Can Geography Explain Quebec's Historical Poverty?*

Vincent Geloso† Louis Rouanet‡

Abstract

From the 19th century to the 1940's, Quebec remained poorer and less economically developed than the rest of Canada in general and poorer than Ontario in particular. This placed Quebec at the bottom of North American rankings of living standards. One prominent hypothesis for the initiation of this gap is tied to disparities in agricultural land quality. Using newly available data for the mid-19th century, we formally test this hypothesis and find it holds little explanatory power. We further argue that poor institutions in Quebec (i.e. notably seigneurial tenure) are at the root of the development gap and that the effect of land quality on living standards is institutionally contingent.

Keywords: Geography, Canadian Economic History, Quebec, Seigneurial Tenure, Institutions

JEL Codes: O13, N11, N51

*Rouanet gratefully acknowledge the financial support of the Mercatus Center and the Institute for Humane Studies. Geloso acknowledges the insights and help of the late Gilles Paquet and also acknowledges the helpful contribution of Winter Bourbon Smash. We thank Mary, Alexandra, Emile, Arthur, Julien and Maxence ? for their love and support.

†Email: vgeloso@gmu.edu. Address: Department of Economics, George Mason University.

‡Email: louis.rouanet@wku.edu. Address: Department of Economics, Western Kentucky University.

1 Introduction

The Canadian province of Quebec, home of the lion's share of Canada's French population, has long been one of the poorest areas of North America. This dates back as early as the first settlements in the 17th century (Arsenault-Morin et al., 2017; Geloso, 2019). Within 19th century Canada, it was poorer than the rich province of Ontario by somewhere between 34% and 42% (McInnis, 1992; Egnal, 1996; Geloso and Macera, 2020). Given that Ontario was one of the richest places in North America (Egnal, 1996; Lewis and Urquhart, 1999), these proportions imply that Quebec was exceptionally poor by North American standards. Estimates for the 1850s suggest that Quebec was poorer than the low-income US slave states (Egnal, 1996). By the 1940s, Quebec's francophone majority still lagged heavily behind (Raynauld, 1961; Migué, 1998; Paquet, 1999; Geloso, 2017; Gagnon et al., 2020; Dean and Geloso, 2021). This long-lasting gap has been the object of considerable attention by historians and economists. The proposed explanations fall into three sets: a) cultural differences; b) institutions; c) geography.

The first set dominated the literature until the 1980s. It held that French-Canadians were culturally ill-disposed towards markets prior to 1960 and, as such, achieved poorer outcomes (Jones, 1942; Taylor, 1960; Ouellet, 1966; Egnal, 1996; Ouellet, 1976). These explanations have grown less prominent since the 1980s as a result of econometric works by cliometricians showing that there were no differences in the efficiency of input use so that all differences stemmed from endowments, geography or institutions (Lewis and McInnis, 1980; Armstrong, 1984b; Lewis and McInnis, 1984; Altman, 1998; Paquet and Wallot, 2007; Geloso et al., 2017). This cultural hypothesis is no longer widely shared in the literature (Kerr and Smyth, 1980; Harris, 2009; Russell, 2012) – reflecting a broader trend among economic historians (Schultz, 1964; Rothenberg, 1992; Ogilvie, 2001; Dennison, 2011)

The second set holds that institutional differences are the key driver. The institution of seigneurial tenure – a feudal import from France that the British kept in certain portions of the colony as late as 1854 – is the center of attention. The institution gave landlords important powers notably in terms of taxing local populations, restraining internal migration and monopoly

rights on industrial activities. The institution did not exist in the rest of Canada. However, the standard view in the literature since the 1970s is that while the institution was detrimental, its effects are insufficient to explain Quebec's relative poverty (McCallum, 1980; Percy and Szostak, 1992; Russell, 2012; Altman, 1998). However, economists and cliometricians have pushed back against that view arguing that the more traditional view of seigneurial tenure as being a crucial determinant was too eagerly dismissed. They argue that too little (much) attention has been given to the non-farm (agricultural) sector (Phillips, 1974; Altman, 1983; Armstrong, 1984a; Pronovost, 1998; Geloso and Lacombe, 2016; Geloso, 2020; Geloso et al., 2018). They point to the combination of monopoly rights and migration barriers that would have slowed down the emergence of an industrial sector. In recent econometric work using a regression discontinuity design, Geloso et al. (2018) showed that non-seigneurial areas in Quebec offered significantly higher wages (both in nominal and real terms) than seigneurial areas in Quebec (by somewhere between 20% and 47%). As such, there appears to be an ongoing debate on the validity of this set of explanation.

This leaves the third set of explanation which is that geographical features pertaining to farmland are of relevance (Faucher, 1973; Kerr and Smyth, 1980; McCallum, 1980; Harris, 2009; Russell, 2012; Desloges, 2016).[1] Suitable farmlands in Canada are concentrated along the American border such as in the Ontario peninsula surrounded by Lakes Huron, Erie and Ontario (Harris, 2009). In Quebec, suitable farmland is mostly concentrated in a small area around the island of Montreal. (Harris, 2009). In other words, Ontario had more high-quality farmland than Quebec. As such, during the 19th century, Ontario's farm settlements could expand easily with limited decreasing marginal returns (Clarke, 2001). In contrast, Quebec's smaller endowment of high quality farmland translated in steeply decreasing marginal returns to opening new farms (Ouellet, 1966,9).[2]

[1]There are other variants of this view. Most notable is the variant proposed by Faucher and Lamontagne (1971). In their telling , Quebec's relative distance from coal and iron ore sources meant higher input costs than in Ontario. This view has been heavily criticized by Altman (1986) and fails to explain why the gap existed prior to the 1860s when these resources became valuable to industrial development.

