by him.[33] The first thing to note is that only some questions suffer from poor computation-snotably those that relate to land acreage[34], the overall tabulations of some population headings and the example of the iron factories mentioned above. None of these, with the exception of the last, are of relevance to our paper. As for the last issue, the Appendix to the Legislative Council of Lower Canada (1831, Appendix III, Unpaginated) makes the solution for an adjustment abundantly clearnot that we need it, since we excluded iron factories and foundries from our main narrative given that their relatively more skilled workforces would not have spoken to the wage rates for unskilled workers that we used. The second thing to note is that Courville et al. (1995) identified the proper weights and measures to use in each sub-district. As the French and English settlers in Quebec used different metrological systems even as late as the 1890s (McInnis, 1981; Thibeault, 1989; Geloso, 2019), the proposed list of proper adjustments simplified our use of the data. In addition, the remarks made by census-takers regarding the counties they were assigned (House of Assembly of Lower Canada, 1832a, Appendix O.o, numerous pages) allow us to confirm the proper units to use. When doubts arose, the rolls themselves were consulted. As the census-takers wrote down notes and inscriptions on the schedules, such as the price per bushel or per *minot* (the French unit which equal 1.107 bushels), this could be easily accomplished. These solutions allow us to marshal the 1831 census data for our purposes.

A.2 Wages and Prices in the Census

In the census of 1831, headings # 77 through #79 required enumerators to report the "average price of wheat in every such place since last Harvest;" the "average wages paid in every such place, to servants employed in Agriculture, who are boarded by their employers per month;" and the "average wages paid in every such place to Day labourers, per day." These three pieces of information are the ones we use to derive the nominal wages and the grain-wages. The most daunting issue faced in order to make the data usable was to assess which volume unit was used in the census when prices were reported. We know that the Appendix commits some errors (as testified within the Appendix by the notes that enumerators were asked to provide as part of heading #85). In both the rolls and the Appendix, a handful of sub-districts actually had written notes that allowed us to determine beyond any reasonable doubt which measuring system was used. One such sub-district was that of Grenville (county of Deux-Montagnes) where the census enumerator

[33] Another reason for the scorn heaped on the census is that the next census whose rolls are still available was the census of 1851. That census has been the one of reference, because it had more questions than the 1831 census and was taken simultaneously in other colonies following the same outline. This is why historians and cliometricians tend to prefer it. However, Geloso et al. (2017) highlighted that the census of 1831 actually has numerous strengths in terms of occupational data, price and wage data, and recent immigration which the census of 1851 does not possess. As such, rather than viewing the census of 1831 as inferior to that of 1851, they argue that its value depends on the questions and uses that it aims to serve research-wise.

[34] In the county of Chambly, the census-taker thought that the land occupied heading represented the land on which a households residence was located and not the farm concession it received (House of Assembly of Lower Canada, 1832a, Appendix O.o, Unpaginated).

clearly reported a price of 7 shillings "per bushell" (sic) in the rolls. The compiler reported 7 shillings as well but the unit of measurement is not specified in the Appendix. We therefore went carefully to the rolls to assess which unit was being used to make sure. There are no indications that the compilers converted the units reported by enumerators in order to produce a unified metrological system. Hopefully, the sub-districts for which information existed did make it clear that the local conversion factors (English areas using the bushel and French areas using the minot which is equal to 1.107 bushels) proposed by Courville et al. (1995) and Geloso et al. (2017) are accurate. The schedules for French districts are always clearly reporting the *minot* when they did report the unit, and English districts did the same with the bushel.

With regard to wages, two issues ought to be mentioned. The first is that most of the time, the wages and prices reported in different sub-districts were equivalent in both the rolls and the tabulations contained in the Appendix to the Journal of the House of Assembly. However, in some instances they did not match perfectly. For example, in the parish of Beaumont (county of Bellechasse) a large number of wage observations were reported ranging from 1.25 to 2.5 shillings per day for unskilled workers. The Appendix reports 1.83 shillings per day, while the average of all the observations equals 1.6 shillings per day. The average of all the different observations (i.e. each time a value is reported, it is counted only once) is equal to 1.8 shillings per day. In another sub-district, Frampton (county of Beauce), the enumerator reported wages going from 1.25 to 2 shillings per day, but he only provided the range rather than all the observations within that range. The Appendix reports an average of 1.5 shillings, while the average of the two bounds is 1.625 shillings per day. Enumerators tended either to provide an actual average of all the observations (as in the subdistricts in the county of Kamouraska), a single entry for the range of wages he found, or a single entry for the whole sub-district with few more details. As such, it seems that some census compilers used different rules to produce a value for the average of the sub-district.

The second issue is that the Appendix sometimes failed to provide information about wages in a sub-district while there are inscriptions in the rolls themselves.[35] The compilers also made some transcription mistakes on occasion. To err on the safe side, since in many of the rolls the enumerators only reported the range of wages they saw in a sub-district, we averaged all the observations we could find within the range. If a sub-district merely reported 1.25 shillings per day at the lower bound and 2 shillings per day at the higher bound, the average of the two was taken.[36] If a sub-district reported 19 times a wage rate

[35]The only instances when only the Appendix provided wage rates was when the rolls for the district were lost (such as Chambly and Ottawa).

[36]There are also instances of the compilers not understanding the notes of the enumerators. For example, the le Perrot sub-district (county of Vaudreuil) had its enumerator reporting the wages in *sols*, a monetary accounting system still widely used in 1831, but which dated to the era of French rule. Somehow, it seems that the compiler was unaware of the valid exchange rates between the French and British units. The values reported in sols by the enumerator should be equal to somewhere between 1.25 and 1.67 shillings per day which suggests an average of 1.46 shillings per day (rounded). However, the compiler merely reported 1.5 shillings per day. The other subdistricts in the county of Vaudreuil suffer from the same issue which suggests that the error was not on the enumerators part, but rather on the compilers. The same

of 1.25 shillings and 16 times a wage rate of 1.5 shillings per day, we simply averaged 1.25 shillings and 1.5 shillings regardless of the number of times the wage is observed.

For our purposes, these first two issues mean that data entry rules must be specified. To enter the data, we used the rolls whenever available and when sheets were lost or degraded so that the rolls were unusable, we relied on the Appendix. When using the rolls, we had two options for computing average wage rate. First, we could take the average value of all the different rates found (regardless of the frequency of each rate). Second, we could use all the wage rates compiled and compute the average value of all the observations. For some sub-districts, this leads to some differences. Most enumerators reported the range by saying between 1.5 and 2 shillings (for example), but some reported all the observations they could so that there are hundreds of observations per district. The differences between both methods are small and we believe the second to be superior. Nevertheless, we conducted all our tests with both rules and they yield the same results. In the paper, we report with the average of all the observations rather than merely the average of the range of different observations. However, in figures 7 and 8, we report the same results using the quadratic fit. In tables 13, 14 and 15, we report the same as in Section 4 on wages. We also performed the results with a linear fit, these are available on demand but they also did not change the results in a significant manner. The stylized fact remains the same: seigneurial tenure depressed wages.

[Figure 7 here]
[Figure 8 here]
[Table 13 here]
[Table 14 here]
[Table 15 here]

A.3 Industrial Activities

Headings #65 through #76 in the census concerned industrial activity. The enumerators were asked to report the number of inns, taverns, grist mills, saw mills, oil mills, fulling mills, carding mills, iron plants, iron foundries, distilleries, pearl ash & potash factories, and all others. As such, these headings account for distinct buildings without any distinction of size and scope. These exclude artisanal and household activities, as Courville et al. (1991: 46) emphasize, and concentrate on actual industrial activities. We use this as our proxy for industrial development and the demand for non-farm labor within a subdistrict.

While historians believe that this provides a proxy of industrial development (Phillips, 1974), that number remains a "crude" indicator as "numbers alone do not describe the totality of industrial expansion" (Courville et al., 1991, 54). While historians often recognize that while industrial activityin spite of being far removed from the port cities of Montreal and Quebecwas more intense in English tenure areas than in seigneurial areas

error was found for the district of Lachenaie with the exception of the sub-district of Kilkenny which was reported in British monetary units.

(Harris, 2009, 275), by using this proxy we are biasing our design against our position. We are assuming that one plant per 1,000 inhabitants in a non-seigneurial estate is the same as one plant per 1,000 in a seigneurial estatethat is, that there are no quality differences. This was not the case. For example, flour mills were known to be of superior quality in non-seigneurial areas, where the legal monopoly did not exist. Settlers in townships refused to build windmills and opted, in spite of their limited capital endowment, to invest in capital-intensive watermills (Deschênes, 2009, 148). Historians generally agree that watermills were better for the purposes of milling grain than windmills were, at a lower marginal cost.[37] Thus, the quality of installations in non-seigneurial areas was generally superior.

A.4 Validity of the Differences Across Institutional Lines

One of the claims that we make in this paper is that wages were higher in the non-seigneurial districts. There are two possible criticisms that we must pre-empt. The first, which is discussed in the next subsection of the present appendix, is that the wages do not speak to actual wages in the colony. The second, which is dealt with here, is that the differences in wages could be a fluke of the 1831 census. This seems unlikely to be the case, as evidenced by the census of 1842.

As we explained above, the census of 1842 is the most scorned of all censuses largely because it was not completed and not properly funded (Curtis, 2002). However, it had the same architecture as the census of 1831 and provides information about a variety of districts and sub-districts which is why some historians believe that it can be used in "controlled exercises" (Olson and Thornton, 2002, 339). We believe that we have here such an exercise: the goal is to see if the 1842 census points in the same direction as the 1831 census. While this is not sufficient in itself, it is necessary to assess quality. The census rolls of 1842 provided 47 sub-districts (consulted on www.familysearch.org and made available to us by Geloso and Macera [2018]) with both wages and prices that allow us to compute grain wages. Of those, only 17 concern seigneurial estates. However, the average grain wage in those seigneurial estates stood at 0.36 *minots* per day. In non-seigneurial estates, this figure stood at 0.41 *minots* per day which implies that grain wages in seigneurial areas were equal to 88% of the grain wages in non-seigneurial areas (see table 16).

[Table 16 here]

Contemporary sources confirm the observation of higher wages in non-seigneurial areas. For example, an emigration agent reported in 1841 that wages to be obtained by British migrants to Canada were higher in the townships east of Montreal than in Montreal itself (House of Commons, 1842, 229) while Montgomery Martin (1836, 331) reports the same for the early 1830s.

[37] The difference in efficiency in favor of watermills is explained by the fact that millers can control water debit to maximize rotations of the millstones while it is impossible to control wind factors. In fact, operators of windmills had to be especially careful in monitoring the winds, because, if they were too strong, they could rip the cloth of the blades of the mills.

A.5 Validity of Wage Levels

Were the wages found in line with what other sources suggest for unskilled workers? We find evidence that the wages contained in the census of 1831 match well with those found elsewhere. For example, one emigration agent pointed to wage rates of 2.5 shillings per day for laborers in 1837 in the township of Sherbrooke, at the same level as suggested in the 1831 census (Mack, 1837, 13). Montgomery Martin (1836, 331) reports that laborers in Quebec City paid by the Royal Corps of Engineers could expect wages of between 2 and 2.5 shillings per daythe same range as that reported in the census. In the *Present State of the Canadas*, an anonymous author (1833, 104, 175) placed wages between 1.67 and 2.5 shillings per day for the average colonial laborer while the average of all observations in the census place wages at 1.9 shillings per day in 1831. Evans (1836, 132–133) places wages in Lower Canada at 2.5 shillings per day for laborers occupied with the physically intense task of land-clearing. Finally, in more systematic archival work, Geloso (2018) has collected wage rates from the account books of religious congregations around Quebec City. These congregations operated important farm estates as well as saw mills, for which they demanded workers. He reports a wage rate of 2.43 livres per day which, when converted into shillings (2.03), is closer to the lower end of the range of census wage rates found for the sub-districts in the county of Quebec. As such, the levels of wages reported in other sources around the time of the census appear to be more or less in line.

A.6 Regional Price Levels

In debates that relate to the issue of farm productivity measured at the time of the census of 1851 (Lewis and McInnis, 1980, 1984; Armstrong, 1984; Altman, 1998), some scholars emphasize that the use of national prices to measure output value rests on the strong assumption that the different regions of the colony did not exhibit large price differences. This is important, as it justifies our decision to use both nominal wages and grain-wages (the former divided by the local price of wheat). Until recently, there existed very little cross-section of prices to allow us to assess whether or not this was a legitimate criticism. What data existed (Ouellet et al., 1982) only allowed the comparison of prices in Quebec City and Montreal – the two largest in the cities in the colony – as well as a handful of minor districts around them. These data showed some significant differences in price levels (but not in trend). However, this was by no means sufficient to settle the issue. Using the census of 1831, Geloso et al. (2017) showed that the important differences in price levels over time are also found at one point in time across space. These data suggest that the coefficient of variation of all price observations is equal to 9.7%. Even within the districts (the groups of counties that compose the districts of Montréal, Québec City, Gaspé and Trois-Rivières), there are important variations. These variations are also consistent with the differences highlighted by Ouellet et al. (1982). These variations justify our use of the price data to circumvent issues related to differences in price levels across the colony.

[Table 17 here]

A.7 The Sherrington Exception

There was one sub-district which did not follow the demarcation line (see note under Map 1). This was the township of Sherrington which was actually within the boundaries of the seigneurial system. This was the result of a legal oddity well known to historians of Quebec (Courville, 2008, 106). Defective land surveying led the local *seigneur* to grant concessions beyond the boundaries of his estate, within the township of Sherrington. This led to legal disputes which the colonial government resolved by establishing that the settlements were governed under seigneurial tenure. We tried our results with and without the township, and there was no change (results available on demand).

A.8 The Gaspé District

Within the colony, there were four administrative districts: Montréal, Québec, Trois-Rivières and Gaspé. For the census of 1831, we only relied on the first three. The Gaspé district was excluded because, while institutionally mixed, only the non-seigneurial areas provided wage data. This was problematic to the extent the Gaspé district was on the Gaspesian peninsula whose hinterland was largely uninhabited, and settlements were quite widely spaced from one another in 1831. It is the farthest removed from the rest of the colony and is probably best considered as part of New Brunswick at the time. As such, the sub-districtswhich appeared to have high nominal and grain wages (well above the rest of the colony)were freehold districts with no close comparable district. This would have biased the RD design. In any case, in 1831, the two districts (Gaspé and Bonaventure) accounted only for 13,312 individuals (or 2.6% of the population of colony) (Legislative Council of Lower Canada, 1831, Appendix III, Unpaginated). For 1851, we included it, because we were only relying on industries relative to population, on which all sub-districts accurately reported information (see more in Appendix B).

A.9 Control Variables

The list of control variables is mostly derived from the work of Geloso et al. (2017) who used them for an assessment of farming productivity in Lower Canada in 1831. The details regarding "land quality,[38] "growing season"[39] and "distance to nearest urban centers"[40]

[38] A measure based on the Canada Land Inventory (Agriculture and Agri-Food Canada, 1998) which categorized land quality in Canada at high levels of granularity. Divided into seven classes of which the top three classes are those most suited for crop farming (i.e. the best farmland), the survey has also been used in other seminal contributions such as Lewis and McInnis (1984). The top three classes were computed as a share of the total land area around the centroids so as to generate our measure of land quality.

[39] Land quality as measured by the Canada Land Inventory may be deemed somewhat imperfect given that the issue of the quality of land in the survey (dating from the late twentieth century) is affected by past farming practices. The length of the growing season does not suffer from this problem. Although it tells us nothing about the soil, it tells us about the suitability of certain types of crops. As such, this measure contained in the *Atlas Agroclimatique du Qubec* (Centre de Référence en Agriculture et Agroalimentaire du Québec, 2012), provides a suitable complement.

[40] The Euclidian distance to the nearest of the three main cities; Montréal, Québec City and Trois-Rivières.

are all described in the appendix to their paper.

However, two additional control variables were added in the present paper. The first stems from headings #80 to #82 in the 1831 census. These first two headings requested information about immigrants from the British Isles who came by sea or land. The last concerns the number of immigrants from all other countries, although this heading concerned a very small number of individuals (1,500 in all of Lower Canada). However, the questions are limited to those who arrived after 1825. As such, the headings are useful for capturing the effects of recent migration to Lower Canada. This recency allows us to capture unfamiliarity with the land and the area and the fact that areas with higher number of migrants would be dealing with an important disadvantage regarding their familiarity with the land. According to the census headings tabulations in the Appendix to the Journal of the House of Assembly, 4.6% of Lower Canadas population had settled in the colony since 1825. The second variable is the postal office variable. Using a report to the House of Assembly of Lower Canada (1832b, 58–60), we were able to assemble a list of areas with a post office which we take as a proxy of communication costs and, as this was an arm of the state, as a proxy for state capacity in the area (Acemoglu et al., 2016). Only 29% of sub-districts possessed a post office.

A.10 Smoothly Running Controls

As we mentioned, one of the necessary conditions for a successful RD is that the controls do not vary at the treatment in a way that merges the treatment with the controls. As such, controls must run smoothly and not jump suddenly at treatment. Figure 9 shows that this is a safe assumption.