[2]Some scholars initially emphasized differences in soil exhaustion due to the fact that Lower Canada had begun large-scale agriculture in the early 18th century (Jones, 1942). However, the soil exhaustion narrative is

Yet, while econometric methods have been used heavily to discuss the cultural (Lewis and McInnis, 1980; Armstrong, 1984b; Lewis and McInnis, 1984; Geloso et al., 2017) and institutional explanations (Geloso et al., 2018), they have not been used to question geography's role. This is perplexing given that geography – being exogenous – can be most easily subjected to econometric analysis such that interpreting productivity differences is relatively straightforward. Moreover, analyzing the empirical importance of geography indirectly informs us about the validity of the other explanations.

In this paper, we provide the first econometric estimation of the effects of land quality on determining productivity differences in historical Canada. We rely on newly available cross-section of agricultural wages and prices in Quebec and Ontario in 1842 (Geloso and Macera, 2020) in conjunction with the suitability of land for growing wheat (i.e. the two colonies' main crop). We find that geography fails to explain a sizable share of the difference in wages. In fact, in most specifications, land quality fails to yield an effect that is significantly different from zero. Our results are robust to numerous definitional changes to the data and estimation strategies. In the best possible settings, holding land quality constant, there remains substantial differences to be explained between Lower and Upper Canada (as Quebec and Ontario were known then).

We further argue that effects which could be attributable to geography are byproducts of institutional features. As some areas *within* Quebec were not under seigneurial tenure, we run a horse race between land quality and land tenure regimes. The latter appears to weigh more heavily lending authority to those who argue that institutional factors were crucial.

More importantly, we take up the institutional mechanisms used by Geloso et al. (2018) to tie seigneurial tenure to lower living standards and argue that there are institutionally-contingent effects of geography. According to Geloso et al. (2018), seigneurial tenure gave landlords a labor

tied to cultural explanations (Ouellet, 1966; Séguin, 1970; Ouellet, 1980; Lavertue, 1984). The soil was exhausted, so the argument goes, because the French-Canadians continually cropped wheat and failed to use manure to prevent erosion. Using the 1851 census data, Lewis and McInnis (1980) showed that, within Quebec, there were no differences in farming efficiency (measured by total factor productivity) between English and French farmers. Geloso et al. (2017) extended their results to the 1831 census data and controlled for how long a census sub-district had been settled which would capture the extent of soil erosion. They also found no differences along cultural lines. By dealing with the cultural explanations for living standards differences, these scholars have provided the only econometric assessment (albeit indirectly) of the geographic explanation.

market monopsony. By restraining the mobility of workers while enjoying monopoly rights over certain industrial activities, landlords were the sole demanders (within their large estates) of non-farm labor. This meant that by selecting the quantity of labor to hire, they could also determine the wage-level that maximized their profits. In section 3.2, we explain that if Geloso et al. (2018) are correct, there should be an effect of geography on wages *within* the group of areas under seigneurial rule. In more competitive labor markets (i.e. outside the seigneurial zone), workers could move and wages would equalize across locations with land prices showing greater variance. We confirm this implication of their model as there is a strong effect of geography on wages within the group of seigneurial observations. There are little to no effects of geography on wages within the non-seigneurial group. Another implication of the model developed by Geloso et al. (2018) is that labor markets should show few signs of integration on the seigneurial side whereas markets on the non-seigneurial would have been better integrated. We confirm that this is the case. As such, we argue that whatever effects geography can be argued to have had are actually attributable to institutions.

Our paper is divided as such. Section 2 highlights the data and econometric strategy we used to test the role of geography. Section 3 provides and discusses the results. Section 4 concludes.

2 Data and Econometric Strategy

2.1 Wage and Price Data

Thanks to Geloso and Macera (2020), the wage data contained in the 1842 census of Canada West and Canada East (also referred to as Upper Canada and Lower Canada) can be used as the data source. The 1842 census is often used by historians to study Canada West, but it is more frequently avoided for Canada East. In that colony, the census was conducted very differently and has been deemed a "failure" (Curtis, 2002, 56). Enumerators were not appointed for all areas of the colony and the funds allocated by the legislature proved insufficient (Curtis, 2002,

55–56). The information for some counties in which the census was fully completed has been lost and no total tabulations of the incomplete census exists. All that remains are the rolls for 23 counties (encompassing 139 sub-districts).[3]

At first glance, this suggests that the census of 1842 is not the proper source to use. However, some researchers have resorted to using the 1842 census in "highly controlled exercises" (Olson and Thornton, 2002, 339) as there are some important advantages of the 1842 census. In our case, there are three advantages.

First, this is the only source that provide a methodologically consistent estimation of wages and prices for 1842 over an area that encompasses Canada East and West at the same time mark.[4] In column 88 of the census, enumerators were asked to report the "average price of agricultural labour per day throughout the year." In column 87, enumerators reported the "average price of wheat in every such place since last harvest". Combining columns 88 and 87 allows us to deflate wages by local prices and create "grain wages". These grain wages essentially adjust for regional differences in purchasing power parities. This Geloso and Macera (2020) were able to collect wage rates and prices for 47 sub-districts in Canada East and 53 for Canada West (see map 1 below for a geographical distribution) in order to assess whether Canada East was indeed poorer than Canada West (as many historians had claimed). No other sources provide such rich spatial comparisons of wages in both nominal terms and relative to wheat prices. As we show in Appendix D, wheat prices tended to be lower in seigneurial areas in Lower relative to non-seigneurial areas. This means that using grain wages will constitute the lower bound case and nominal wages will constitute the upper bound case.

Second, Geloso and Macera (2020) also provide a rich assessment of the reliability of the data. Using a multitude of other primary sources such as the *Colonization Circular*[5], Colonial

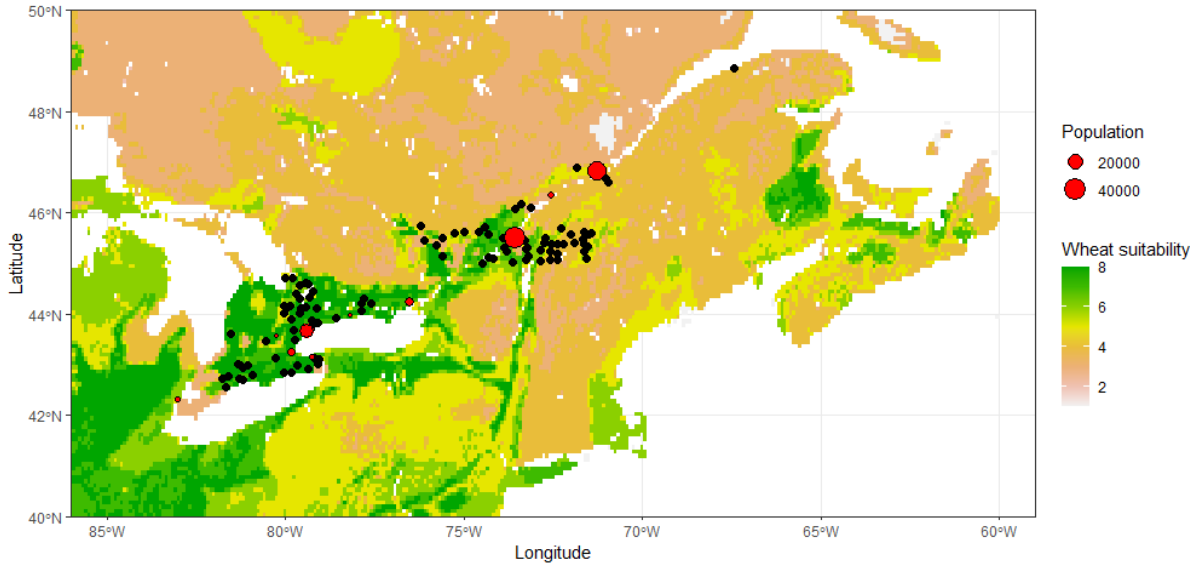
[3]In two of these counties, some pages appear to be missing, preventing us from tabulating the total population in these areas.

[4]It is also the only pre-1851 census that is identical in both colonies and taken at the same time. The other censuses have different questions and were administered differently at different moments in time. The census of 1851, while it is identical for both places, does not provide the wage data and the advantage underlined below.

[5]A British publication informing potential emigrants to Canada about the economic conditions in the different British colonies. Wage data and prices is contained in the different editions of the *Circular*.

Figure 1: Map.

Note: Each black dot is one of the 104 towns for which we have wage data. Red dots represent the 10 biggest cities in Canada in 1842.



Land and Emigration Commissioners reports and testimonies to the House of Commons, they found that the wage rates reported in these sources line with those found in the census. They also assessed whether the areas that provided data for Canada East were representative of the colony as a whole. They point out that Canada East had conducted a complete census in 1831 that asked the same questions about prices and wages (but Canada West did not) which can be used to assess the sample available from 1842. They found that the areas in 1831 that provided data in 1842 were slightly richer than the rest of Canada East. However, they pointed out that this bias works in favor of finding a more productive and richer Canada East. Thus, Geloso and Macera (2020) argue that they were presenting a "lower bound" case. Thus, the wage data appears to be of sufficient quality to be usable.

The quality of the wage data yields the third and last advantage of using the 1842 census data which is that wage data is preferable to net farm income data. Although Canada East and Canada West were agrarian economies (i.e. agriculture clearly represented close to or more than 50% of total output), agricultural income was not the sole source of income. There was a high level of pluriactivity so that farm households were not exclusively engaged in agriculture

and earned substantial shares of their income from non-farm activities (Dufour, 1981; Davis and Engerman, 1999; Lewis, 2001; Courville, 2008). Areas with more opportunities for non-farm work[6] would have lower levels of net farm income but not total income.[7] The wage rate would, however, be less affected by this issue. Indeed, competition for unskilled labor across sectors (e.g. farming, shipbuilding, timber, potash, pearl ash, fulling, carding, tanning, distilling) would tend to equalize wage rates across sectors thus circumventing the issue mentioned above.

Table 1: Wages in Upper and lower Canada

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
			Upper Canada		
Day Wage (shillings)	56	2.901	0.612	1.750	4.630
Price of Wheat (shillings/bushel)	55	4.841	0.654	2.670	7
Grain Wage (bushel/day)	53	0.615	0.170	0.250	1
Wheat suitability	61	6.577	1.384	2.533	8
			Lower Canada		
Day Wage (shillings)	48	2.511	0.763	0.830	6
Price of Wheat (shillings/bushel)	87	5.598	0.908	3.610	9.030
Grain Wage (bushel/day)	47	0.434	0.107	0.153	0.750
Wheat Suitability	91	4.901	1.379	2.034	7.991
			Seigneurial Lower Canada		
Day Wage (shillings)	18	2.057	0.587	0.830	3
Price of Wheat (shillings/bushel)	54	5.358	0.961	3.610	9.030
Grain Wage (bushel/day)	17	0.391	0.127	0.153	0.663
Wheat Suitability	58	4.850	1.460	2.034	7.713

Geloso and Macera (2020) found that Canada East had nominal wages and grain wages that were respectively 16% and 42% below those of Canada West (see first two panels of table 1). As they were engaging exclusively with documenting the extent of the living standards gap

[6]The extent of non-farm activities depended in part on proximity to cities, villages, forests (i.e. for the timber, pearl ash and potash industries) and riverways (i.e. for shipbuilding). This is something that we control for below by including variables for market access.

[7]The census data for net farm income is easy to compute as demonstrated by Geloso et al. (2017); Lewis and McInnis (1980); Altman (1998); Armstrong (1984b); McInnis (1992) and can even be compared across the colonies. However, the census data makes it harder to decompose labor inputs within households in order to reflect pluriactivity. As such, the output numerator is certain but the denominator for partial productivities (which are in turn needed to estimate total factor productivity) is subject to more uncertainty – see McInnis (1981) for a discussion of how the farming of small plots was tied to market proximity.

between the two colonies, they did not try to explain the gap's causes in great details. The key question here is whether lower land quality can explain Canada East's lower wages. To develop an answer the next step is to produce an estimate of land quality.