[Figure 9 here]

A.11 Tables and Figures for Appendix A

Figure 7: Replication of figure 3 with a different data entry rule for wages and prices

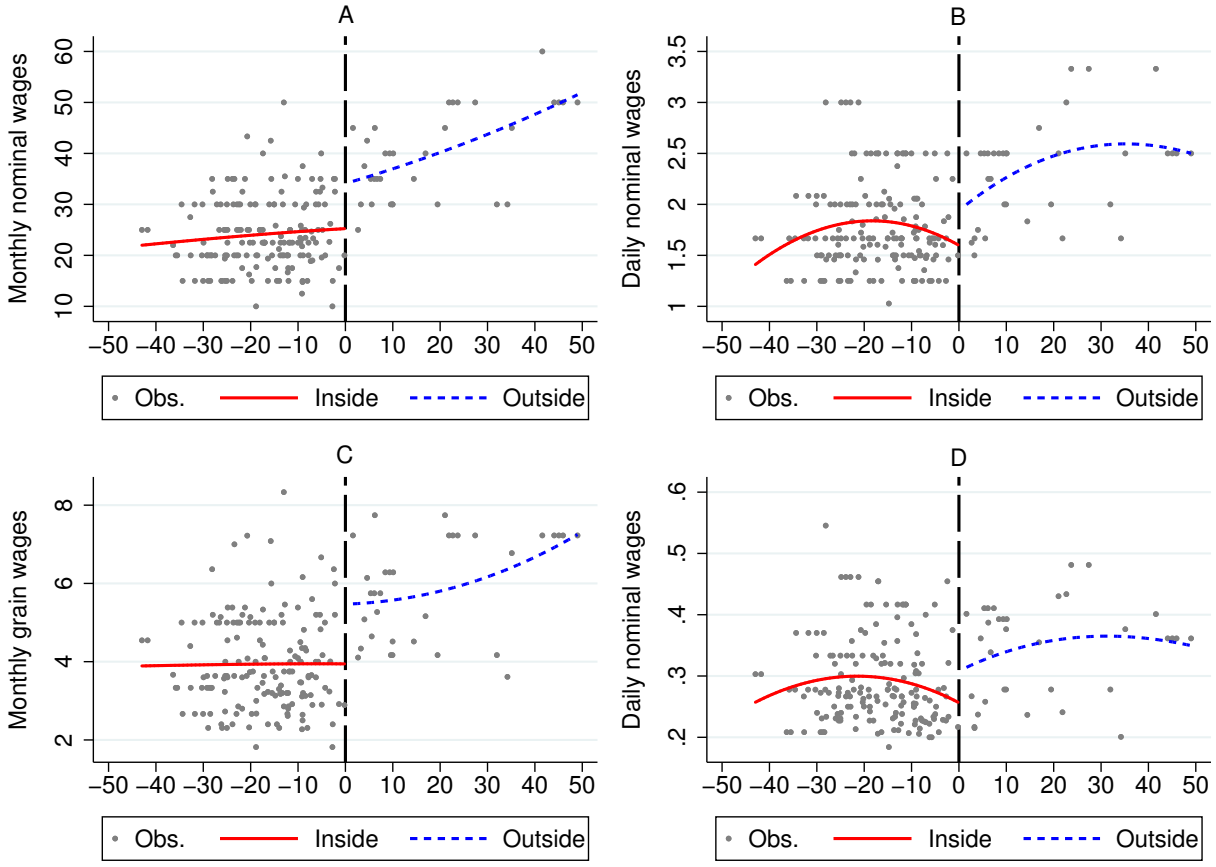

Figure 8: Replication of figure 4 with a different data entry rule for wages and prices

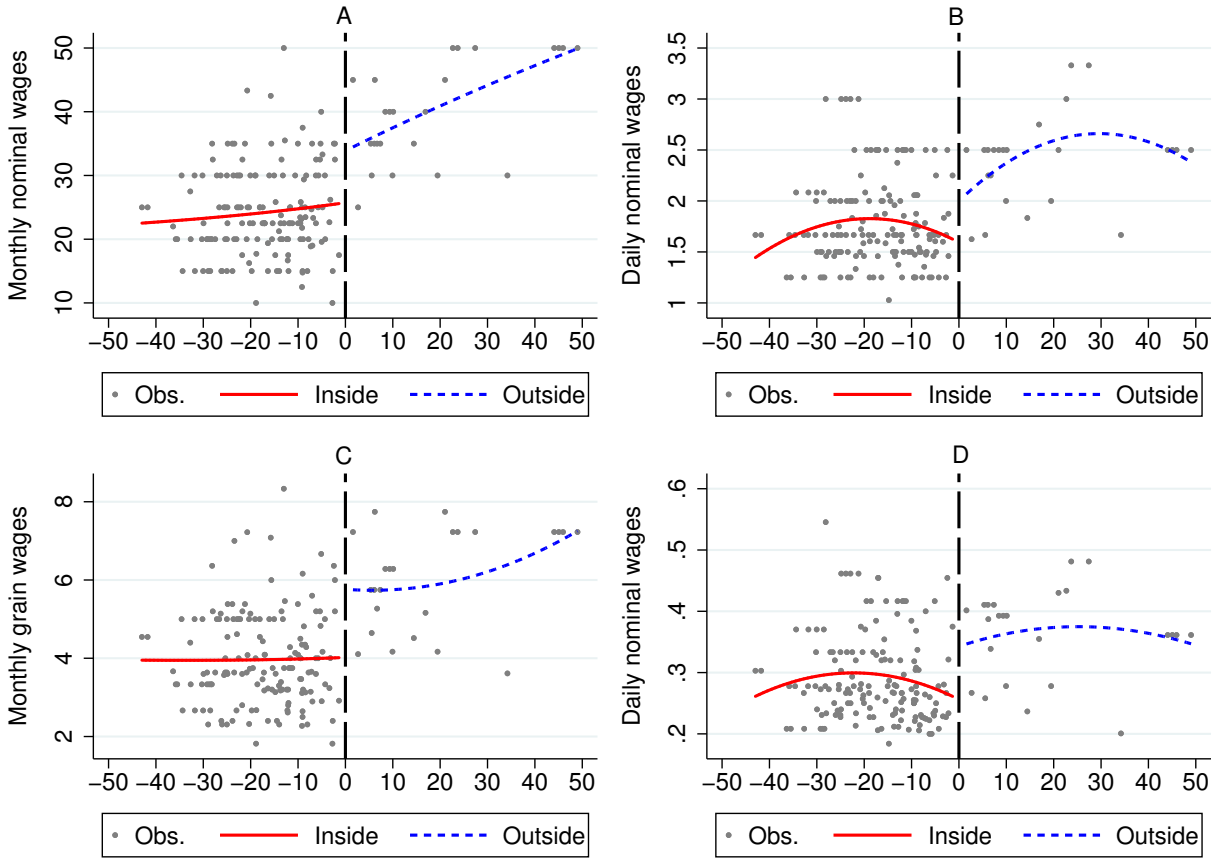

Figure 9: Absence of discontinuities in the control variables, 1831

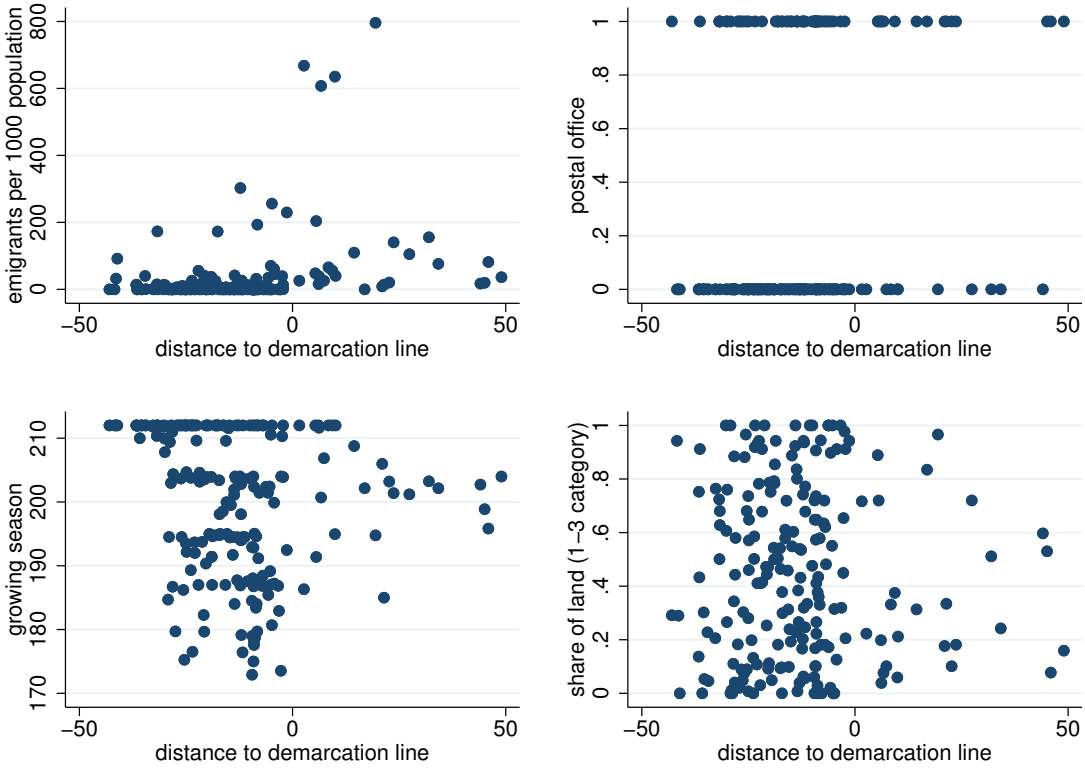

Table 13: Replication of table 4 with a different data entry rule for wages and prices

	Quadratic estimate		Difference	
Wages	Tenure	Township	Units	in % to tenure
50 km window				
Monthly Nominal	25.2499	34.0982	8.8483	35.04%
Daily Nominal	1.5983	1.9392	0.3409	21.33%
Monthly Grain	3.9444	5.4706	1.5262	38.69%
Daily Grain	0.2565	0.3082	0.0323	12.60%
50 km and population above 500				
Monthly Nominal	25.7237	33.8762	8.1525	31.69%
Daily Nominal	1.5940	1.9990	0.4050	25.41%
Monthly Grain	4.0214	5.7633	1.7418	43.31%
Daily Grain	0.2562	0.3427	0.0865	33.76%

Table 14: Replication of table 5 with a different data entry rule for wages and prices