2.2 Land Quality

To measure land suitability, we use the Global Agro-Ecological Zones (GAEZ v.3) data provided by the FAO and the International Institute for Applied Systems Analysis (IIASA) (Fischer et al., 2002). Because wheat was the main crop, we use the data measuring potential wheat suitability.

The database contains around 2.2 million grid-cells (at 5 degrees latitude/longitude) and covers all countries' land resources. A grid-cell amounts to a land area of some 5,000 to 10,000 ha, depending on the latitude of a location. We projected the data using Albers equal-area conic projection for North America. We then drew a 10km buffer around each sub-district's centroid and then calculated the average wheat suitability of the area within the buffers which is not covered by water.[8] In Appendix E, we show that the results discussed in the next section are not affected by the use of different-sized buffers. The values used in this paper are reported in the last rows of each panel of table 1. As can be seen, Upper Canada had a strong advantage in terms of land quality relative to Lower Canada. Land quality in the seigneuries of Lower Canada, on the other hand, was comparable to that of towns in Lower Canada not subject to seigneurial institutions.

Measuring wheat suitability involves making assumptions about input uses. We use the GAEZ v.3 data based on intermediate input/improved management assumption, which corresponds to a situation where "the farming system is partly market oriented. Production for subsistence plus commercial sale is a management objective. Production is based on improved varieties, on manual labor with hand tools and/or animal traction and some mechanization." (Fischer et al., 2012).[9]

[8]The values of wheat suitability range from 1 (very high suitability) to 8 (not suitable). To make the interpretation of results more intuitive, we reversed that order so that a higher value signals higher wheat suitability.

[9]Using the GAEZ v.3 data with the low-input assumption (corresponding to a situation where "the farming

2.3 Econometric Strategy

To evaluate the relative strength of the geographic explanation for Quebec's poverty, we begin by estimating a baseline OLS specification as follows:

$$W = \alpha + \beta \times WheatSuitability + \mathbf{X} + \varepsilon \tag{1}$$

Where W is the log of wage, $\mathbf{X}$ is a vector of controls and ε is the error term. The coefficient β can be interpreted as the semi-elasticity of wages with respect to the wheat suitability of land. If geography was a relevant factor as predicted, we should expect β to be positive independently of whether an area is in Upper or or Lower Canada (which is captured by a dummy variable in the vector $\mathbf{X}$).

We also want to evaluate relative merit of the institutional explanation for Quebec's historical poverty. As such, we must discuss the institution of seigneurial tenure. Formally transplanted in the colony in 1627, it was essentially a weakened version of French feudalism. The British preserved it when they conquered Quebec in 1760 but, in 1791, froze the geographical boundaries of the regime. All newly settled areas after that data had to be settled under British freehold tenure. By 1854, when the institution was abolished, roughly a fifth of Quebec's farmers and all of Upper Canada were operating under non-seigneurial rule. Under seigneurial tenure, the crown conceded an estate to a *seigneur* (i.e. landlord) who had to freely concede plots to *censitaires* (i.e. peasants) in exchange for paying taxes in perpetuity.[10] Once settled, the censitaire could not legally leave his plot unless he sold his land. If he sold his land, he had to pay the *lods et ventes*, a tax equal to one-twelfth tax of the value of the sale, to the *seigneur*. The *seigneurs* also had important the monopoly rights. In addition to a straight-up monopoly on milling grain, the *seigneur* could also use the numerous other taxes he could legally charge to limit entry into other non-farm industries. This was advantageous to him as it meant he could tax competitors to

system is largely subsistence based and not necessarily market oriented") leaves all of our econometric results virtually unchanged. The regressions using that data are available on request. This assumption appears to match discussion of farming practices in Canada (Lewis and McInnis, 1980; Geloso et al., 2017).

[10] The taxes represented 5% of income as opposed to 9% to 18% in France (Geloso, 2020).

activities in which he was involved (e.g. saw mills, textile factories, tanneries, distilleries, potash and pearl ash factories).[11] As a result, the virtual totality of non-farm industries in seigneurial areas were owned by *seigneurs* (Courville, 1993; Pronovost, 1998).

Geloso et al. (2018) argued that the restrictions on mobility and the monopoly rights essentially gave *seigneurs* a monopsony on the non-farm labor market. The monopolies meant that *seigneurs* could set wage rates on the non-farm labor market. Workers, with few exit options, could not rely on the threat of changing employment to bid up wages. Using a regression discontinuity design and the wage data contained in the 1831 census to compare non-seigneurial and seigneurial areas in Quebec, Geloso et al. (2018) found that seigneurial areas had wages 20% to 47% below those of non-seigneurial areas. Their work, being contained only to Quebec, can be extended to the object of interest of this paper: the differences between Upper Canada and Lower Canada. The last panel of table 1 shows wages and land quality of seigneurial areas. Wages are lower than in seigneurial Lower Canada – as predicted by Geloso et al. (2018). However, differences in land quality appear minimal in contrast to land quality differences with Upper Canada.

If Geloso et al. (2018) are correct, we should expect that seigneurial areas in Lower Canada would be poorer than non-seigneurial in *both* Upper Canada and Lower Canada. As such, we will run separate specifications of equation 1 where a variable for seigneurial tenure will be included. This will essentially amount to running a horse race between geographical and institutional factors.