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	7.284**	1.214**	0.375	0.0551
	(3.363)	(0.565)	(0.235)	(0.0413)
(1-T) x distance to line	0.190	0.0180	-0.0217*	-0.00379*
	(0.203)	(0.0332)	(0.0125)	(0.00220)
(1-T) x distance to line sq	0.000130	-0.000113	-0.000595**	-9.03e-05*
	(0.00466)	(0.000777)	(0.000288)	(5.19e-05)
T x distance to line	0.351	0.0196	0.0388	0.00396
	(0.338)	(0.0572)	(0.0263)	(0.00413)
T x distance to line sq	0.000571	0.000401	-0.000563	-6.72e-05
	(0.00623)	(0.00105)	(0.000494)	(7.64e-05)
length of growing season	0.125**	0.0308***	-0.00308	0.000256
	(0.0612)	(0.0109)	(0.00356)	(0.000579)
distance to closest urban center	-0.0231	-0.00264	-0.000615	5.30e-05
	(0.0167)	(0.00288)	(0.000826)	(0.000136)
postal office	0.383	0.166	-0.0482	-0.000927
	(0.940)	(0.157)	(0.0617)	(0.0106)
emigrants per 1000	-0.00963**	-0.00194***	-0.000283	-6.74e-05*
	(0.00402)	(0.000569)	(0.000276)	(3.91e-05)
constant	3.645	-1.723	2.289***	0.207*
	(12.80)	(2.255)	(0.713)	(0.115)
Observations	200	196	201	197
R-squared	0.499	0.391	0.235	0.104
Adjusted R-squared	0.475	0.362	0.199	0.0606
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 15: Replication of table 6 with a different data entry rule for wages and prices

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	8.061**	1.724***	0.566**	0.114***
	(4.022)	(0.641)	(0.258)	(0.0416)
(1-T) x distance to line	0.257	0.0265	-0.0200	-0.00377
	(0.216)	(0.0362)	(0.0138)	(0.00248)
(1-T) x distance to line sq	0.00174	7.87e-05	-0.000525*	-8.43e-05
	(0.00487)	(0.000826)	(0.000311)	(5.66e-05)
T x distance to line	0.367	-0.0101	0.0428	0.00215
	(0.410)	(0.0702)	(0.0280)	(0.00431)
T x distance to line sq	-0.000731	0.000800	-0.000759	-5.41e-05
	(0.00714)	(0.00125)	(0.000501)	(7.74e-05)
length of growing season	0.104	0.0266**	-0.00367	8.64e-05
	(0.0655)	(0.0120)	(0.00389)	(0.000645)
distance to closest urban center	-0.0332	-0.00458	-0.000572	7.87e-05
	(0.0203)	(0.00359)	(0.000910)	(0.000164)
postal office	-0.105	0.0752	-0.0883	-0.00802
	(0.934)	(0.165)	(0.0632)	(0.0110)
emigrants per 1000	-0.0106***	-0.00217***	-0.000631**	-0.000130***
	(0.00395)	(0.000561)	(0.000258)	(3.66e-05)
constant	8.998	-0.680	2.417***	0.240*
	(13.84)	(2.515)	(0.779)	(0.128)
Observations	181	177	181	177
R-squared	0.465	0.365	0.258	0.149
Adjusted R-squared	0.436	0.331	0.219	0.103

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 16: Wages extracted from the 1842 census of Canada East by institutional regime

	Nominal Wage (s/day)	Grain Wage	Number of observations
Seigneurial	2.12	0.35	18
Township	2.80	0.42	29
Ratio	75.56%	85.45%	

Note: The wages from the 1842 were extracted from www.familysearch.org by Geloso and Macera (2018). The data is available on request.

Table 17: Coefficient of Variation for Prices Reported in the 1831 census

	Coefficient of Variation
All	9.7%
Quebec	10.5%
Trois-Rivières	8.0%
Montréal	10.0%

B The Census of 1851

B.1 Description of the Census as a Source

While the census of 1831 has been the object of recent rehabilitation, the census of 1851 has been subjected to more scrutiny by economic historians, social historians and economists. We suspect that the main reason for this greater attention derives from the quality of the agricultural portion of the census. Unlike the census of 1831, it included questions regarding the division of land acreage by type (garden, meadow, cultivation and unimproved) and by cereal type (for certain crops such as wheat, peas, oats, rye, buckwheat, corn, potatoes, and barley). As Lower Canada was then largely an agrarian economy, we suspect that this led to the greater respect accorded the 1851 census. The other strength that the 1851 census possesses is that it includes a richer array of demographic information, notably regarding births, deaths, age of population and marital status. This is why historical demographers are keener towards the 1851 census. The fact that it is often used by a wide array of scholars, and that it was one of the first to be digitized as part of the IPUMS- North Atlantic Population Project (see https://www.nappdata.org/napp/samples.shtmlca1852a), allows us a simpler task in terms of asserting data accuracy and shortcomings.

In 1853, the tabulations of the 1851 census (it is sometimes also referred to as the 1851-52 census) were published (by then the colony was legally referred to as Canada East but informally it was still often referred to as Lower Canada) (Government of the Province of Canada, 1853). In two volumes, these compilations are all we have left for some counties (whose numbers grew relative to 1831) as a sizable number of pages are missing, meaning that a non-negligible number of areas are lost.[41] As such, we will be using the compilations included in the 1853 volumes. These are the same sources that other cliometricians have used when assessing the relative farming efficiency of farming (Lewis and McInnis, 1980, 1984; Armstrong, 1984; Altman, 1998)

The main flaw that it shares with the 1831 census is the metrological issue (i.e. French areas using different measurement systems than English areas for which compilers/enumerators did not properly adjust). However, thanks to the works of McInnis (1981),Thibeault (1989), Courville et al. (1995), and Geloso (2019), this issue is circumvented. Moreover, for the manner in which we will use the 1851 census, the issue is not relevant. Indeed, the census of 1851 did not include any questions regarding the wages and prices in each sub-district. This means that the only way we can use the 1851 census is as a robustness check for the number of industries relative to population (see discussion on industrial activity in appendix A on the census of 1831).

[41] There were two censuses in the intervening period. The census of 1842 which is deemed to be a failure (Curtis, 2002) and the census of 1844. The latter census is pretty well detailed in terms of its headings but its rolls have been completely lost. All that is left are the aggregations at the county level (there were 37 counties). While not without value, this level of aggregation limits the uses that can be made of this census.

B.2 Industrial Activities

Akin to the census of 1831, there was one section in the census of 1851 which concerned industrial activities. Enumerators were asked to report the number of grist mills, saw mills, carding fulling mills (unlike in 1831, these two are blended), woolen factories, tanneries, distilleries, foundries and breweries. In a different schedule there were also sections regarding stores, shops, inns and taverns. The most important of the non-farm industries, as we highlighted in the paper, relates to timber products. In that regard, the census of 1851 is slightly inferior because, while it does ask questions regarding the number of saw mills, it fails to ask questions regarding the number of potash and pearl ash factories (an important byproduct from the timber industrysee Pronovost [1998]) (Courville et al., 1991, 47). To be sure, saw mills did constitute the bulk of what we could call the timber industry as proxied by export values (in 1850 and 1851, wood product exports were between 4.99 and 5.38 times more important that potash and pearl ash exports (Vallières and Desloges, 2008). However, local studies of where the potash and pearl ash factories were located in 1831 suggest that they were disproportionately settled in British freehold areas such as the townships within the county of Beauharnois.[42] Therefore, the census of 1851 omits a key industry in our narrative in a way that biases against our hypothesis. This limitation is offset by the fact that by 1851 there were more townships in close proximity to seigneurial areas so that the sample is larger. There is a gain from extending our gaze beyond the more useful 1831 census to the 1851 census. This is why we use the census of 1851 as our robustness check. As the industries that we believe most relevant to our argument (timber products and byproducts and textile factories) are present in both censuses, we feel comfortable that the census of 1851 acts as a viable (if imperfect) source to assess the quality of our results derived from the 1831 census. In tables 18 and 19 we show the descriptive statistics by institutional regime.

[Table 18 here]
[Table 19 here]

B.3 Control Variables

Most of the control variables used are the same as those used with the 1831 census. As the variables used relate to land quality in surveys that happen much later (soil quality and growing season both relate to late twentieth century environmental data), or that do not change (distance from closest urban centers), this is easily explained. However, two variables differ. First, we could not include the same measure for immigration since the census of 1851 does not ask the question of how many individuals are recent immigrants (the census of 1831 asked about immigrants that had arrived since 1825). The census only distinguishes the natives of Canada from the other, so this control is absent from

[42] While 21% of sub-districts included in our study for 1831 were townships (they represented 11% of the population), they held 35% of the potash and pearl ash factories.

the 1851 results. We used that definition which is the foreign-born variable. The other variable which changes is the one that relates to the postal office. We used the report of the postmaster general (1852) to assess which sub-districts had gained, lost or kept their post offices between the 1831 and 1851.