Before proceeding with our results, we must discuss our other control variables. Wheat suitability may be correlated with other variables, including other geographical characteristics, which cause wages to be lower or higher. If it is, then our estimate of the effect of wheat suitability on wages will be biased. One such factor which could impact wages is the size of the market each sub-district is embedded into. To account for that possibility, we add two variables. The first, named "Distance to water," measure the distance, in 100 of km, to the

[11] As way of example, a *seigneur*-owned saw mill would not be charged those taxes but all competing saw mills would be charged.

nearest body of navigable water. This variable is important because navigation at the time was much cheaper than land transportation, which means that access to navigable waters increases the size of the markets members of each sub-district had access to. The second control we include, "Market potential," for town i is defined as follows: $MarketAccess_i = \sum_j^d \frac{Population_j}{Distance_{ij}^{\sigma}}$ (Juhász, 2018), where $j \in (Montreal, Toronto, Quebec)$.[12] We took the population of the 3 largest cities discussed in the closest censuses for population. Using the coordinate of these cities, we then took the distance to the different towns for which we had data.[13]

We also control for cultural differences across our sample. The farmers in seigneurial tenure regions were almost all Francophone, while the farmers non-seigneurial tenure regions were typically Anglophones, who arrived later (Percy and Szostak, 1992). This meant that there typically were vast cultural differences between seigneurial and non-seigneurial regions besides differences in tenure.

Finally, we include longitude and latitude as controls. In appendix C, we add several controls and account for whether our results are sensitive to the selection of observables using the 'speccheck' stata package provided by Brodeur et al. (2020). We show that they are not.

The spatial distribution of land quality and wages is most likely geographically clustered, which may lead spurious results to appear statistically significant. If both the dependent and the independent variable are spatially correlated, the standard error of the coefficient will not be adjusted for the fact that close observations are naturally more likely to possess the same attributes, hence resulting in inflated t-statistics. To account for spatial auto-correlation, we use adjusted standard errors (Conley, 1999) with a 300km cutoff value and a linearly declining spatial kernel in all of our tables.[14]

[12] σ can be thought as the elasticity of trade with respect to distance. We set $\sigma = 1$ although different values of σ do not change the results.

[13] We also included the 10 largest Canadian cities from 1825 (Osborne et al., 1993) instead of the 3 largest to measure market potential. The results are virtually unchanged (see Appendix C).

[14] Kelly (2019) shows that the use of Conley standard errors can be unsatisfactory when using low cutoff values. Our results are robust to changing the cutoff value to 100, 200, 400, 500 and 600km. Those regressions are available on demand.

3 Geography, institutions and development

3.1 Institutions or geography?

The results in tables 2 and 3 tend to confirm the idea that geography played a trivial role in determining Quebec's relative poverty. Column 3 in table 2 shows that wheat suitability is only very tenuously correlated to nominal wages and is statistically insignificant. For grain wages, there is a significant effect as can be seen from column 3 table 3. However, the coefficients are small in both cases. Using the only two columns in table 3 where land quality has a statistically significant effect, an increase from the "wheat suitability" average in Lower Canada to that of Upper Canada is associated with only with a 10.1 to 11.9 log points increase in grain wages –i.e. a 10.6 to 12.7%.[15] In our sample, grain wages are 41.7% higher in Upper Canada than in Lower Canada. This means that at best land quality accounts for a fourth of the development gap between the two regions. In many other specifications, the effect of "Wheat suitability" vanishes and is statistically insignificant.

In addition, adding our measure of wheat suitability to our dummy variable for Upper Canada (Tables 2 and 3, column 5) does not decrease the magnitude of the later. On the contrary, it increases it in Table 2 and only barely decreases it in Table 3, thus suggesting that land suitability is an unlikely candidate to explain Quebec's relative poverty.

Nonetheless, it could be the case that labour markets were well integrated at the provincial level, but not well integrated across the two provinces (a reasonable hypothesis given the linguistic and cultural differences between Upper and Lower Canada). Thus, the better quality land in Ontario could still explain much of the difference in wages between Ontario and Quebec, while at the same time land quality at the local level would explain little of the variation in local wages within each province. The evidence for this hypothesis is limited.

First, if markets were integrated within provinces but not across them, we should "Wheat suitability" coefficients to be much smaller when we include our Upper Canada dummy variable.

[15] The percentage impact of a variable (because wages are logged) is calculated using 100*[exp(β_1) - 1] as proposed by Halvorsen and Palmquist (1980).

Comparing wheat suitability coefficients in columns (3) and (5), we do see that including Upper Canada as a control reduces their size. However the economic significance of those coefficients is small. In appendix D, we reproduce the regressions from Tables 2 and 3 while excluding "Upper Canada" from these specifications. In only one 1 of 8 regressions is "Wheat Suitability" statistically significant. This statistically significant effect of wheat suitability vanishes when controlling for our cultural variable.[16] These results indicate that wheat suitability is unlikely to have played a role in explaining wage differences both within upper and lower Canada and between those regions.

Table 2: Geography, institutions and nominal wages.

Note: This table displays the results of the cross-sectional regression of the natural logarithm of wage on geographical and institutional characteristics.

Log of Wage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Seigneurial	-0.35298***			-0.32322***		-0.34501***	-0.32627***	-0.37688***	-0.27680***	-0.29169***
	(0.08107)			(0.08822)		(0.07681)	(0.09011)	(0.09189)	(0.07734)	(0.07264)
Upper Canada		0.16691***		0.04571	0.17928***		0.03502	0.03393	0.07774	0.06410
		(0.05718)		(0.04423)	(0.05186)		(0.06566)	(0.06343)	(0.09063)	(0.10223)
Wheat suitability			0.02550		-0.00687	0.01083	0.00530	-0.00487	-0.01532	-0.01313
			(0.01731)		(0.01662)	(0.01262)	(0.01829)	(0.01515)	(0.01583)	(0.01729)
Distance to Water								-0.21340**	-0.07829	-0.09800
								(0.08903)	(0.08291)	(0.08564)
Market potential								0.01359	0.01859	0.01923
								(0.01522)	(0.01319)	(0.01395)
Of French descent (%)										-0.03315
										(0.11254)
Longitude									✓	✓
Latitude									✓	✓
Observations	104	104	104	104	104	104	104	104	104	102
R-squared	0.24471	0.09502	0.02212	0.25010	0.09610	0.24857	0.25073	0.27838	0.33850	0.34704

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

The institutional explanation of the development gap, on the other hand, relies on much more robust evidence. Indeed, column (1) in tables 2 and 3 shows that without including any controls, sub-districts subject to seigneurial tenure had wages between 29.7% and 31.1% lower than sub-districts not subjected to such a tenure regime. On the other hand, Upper Canada was, as shown in columns (2), richer than Lower Canada with wages being around 18.2% and 41.1% higher for nominal and grain wages respectively.