B.4 Tables and Figures for Appendix B

Table 18: Descriptive statistics for seigneurial areas in 1851

Variable	Mean	SD	Min	Max
Broad industries per 1000 pop.	1.97	2.21	0.00	14.00
Core industries per 1000 pop.	1.67	1.96	0.00	13.00
Length of growing season	198.74	12.45	169.90	212.00
Share of land (13 category)	0.48	0.32	0.00	1.00
Distance to closest urban center	62.96	83.48	0.00	719.00
Postal office	0.59	0.49	0.00	1.00
Foreign born per 1000 pop.	0.05	0.09	0.00	1.00

Table 19: Descriptive statistics for non-seigneurial areas in 1851

Variable	Mean	SD	Min	Max
Broad industries per 1000 pop.	5.02	6.79	0.00	43.00
Core industries per 1000 pop.	4.83	6.65	0.00	43.00
Length of growing season	194.70	12.01	170.10	212.00
Share of land (13 category)	0.25	0.22	0.00	1.00
Distance to closest urban center	154.42	133.55	24.00	561.00
Postal office	0.42	0.50	0.00	1.00
Foreign born per 1000 pop.	0.19	0.17	0.00	1.00

C Additional Results

C.1 Wages in 1831, Linear Fit

Figure 10: Effect of seigneurial tenure on wages, local polynomial estimates, first order, 50km

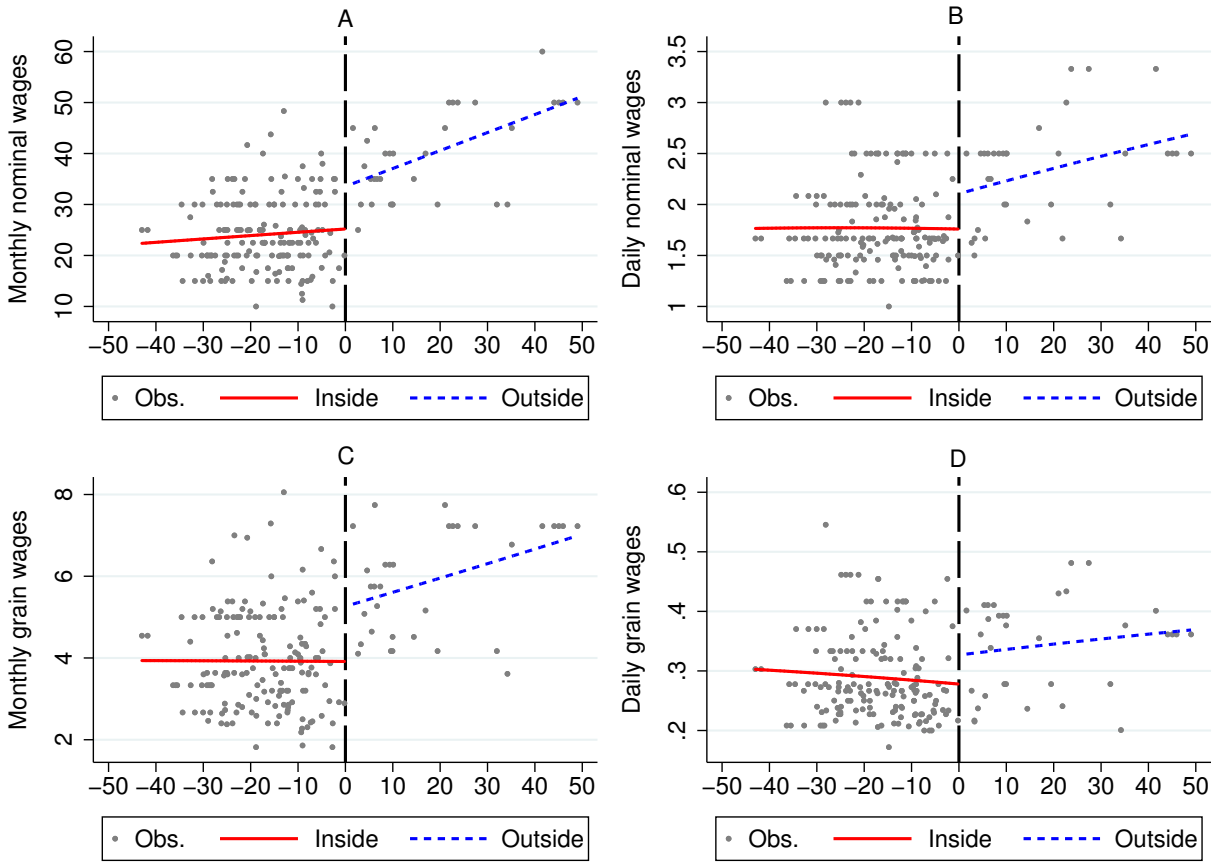

Figure 11: Effect of seigneurial tenure on wages, local polynomial estimates, first order, 50km and 500 pop

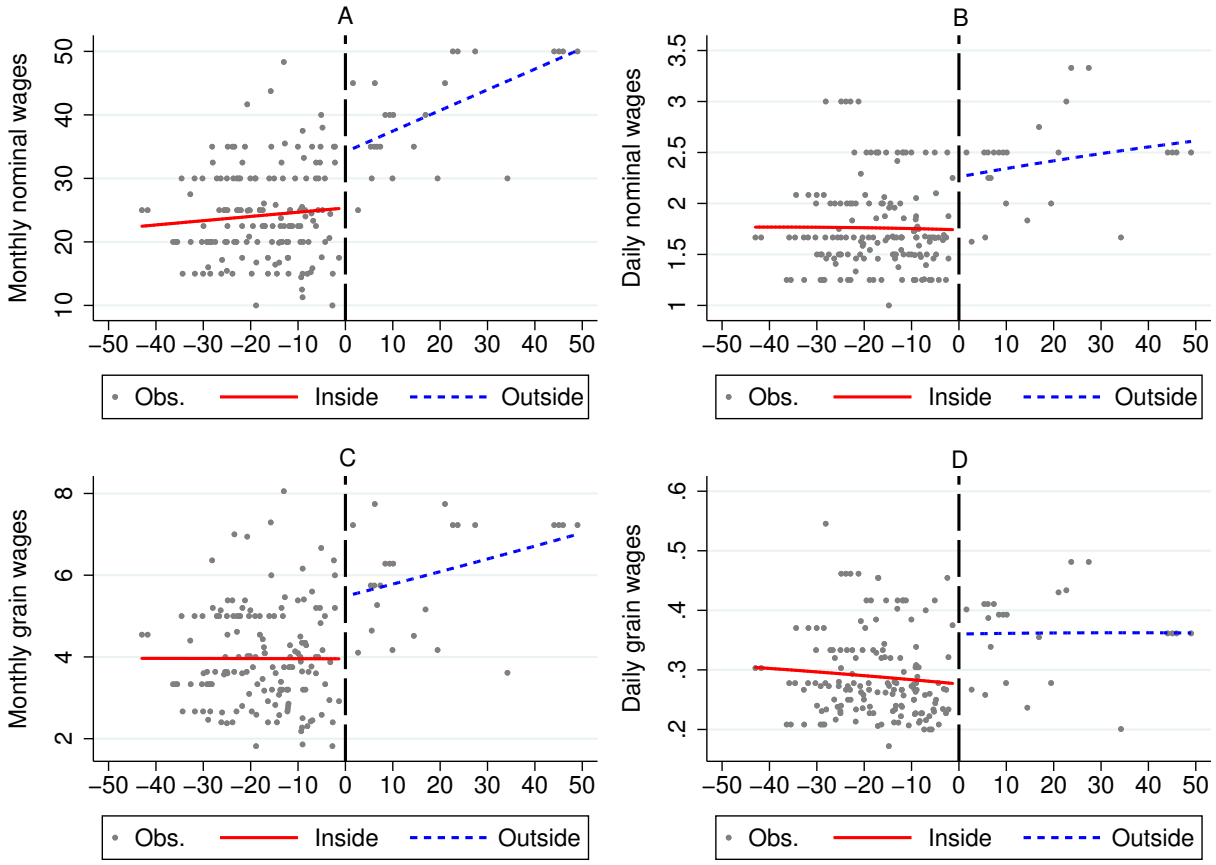

Table 20: Replication of table 4 with linear fit

	Linear estimate		Difference	
Wages	Tenure	Township	Units	in % to tenure
50 km window				
Monthly Nominal	25.1973	33.5560	8.3587	33.17%
Daily Nominal	1.7590	2.1052	0.3462	19.68%
Monthly Grain	3.9151	5.2643	1.3492	34.46%
Daily Grain	0.2780	0.3268	0.0488	17.55%
50 km and population above 500				
Monthly Nominal	25.3450	34.1829	8.8379	34.87%
Daily Nominal	1.7418	2.2606	0.5188	29.78%
Monthly Grain	3.9540	5.4868	1.5327	38.76%
Daily Grain	0.2764	0.3603	0.0839	30.36%

C.2 Wages in 1831 with Different Data Entry Rule, Linear Fit

Figure 12: Effect of seigneurial tenure on wages (using a different data entry rule for wages and prices) local polynomial estimates, first order, 50km

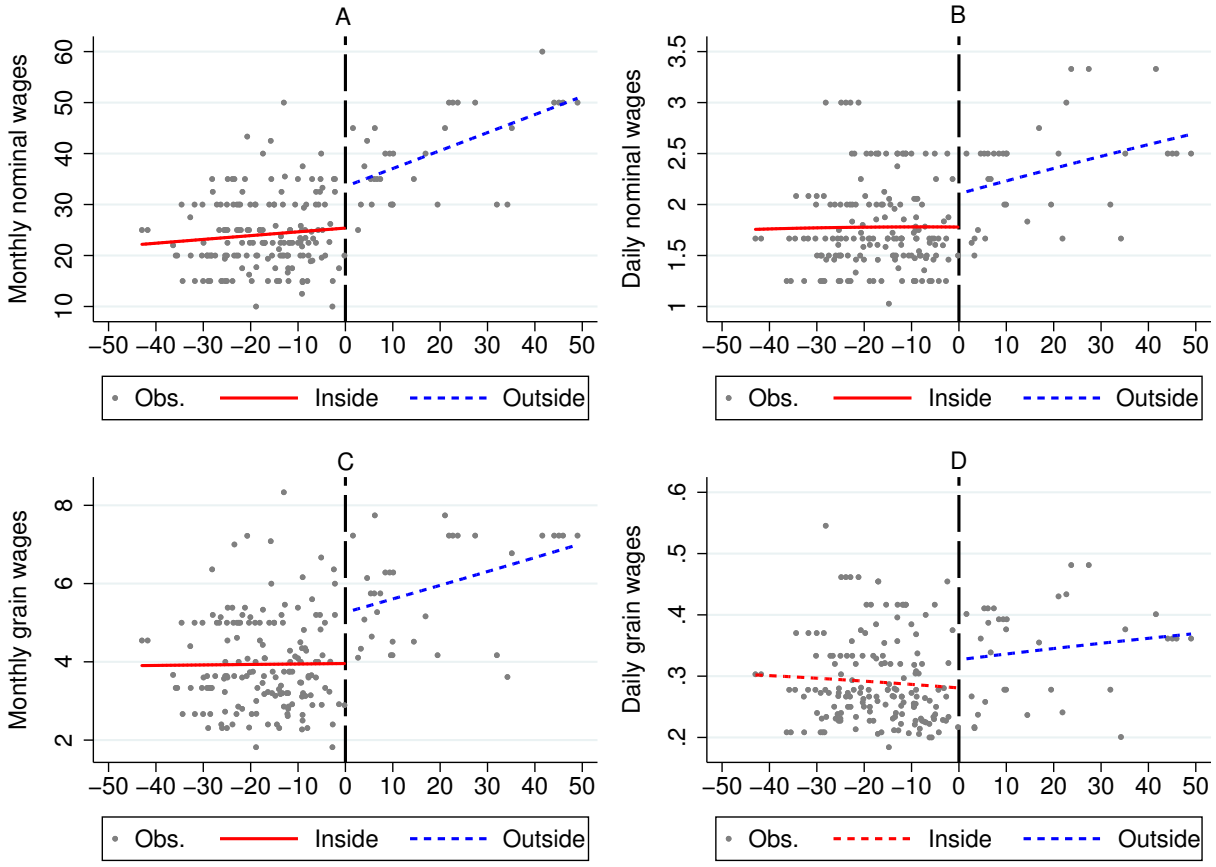

Figure 13: Effect of seigneurial tenure on wages (using a different data entry rule for wages and prices) local polynomial estimates, first order, 50km, 500 pop

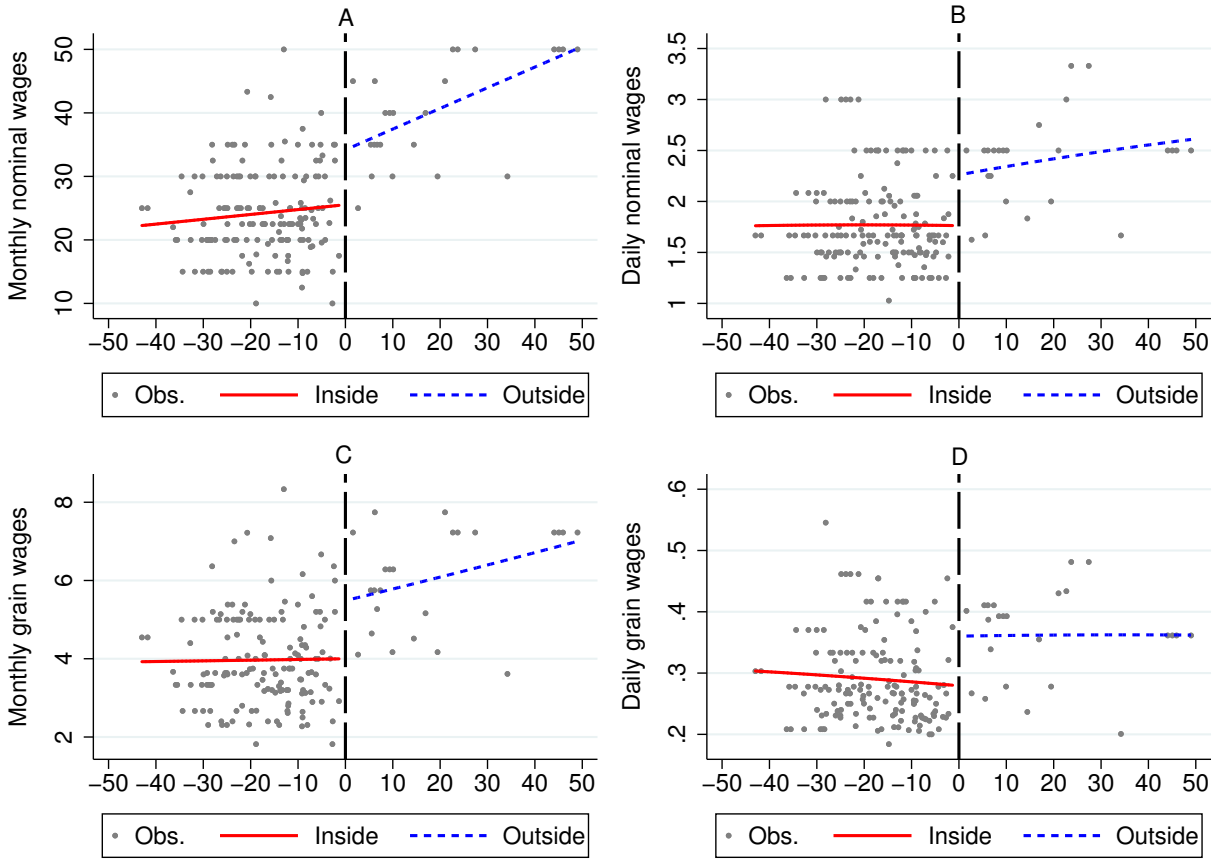

Table 21: Replication of table 13 with a linear fit

	Linear estimate		Difference	
Wages	Tenure	Township	Units	in % to tenure
50 km window				
Monthly Nominal	25.3849	33.5560	8.1711	32.19%
Daily Nominal	1.7794	2.1052	0.3259	18.31%
Monthly Grain	3.9571	5.2643	1.3072	33.03%
Daily Grain	0.2808	0.3268	0.0460	16.40%
50 km and population above 500				
Monthly Nominal	25.5466	34.1829	8.6362	33.81%
Daily Nominal	1.7629	2.2606	0.4977	28.23%
Monthly Grain	4.0005	5.4868	1.4863	37.15%
Daily Grain	0.2793	0.3603	0.0809	28.98%

C.3 Wages in 1831 with Land Quality Classes, Quadratic Fit

Table 22: Effect of seigneurial tenure with regression fit and second order polynominal, 1831 wages, no population restriction and 50 km window and land quality control replacing length of growing season

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	8.950**	1.601***	0.363	0.0568
	(3.603)	(0.611)	(0.223)	(0.0407)
(1-T) x distance to line	0.208	0.0259	-0.0229*	-0.00338
	(0.223)	(0.0383)	(0.0129)	(0.00230)
(1-T) x distance to line sq	0.00160	0.000324	-0.000644**	-7.95e-05
	(0.00503)	(0.000872)	(0.000299)	(5.39e-05)
T x distance to line	0.337	0.0161	0.0386	0.00397
	(0.352)	(0.0599)	(0.0261)	(0.00418)
T x distance to line sq	0.000634	0.000408	-0.000549	-6.67e-05
	(0.00643)	(0.00109)	(0.000493)	(7.73e-05)
share of land of quality 1 to 3	-0.906	-0.298	0.00755	-0.00737
	(1.540)	(0.264)	(0.0972)	(0.0164)
distance to closest urban center	-0.0364**	-0.00592**	-0.000606	-4.68e-05
	(0.0159)	(0.00261)	(0.000735)	(0.000114)
postal office	0.497	0.207	-0.0453	0.00159
	(1.023)	(0.181)	(0.0625)	(0.0111)
emigrants per 1000	-0.0120***	-0.00261***	-0.000225	-7.33e-05**
	(0.00393)	(0.000538)	(0.000261)	(3.62e-05)
constant	29.23***	4.646***	1.662***	0.267***
	(2.848)	(0.477)	(0.151)	(0.0259)
Observations	200	196	201	197
R-squared	0.475	0.351	0.237	0.107
Adjusted R-squared	0.450	0.319	0.201	0.0639
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 23: Effect of seigneurial tenure with regression fit and second order polynominal, 1831 wages, population greater than 500 and 50 km window and land quality control replacing length of growing season