Columns (5) through (10) in both tables indicate that controlling for whether a sub-district was subjected to seigneurial institutions drastically reduces the estimated premium wage earn-

[16] See: Appendix D.

ers enjoyed in Upper Canada. In table 2, the nominal wage difference between Lower and Upper Canada vanishes when accounting for seigneurial institutions (column 4) but not when accounting for variations in land quality (column 5). When using grain wages instead, the wage gap between Upper and Lower Canada is more persistent but also declines substantially when accounting for seigneurial tenure. Further adding controls whittles away – in both specifications – the effect of Upper Canada. However, the effect of seigneurial tenure persist regardless of specification. Most importantly, at no point does wheat suitability appear to play a crucial role in determining wages. When wheat suitability is significant, the effect is small and tends to be smaller than in the bi-variate settings from column (3).[17] Finally, we control for cultural differences in column (10) using the proportion of inhabitants of French descent. The effect is not statistically significant and changes sign between Table 2 and 3.

The validity of econometric estimates should always be questioned when they rely on a relatively small number of observations while the number of relevant explanatory variables can be large. With a small number of observations, especially for the seigneurial sub-districts, our results could be driven by an outlier.[18] In other words one seigneurial sub-district may have experienced lower wages because of factor unique to it. One way to address this worry is to follow a "leave one observation out" process (Sala-i Martin, 1997; McCannon and Hall, 2021). Appendix B reports the coefficients and t-statistics of 104 regressions by rerunning the specification from column 7 in table 2 while removing one from our sample observation each time. No coefficient exceeded -0.23 and none failed to pass the 1% significance threshold.

The results in tables 2 and 3 cannot be interpreted as causal. Yet they are consistent with the institutional explanation of Quebec's relative poverty while those same results provide very little to no evidence that geography played an independent role on economic development. To further expand on this finding and provide some economic robustness to our findings, we test two corollaries that accompany proposed mechanisms by which the institution of seigneurial

[17] The same is true when we omit "Upper Canada" from our regressions. See: Appendix D.

[18] We have nominal wage data for 18 "seigneurial" sub-districts. For grain wages, we have data for 17 sub-districts.

Table 3: Geography, institutions and grain wages.

Note: This table displays the results of the cross-sectional regression of the natural logarithm of grain wages on geographical and institutional characteristics.

Log(grain wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Seigneurial	-0.37218***			-0.19794**		-0.33082***	-0.21290***	-0.29027***	-0.17092**	-0.19268***
	(0.12758)			(0.08111)		(0.09698)	(0.07850)	(0.08615)	(0.06787)	(0.05696)
Upper Canada		0.34446***		0.27286***	0.32004***		0.22519**	0.22255***	0.01554	0.03239
		(0.06026)		(0.04825)	(0.08435)		(0.09354)	(0.07080)	(0.10290)	(0.11686)
Wheat suitability			0.07390***		0.01316	0.06088***	0.02278	0.00749	-0.01326	-0.01261
			(0.01904)		(0.02395)	(0.02029)	(0.02814)	(0.02141)	(0.02062)	(0.02174)
Distance to Water								-0.32760**	-0.11862	-0.10808
								(0.13733)	(0.12385)	(0.13735)
Market potential								0.01807	0.02888	0.02839
								(0.03310)	(0.02327)	(0.02140)
Of French descent (%)										0.05999
										(0.11881)
Longitude									✓	✓
Latitude									✓	✓
Observations	100	100	100	100	100	100	100	100	100	98
R-squared	0.28567	0.18890	0.12852	0.32676	0.28831	0.27378	0.33444	0.37915	0.45352	0.45001

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

tenure depressed living standards. The monopsony mechanism proposed by Geloso et al. (2018) (and discussed in section 2.3) has two implications tied to geographical factors. The first is that there should be an effect of geography ***within*** the group of seigneurial areas (i.e. the effect of geography is institutionally-contingent). The second is that labor markets should be less integrated (i.e. greater wage differences) on the seigneurial side than on the non-seigneurial side. In sections 3.2 and 3.3 we expand and test these implications. This will allow us to move from mere criticism of the geographical hypothesis to weighting it against the role of institutions.

3.2 Institutionally contingent effects of geography?

Consistent with Geloso et al. (2018), imagine the seignorial economy as composed of N monopsonists in $i \in (1, ..., x)$ locations. Each ***seigneurie*** is composed of N workers with the total supply for labor equal to $L = Nl(W_i)$, where each worker's individual labor supply l is upward sloping in the wage paid to them in their locality W_i. Finally, each ***seigneur*** owns the same amount of land T and faces the same constant returns to scale production function $X = F(L; AT)$, where A captures the effect of land quality. The profit function of a ***seigneurie*** is thus:

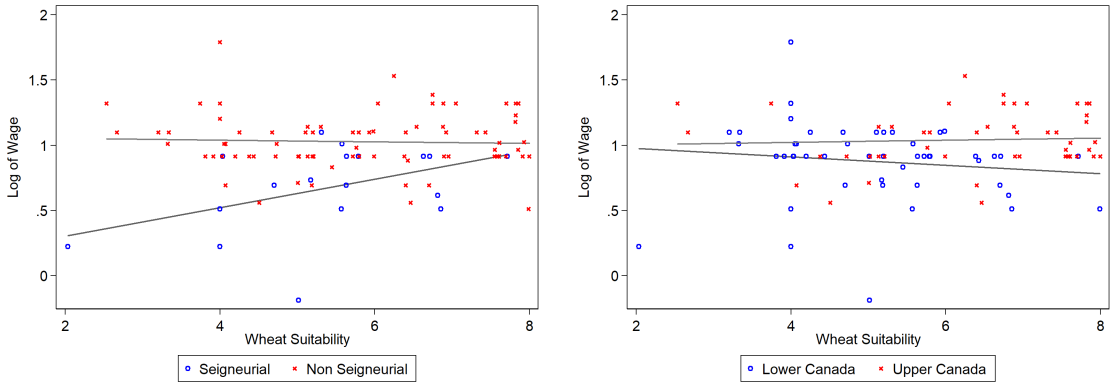
$$\Pi_i = F(L; AT) - W_i L \tag{2}$$

As we explained above, *seigneurs* were also monopsonists. As such, the profit maximizing amount of labor hired occurs by equating marginal factor cost to the marginal productivity of labor. Solving for W_i, profit maximization implies that:

$$W_i = \frac{F_L}{\left(1 + \frac{1}{\varepsilon^i_{LW}}\right)} \tag{3}$$

Where ε^i_{LW} is the wage elasticity of the labor supply. As shown in equation 3, wage in each lordship is positively impacted by land quality as long as an increase in land quality leads to an increase in the marginal productivity of labor ($F_{LA} > 0$). But this only applies to the *seigneuries* where there is limited labor movement. In more competitive labor markets, such as those on the non-seigneurial side, grain wages will tend to equalize across locations. With competition, workers in regions with poor land quality are paid as much as workers in regions with fertile land, net of the cost of moving and contracting. Owners of poor quality land, on the other hand, will receive lower land rents.

Figure 2: The relationship between wheat suitability and wages



The 1842 census recorded the "average price of agricultural labour per day throughout the year," and agricultural labor was fairly homogenous across workers. As long as land quality positively impact the marginal productivity of labor, we should therefore expect wages to be positively related to land quality across *seigneuries* because of monopsony power while wages in regions not subject to seigneurial tenure will tend to equalize to the extent that the labor

market is competitive and labor movements are cheap. We should therefore see a weaker, if any, relationship between land quality and wages across non-feudal localities.

Table 4: Geography and the institutionally contingent effect of geography (nominal wages).

Note: This table displays the results of the cross-sectional regression of the natural logarithm of wage (either nominal or deflated by wheat prices) on geographical and institutional characteristics.

	Log of Nominal Wage					*Log of Grain Wage*				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Seigneurial × Wheat Suitability	0.12128***	0.11548***	0.11543***	0.09666***	0.13466***	0.14362***	0.13440***	0.13372***	0.09147***	0.1215***
	(0.02922)	(0.03119)	(0.03126)	(0.03351)	(0.02924)	(0.02699)	(0.03003)	(0.03043)	(0.03292)	(0.03535)
Non Seigneurial × Wheat Suitability	-0.00372	-0.01376	-0.02845*	-0.03362***	-0.03199***	0.05020***	0.03446	-0.01857	-0.03192**	-0.03107**
	(0.01067)	(0.01080)	(0.01616)	(0.01050)	(0.01135)	(0.01888)	(0.02213)	(0.01664)	(0.01278)	(0.01229)
Seigneurial	-0.97315***	-1.04452***	-1.07394***	-0.92346***	-1.20297***	-0.80701***	-0.91668***	-1.03797***	-0.78990***	-1.03069***
	(0.20194)	(0.21339)	(0.21315)	(0.20877)	(0.21264)	(0.24207)	(0.27034)	(0.19765)	(0.20372)	(0.21849)
Distance to Water		-0.23882***	-0.23776**	-0.12673	-0.15885		-0.35959***	-0.35194**	-0.16214	-0.16481
		(0.09179)	(0.11144)	(0.09975)	(0.10183)		(0.11673)	(0.15215)	(0.12624)	(0.13193)
Market potential		-0.00257	-0.00227	0.00277	-0.00078		0.00036	0.00403	0.01623	0.01275
		(0.01765)	(0.01705)	(0.01702)	(0.01893)		(0.02772)	(0.02482)	(0.01791)	(0.01629)
Upper Canada			0.08234	0.15823	0.19333			0.27748***	0.08773	0.14104
			(0.05425)	(0.11860)	(0.14352)			(0.05915)	(0.13034)	(0.15372)
Of French descent (%)					0.08742					0.15575
					(0.10395)					(0.10836)
Longitude				✓	✓				✓	✓
Latitude				✓	✓				✓	✓
Observations	104	104	104	104	102	100	100	100	100	102
R-squared	0.30151	0.33179	0.34297	0.38944	0.41760	0.29401	0.34287	0.42840	0.48486	0.41760

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

The results in table 4 are consistent with our hypothesis that the effect of land quality on wages is institutionally contingent and reports the results of 10 OLS specifications. Columns 1 through 5 and 6 to 10 have the same exact controls as in tables 2 and 3 but the "seigneurial" variable is interacted with "wheat suitability." Among seigneurial sub-districts, the estimated effect of land suitability for growing wheat is large, positive and statistically significant at the 1% level while its effect is inconsistent and generally statistically insignificant isn't for non-seigneurial sub-districts. When it is significant for non-seigneurial areas, the effect smaller and sometimes even slightly negative. A one standard deviation increase in "wheat suitability" predicts an increase in wages by between 14.1 and 19.6 log points –i.e. between 15.2 and 21.7 percent – in seigneurial areas. Of course, our results need to be interpreted with caution. If the elasticity of the labor supply across seigneuries is correlated with wheat suitability, for instance, our results will be biased. Although there is no way to assess the local elasticity of the labor supply in 1842, there is no specific reason to believe it would be correlated with wheat suitability.