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	9.526**	2.091***	0.529**	0.113***
	(4.247)	(0.679)	(0.240)	(0.0395)
(1-T) x distance to line	0.255	0.0290	-0.0206	-0.00338
	(0.235)	(0.0412)	(0.0142)	(0.00257)
(1-T) x distance to line sq	0.00259	0.000364	-0.000570*	-7.58e-05
	(0.00523)	(0.000925)	(0.000323)	(5.92e-05)
T x distance to line	0.367	-0.0104	0.0434	0.00223
	(0.425)	(0.0727)	(0.0279)	(0.00439)
T x distance to line sq	-0.000853	0.000761	-0.000756	-5.42e-05
	(0.00736)	(0.00129)	(0.000500)	(7.87e-05)
share of land of quality 1 to 3	-1.041	-0.281	-0.00794	-0.00699
	(1.543)	(0.273)	(0.0993)	(0.0169)
distance to closest urban center	-0.0452**	-0.00764**	-0.000578	-2.35e-05
	(0.0191)	(0.00316)	(0.000774)	(0.000128)
postal office	-0.108	0.0902	-0.0845	-0.00608
	(1.046)	(0.191)	(0.0644)	(0.0115)
emigrants per 1000	-0.0123***	-0.00272***	-0.000562**	-0.000132***
	(0.00389)	(0.000530)	(0.000233)	(3.24e-05)
constant	30.38***	4.810***	1.684***	0.267***
	(3.046)	(0.522)	(0.164)	(0.0287)
Observations	181	177	181	177
R-squared	0.445	0.334	0.258	0.151
Adjusted R-squared	0.415	0.299	0.219	0.105
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

C.4 Wages in 1831 with Land Quality Classes, Linear Fit

Table 24: Effect of seigneurial tenure with regression fit and first order polynominal, 1831 wages, no population restriction and 50 km window and land quality control replacing length of growing season

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	9.155***	1.555***	0.367***	0.0565**
	(2.159)	(0.368)	(0.134)	(0.0252)
(1-T) x distance to line	0.147**	0.0135	0.00159	-0.000339
	(0.0644)	(0.0110)	(0.00381)	(0.000672)
T x distance to line	0.367***	0.0356***	0.0127**	0.000822
	(0.0827)	(0.0120)	(0.00496)	(0.000756)
share of land of quality 1 to 3	-0.883	-0.293	-0.00149	-0.00852
	(1.526)	(0.263)	(0.0969)	(0.0163)
distance to closest urban center	-0.0358**	-0.00581**	-0.000832	-7.55e-05
	(0.0157)	(0.00259)	(0.000749)	(0.000116)
postal office	0.506	0.208	-0.0477	0.00142
	(1.016)	(0.180)	(0.0625)	(0.0110)
emigrants per 1000	-0.0119***	-0.00261***	-0.000250	-7.54e-05**
	(0.00389)	(0.000524)	(0.000242)	(3.52e-05)
constant	28.75***	4.548***	1.854***	0.291***
	(2.077)	(0.355)	(0.113)	(0.0193)
Observations	200	196	201	197
R-squared	0.475	0.350	0.217	0.095
Adjusted R-squared	0.456	0.326	0.189	0.0610
Robust standard errors in parentheses				

*** p<0.01, ** p<0.05, * p<0.1

Table 25: Effect of seigneurial tenure with regression fit and first order polynominal, 1831 wages, population greater than 500 and 50 km window and land quality control replacing length of growing season

Variables	(1) monthly nominal	(2) monthly grain	(3) daily nominal	(4) daily grain
township (T)	10.50***	1.919***	0.650***	0.112***
	(2.213)	(0.395)	(0.115)	(0.0208)
(1-T) x distance to line	0.156**	0.0149	0.00130	-0.000445
	(0.0671)	(0.0116)	(0.00392)	(0.000703)
T x distance to line	0.324***	0.0273**	0.00594	-0.000440
	(0.0748)	(0.0136)	(0.00419)	(0.000690)
share of land of quality 1 to 3	-0.999	-0.279	-0.0128	-0.00789
	(1.526)	(0.271)	(0.0991)	(0.0168)
distance to closest urban center	-0.0443**	-0.00748**	-0.000807	-5.38e-05
	(0.0189)	(0.00314)	(0.000775)	(0.000129)
postal office	-0.0947	0.0917	-0.0877	-0.00636
	(1.039)	(0.191)	(0.0643)	(0.0114)
emigrants per 1000	-0.0121***	-0.00271***	-0.000588***	-0.000135***
	(0.00391)	(0.000526)	(0.000215)	(3.13e-05)
constant	29.58***	4.697***	1.858***	0.290***
	(2.230)	(0.386)	(0.117)	(0.0204)
Observations	181	177	181	177
R-squared	0.444	0.333	0.236	0.141
Adjusted R-squared	0.421	0.305	0.206	0.106

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

C.5 Industries in 1831, Linear Fit

Table 26: Descriptive differences in industrial activity (1831) between seigneurial and non-seigneurial areas, linear fit, population greater than 500 and 50 km window

	Smoothed estimate		Difference	
Industries per 1000 pop.	Tenure	Township	Units	in % to tenure
All observations				
Broad	4.7678	7.5059	3.0753	64.50%
Core	4.3178	7.0505	2.7327	63.29%
Outlier removed				
Broad	4.7678	5.7874	1.0196	21.38%
Core	4.3178	5.2852	0.9674	22.40%

Restrictions: 50 km and 500 pop.

Table 27: Effect of seigneurial tenure with regression fit and first order polynominal, 1831 industrial activities

Variables	(1) Core	(2) Broad	(3) Core	(4) Broad	(5) Core	(6) Broad	(7) Core	(8) Broad
township (T)	3.829**	3.800**	2.923**	2.918**	5.367**	5.795**	3.376***	3.884***
	(1.643)	(1.672)	(1.377)	(1.428)	(2.230)	(2.241)	(1.101)	(1.277)
(1-T) x distance to line	0.0511**	0.0551**	0.0465**	0.0507**	0.0508***	0.0542***	0.0455**	0.0491**
	(0.0233)	(0.0243)	(0.0228)	(0.0239)	(0.0189)	(0.0207)	(0.0182)	(0.0202)
T x distance to line	-0.0144	4.05e-05	0.00757	0.0215	-0.0275	-0.0172	0.0211	0.0294
	(0.0454)	(0.0472)	(0.0401)	(0.0426)	(0.0549)	(0.0553)	(0.0274)	(0.0321)
growing season	-0.0559**	-0.0643**	-0.0626***	-0.0708***	-0.0563***	-0.0695***	-0.0597***	-0.0728***
	(0.0250)	(0.0261)	(0.0239)	(0.0251)	(0.0195)	(0.0222)	(0.0187)	(0.0214)
distance to closest urban center	0.00207	-0.000403	0.00257	8.25e-05	-0.00299	-0.00625	-0.00128	-0.00461
	(0.00605)	(0.00614)	(0.00606)	(0.00614)	(0.00438)	(0.00475)	(0.00402)	(0.00443)
postal office	0.287	0.564	-0.0302	0.255	0.162	0.358	-0.0601	0.145
	(0.492)	(0.513)	(0.380)	(0.415)	(0.414)	(0.448)	(0.344)	(0.390)
emigrants per 1000	-0.00446	-0.00571*	-0.00371	-0.00498*	-0.00919***	-0.0109***	-0.00723***	-0.00901***
	(0.00315)	(0.00313)	(0.00299)	(0.00298)	(0.00267)	(0.00269)	(0.00191)	(0.00202)
constant	15.13***	17.32***	16.42***	18.58***	15.47***	18.69***	16.00***	19.20***
	(5.012)	(5.228)	(4.815)	(5.036)	(3.913)	(4.455)	(3.778)	(4.320)
Observations	238	238	237	237	206	206	205	205
Outlier excluded			Yes	Yes			Yes	Yes
Retrictions	50 km	50 km	50 km	50 km	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop
R-squared	0.235	0.234	0.244	0.237	0.291	0.309	0.303	0.313
Adjusted R-squared	0.211	0.210	0.220	0.214	0.266	0.285	0.278	0.288

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

C.6 Industries in 1831 with with Land Quality, Quadratic Fit

Table 28: Effect of seigneurial tenure with regression fit and second order polynominal, 1831 industrial activities with land quality control replacing the length of the growing season

Variables	(1) Core	(2) Broad	(3) Core	(4) Broad	(5) Core	(6) Broad	(7) Core	(8) Broad
township (T)	1.906	1.880	1.338	1.329	4.513*	4.995**	2.615**	3.176**
	(1.849)	(1.919)	(1.725)	(1.809)	(2.309)	(2.334)	(1.310)	(1.528)
(1-T) x distance to line	0.0898	0.0845	0.0793	0.0744	0.0231	0.0145	0.0107	0.00262
	(0.0907)	(0.0946)	(0.0890)	(0.0931)	(0.0671)	(0.0739)	(0.0661)	(0.0732)
(1-T) x distance to line sq	0.000559	0.000279	0.000367	9.20e-05	-0.00111	-0.00149	-0.00131	-0.00168
	(0.00196)	(0.00204)	(0.00192)	(0.00201)	(0.00150)	(0.00164)	(0.00149)	(0.00164)
T x distance to line	0.187	0.202	0.154	0.169	0.0219	0.0168	0.0604	0.0537
	(0.150)	(0.168)	(0.139)	(0.160)	(0.123)	(0.151)	(0.113)	(0.149)
T x distance to line sq	-0.00441	-0.00441	-0.00322	-0.00325	-0.000890	-0.000551	-0.000684	-0.000353
	(0.00310)	(0.00348)	(0.00272)	(0.00318)	(0.00214)	(0.00271)	(0.00207)	(0.00275)
share of land of quality 1 to 3	0.508	0.688	0.543	0.721	0.290	0.501	0.284	0.495
	(0.573)	(0.615)	(0.562)	(0.607)	(0.483)	(0.538)	(0.471)	(0.529)
distance to closest urban center	0.00683	0.00527	0.00796	0.00637	0.00285	0.00107	0.00493	0.00306
	(0.00565)	(0.00568)	(0.00556)	(0.00560)	(0.00383)	(0.00407)	(0.00327)	(0.00359)
postal office	0.115	0.371	-0.207	0.0579	0.0302	0.199	-0.199	-0.0200
	(0.496)	(0.516)	(0.379)	(0.413)	(0.422)	(0.455)	(0.350)	(0.394)
emigrants per 1000	-0.00404	-0.00510	-0.00305	-0.00414	-0.00802***	-0.00944***	-0.00600***	-0.00750***
	(0.00319)	(0.00319)	(0.00298)	(0.00300)	(0.00278)	(0.00278)	(0.00202)	(0.00211)
constant	4.009***	4.343***	3.897***	4.235***	3.776***	4.137***	3.577***	3.946***
	(1.036)	(1.067)	(1.022)	(1.055)	(0.752)	(0.811)	(0.723)	(0.787)
Observations	238	238	237	237	206	206	205	205
Outlier excluded			Yes	Yes			Yes	Yes
Retrictions	50 km	50 km	50 km	50 km	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop
R-squared	0.223	0.218	0.219	0.209	0.268	0.280	0.266	0.270
Adjusted R-squared	0.192	0.187	0.188	0.178	0.235	0.247	0.232	0.237

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

C.7 Industries in 1831 with with Land Quality Classes Instead of Length of Growing Season, Linear Fit

Table 29: Effect of seigneurial tenure with regression fit and first order polynominal, 1831 industrial activities with land quality control replacing the length of the growing season

Variables	(1) Core	(2) Broad	(3) Core	(4) Broad	(5) Core	(6) Broad	(7) Core	(8) Broad
township (T)	3.274**	3.169**	2.317*	2.238*	4.526**	4.776**	2.496**	2.831**
	(1.581)	(1.596)	(1.270)	(1.311)	(2.233)	(2.214)	(1.027)	(1.169)
(1-T) x distance to line	0.0668***	0.0728***	0.0642***	0.0703***	0.0677***	0.0745***	0.0635***	0.0705***
	(0.0214)	(0.0222)	(0.0213)	(0.0221)	(0.0175)	(0.0187)	(0.0171)	(0.0184)
T x distance to line	-0.0152	-0.000585	0.00627	0.0203	-0.0219	-0.0104	0.0267	0.0361
	(0.0448)	(0.0465)	(0.0396)	(0.0420)	(0.0545)	(0.0546)	(0.0260)	(0.0303)
share of land of quality 1 to 3	0.485	0.664	0.526	0.704	0.293	0.501	0.286	0.494
	(0.570)	(0.613)	(0.559)	(0.604)	(0.480)	(0.537)	(0.468)	(0.528)
distance to closest urban center	0.00707	0.00542	0.00813	0.00645	0.00259	0.000701	0.00460	0.00263
	(0.00555)	(0.00559)	(0.00546)	(0.00550)	(0.00381)	(0.00406)	(0.00328)	(0.00360)
postal office	0.136	0.392	-0.195	0.0707	0.0271	0.196	-0.202	-0.0231
	(0.503)	(0.521)	(0.381)	(0.414)	(0.419)	(0.452)	(0.346)	(0.390)
emigrants per 1000	-0.00350	-0.00460	-0.00266	-0.00377	-0.00812***	-0.00958***	-0.00612***	-0.00766***
	(0.00318)	(0.00316)	(0.00302)	(0.00301)	(0.00271)	(0.00272)	(0.00194)	(0.00205)
constant	3.814***	4.238***	3.768***	4.193***	4.128***	4.613***	3.996***	4.487***
	(0.671)	(0.694)	(0.671)	(0.693)	(0.557)	(0.597)	(0.539)	(0.582)
Observations	238	238	237	237	206	206	205	205
Outliers excluded			Yes	Yes			Yes	Yes
Retrictions	50 km	50 km	50 km	50 km	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop
R-squared	0.216	0.212	0.215	0.205	0.267	0.278	0.264	0.268
Adjusted R-squared	0.192	0.188	0.190	0.181	0.241	0.253	0.238	0.242

Robust standard errors in parentheses
*** p¡0.01, ** p¡0.05, * p¡0.1

C.8 Industries in 1831 with with Land Quality Classes Instead of Length of Growing Season, Quadratic Fit

Table 30: Effect of seigneurial tenure with regression fit and second order polynominal, 1831 industrial activities with land quality control replacing the length of the growing season

Variables	(1) Core	(2) Broad	(3) Core	(4) Broad	(5) Core	(6) Broad	(7) Core	(8) Broad
township (T)	1.906	1.880	1.338	1.329	4.513*	4.995**	2.615**	3.176**
	(1.849)	(1.919)	(1.725)	(1.809)	(2.309)	(2.334)	(1.310)	(1.528)
(1-T) x distance to line	0.0898	0.0845	0.0793	0.0744	0.0231	0.0145	0.0107	0.00262
	(0.0907)	(0.0946)	(0.0890)	(0.0931)	(0.0671)	(0.0739)	(0.0661)	(0.0732)
(1-T) x distance to line sq	0.000559	0.000279	0.000367	9.20e-05	-0.00111	-0.00149	-0.00131	-0.00168
	(0.00196)	(0.00204)	(0.00192)	(0.00201)	(0.00150)	(0.00164)	(0.00149)	(0.00164)
T x distance to line	0.187	0.202	0.154	0.169	0.0219	0.0168	0.0604	0.0537
	(0.150)	(0.168)	(0.139)	(0.160)	(0.123)	(0.151)	(0.113)	(0.149)
T x distance to line sq	-0.00441	-0.00441	-0.00322	-0.00325	-0.000890	-0.000551	-0.000684	-0.000353
	(0.00310)	(0.00348)	(0.00272)	(0.00318)	(0.00214)	(0.00271)	(0.00207)	(0.00275)
share of land of quality 1 to 3	0.508	0.688	0.543	0.721	0.290	0.501	0.284	0.495
	(0.573)	(0.615)	(0.562)	(0.607)	(0.483)	(0.538)	(0.471)	(0.529)
distance to closest urban center	0.00683	0.00527	0.00796	0.00637	0.00285	0.00107	0.00493	0.00306
	(0.00565)	(0.00568)	(0.00556)	(0.00560)	(0.00383)	(0.00407)	(0.00327)	(0.00359)
postal office	0.115	0.371	-0.207	0.0579	0.0302	0.199	-0.199	-0.0200
	(0.496)	(0.516)	(0.379)	(0.413)	(0.422)	(0.455)	(0.350)	(0.394)
emigrants per 1000	-0.00404	-0.00510	-0.00305	-0.00414	-0.00802***	-0.00944***	-0.00600***	-0.00750***
	(0.00319)	(0.00319)	(0.00298)	(0.00300)	(0.00278)	(0.00278)	(0.00202)	(0.00211)
constant	4.009***	4.343***	3.897***	4.235***	3.776***	4.137***	3.577***	3.946***
	(1.036)	(1.067)	(1.022)	(1.055)	(0.752)	(0.811)	(0.723)	(0.787)
Observations	238	238	237	237	206	206	205	205
Outlier excluded			Yes	Yes			Yes	Yes
Retrictions	50 km	50 km	50 km	50 km	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop	50 km and 500 pop
R-squared	0.223	0.218	0.219	0.209	0.268	0.280	0.266	0.270
Adjusted R-squared	0.192	0.187	0.188	0.178	0.235	0.247	0.232	0.237

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

C.9 Industries in 1851 with with Land Quality Classes Instead of Length of Growing Season, Linear Fit

Table 31: Effect of seigneurial tenure with regression fit and first order polynominal, 1851 industrial activities

Variables	(1) Core	(2) Broad	(3) Core	(4) Broad
township (T)	2.580**	2.395**	1.112*	0.988
	(1.042)	(1.055)	(0.624)	(0.650)
(1-T) x distance to line	0.0134	0.0181	0.0206	0.0253*
	(0.0138)	(0.0149)	(0.0128)	(0.0142)
T x distance to line	0.00369	0.00666	0.0385	0.0376
	(0.0428)	(0.0433)	(0.0275)	(0.0284)
share of land of quality 1 to 3	-1.649***	-1.592***	-1.247***	-1.255***
	(0.524)	(0.557)	(0.342)	(0.396)
distance to closest urban center	0.00232	0.00170	3.92e-06	-0.000588
	(0.00214)	(0.00214)	(0.00181)	(0.00182)
postal office	-0.344	-0.253	0.0613	0.145
	(0.323)	(0.339)	(0.252)	(0.274)
foreign born per 1000	-3.182*	-2.959	-1.505	-1.268
	(1.846)	(1.892)	(1.252)	(1.402)
constant	2.902***	3.218***	2.627***	2.980***
	(0.440)	(0.459)	(0.360)	(0.393)
Observations	413	413	357	357
Retrictions	50 km	50 km	50 km and 500 pop	50 km and 500 pop
R-squared	0.177	0.154	0.189	0.156
Adjusted R-squared	0.163	0.140	0.172	0.139

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

References

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