Overall, our stylized facts, although they cannot be interpreted as causal, are consistent with our hypothesis about the institutionally contingent effect of geography on wages. Our

findings also provide substantiation for diminishing the importance of geography – through land quality – in determining the origins Quebec's historical poverty. Indeed, not only is geography providing a trivial share of the differences, but most of its effects are byproducts of institutional factors.

3.3 Wage dispersion and institutions

A second corollary of the monopsony proposition of Geloso et al. (2018) is related to the first regarding the relationship between wages and land quality. If workers could move between areas within the non-seigneurial estates, we should expect that wages would tend to equalize –at a given level of human capital. This leads to the result discussed above. However, that also entails that labor markets are better integrated on the non-seigneurial side than on the seigneurial side. Limited mobility on the seigneurial side meant that workers could not engage in arbitrage over wage rates so that wage differences would persist. As such, when distance between areas is controlled for, we should expect any measure of dispersion to exhibit lower values in non-seigneurial areas. To measure wage dispersion, we employed the following measures:

$$D_i = \sum_{j}^{N_i} \frac{|log(Wage_i) - log(Wage_j)|}{N_i}, \forall j s.t. Distance_{ij} \leq 100km \tag{4}$$

Where i and j are towns in the same institutional group (i.e. seigneurial or non-seigneurial) for which we have data. D_i denotes wage dispersion for town i. In other words, D_i measures the average percentage absolute difference between wages in a town and wages in towns within a 100 km radius from that town.

Because even within a 100km radius variations in the distance to other towns may drive variations in price dispersion, we include a control for the average distance to other towns used to compute or measure of wage dispersion. In addition, we test whether our results are robust to changing the size of the radius used to measure wage dispersion in Appendix F. Our results are robust to using any radius between 50km and 400km.

Table 5: Wage dispersion and institutions.

Note: This table displays the results of the cross-sectional regression of the dispersion of wages on institutional and geographical characteristics.

Wage dispersion	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Seigneurial	0.14630***		0.16357***	0.15219***	0.12200***	0.15433***	0.15024***	0.10308***	0.10467***
	(0.04592)		(0.04429)	(0.03440)	(0.03440)	(0.03868)	(0.03838)	(0.02139)	(0.02061)
Upper Canada		-0.03264	0.02652*	0.05641**		0.04149		-0.02206	
		(0.02817)	(0.01571)	(0.02859)		(0.03618)		(0.07500)	
Cultural Diversity								-0.29148**	-0.27582***
								(0.14163)	(0.10135)
Of French descent (%)								0.12422**	0.12793**
								(0.06051)	(0.05418)
Wheat suitability				✓	✓	✓	✓	✓	✓
Market potential				✓	✓	✓	✓	✓	✓
Distance to water				✓	✓	✓	✓	✓	✓
Distance to other towns				✓	✓	✓	✓	✓	✓
Latitude						✓	✓	✓	✓
Longitude						✓	✓	✓	✓
Observations	103	103	103	99	99	99	99	97	97
R-squared	0.17772	0.01593	0.18575	0.18046	0.15560	0.18108	0.17799	0.27962	0.27900

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

The results showcased in tables 5 and 6 confirm that seigneurial areas exhibit more dispersion than non-seigneurial areas. The different columns of those tables highlight our results as we include more and more controls until we reach (in column 6) the exact same specifications as in tables 2 and 3. To economize on space, we report only the main coefficient of interest. In all settings the effects of seigneurial is equal to more than 0.13 log points and the effect is always significant to the 99% level.

Tables 5 and 6 also report the coefficients on our cultural variables. We use the proportion of inhabitants of French decent as a proxy for culture as well as a variable measuring how any particular town diverged culturally compared to neighboring towns within a 100km radius.[19] We find that cultural diversity is negatively correlated with wage dispersion is both tables but only weakly so in table 3. Cultural diversity being often a byproduct of trade (Geloso and Rouanet, 2020), it is not surprising that more integrated markets also spurred a cultural melting-pot. Exposition to the French culture, on the other hand, is systematically and positively correlated with both nominal wage dispersion and grain wage dispersion. This may suggest that informal

[19]The exact definition is $C_i = \sum_j^{N_i} \frac{|F_i - F_j|}{N_i}, \forall j s.t. Distance_{ij} \leq 100km$. Where i and j are towns in our sample. C_i here denotes cultural diversity for town i. F_i denotes out cultural variable, "Of French descent (%)."

institutions such as cultural norms may have mattered as well.

Table 6: Grain wage dispersion and institutions.

Note: This table displays the results of the cross-sectional regression of the dispersion of grain wages on institutional and geographical characteristics.

Grain wage dispersion	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Seigneurial	0.12457***		0.16941***	0.17770***	0.13455***	0.17498***	0.18294***	0.15837***	0.16325***
	(0.04823)		(0.04284)	(0.04312)	(0.04256)	(0.03914)	(0.04095)	(0.02974)	(0.02848)
Upper Canada		0.01130	0.07022***	0.08062***		-0.08071		-0.06743	
		(0.03300)	(0.02218)	(0.02442)		(0.06719)		(0.09974)	
Cultural Diversity								-0.05093	-0.00308
								(0.16184)	(0.11883)
Of French descent (%)								0.09833***	0.10968***
								(0.03422)	(0.04166)
Wheat suitability				✓	✓	✓	✓	✓	✓
Market potential				✓	✓	✓	✓	✓	✓
Distance to water				✓	✓	✓	✓	✓	✓
Distance to other towns				✓	✓	✓	✓	✓	✓
Latitude						✓	✓	✓	✓
Longitude						✓	✓	✓	✓
Observations	99	99	99	99	99	99	99	97	97
R-squared	0.11289	0.00170	0.16413	0.17300	0.12964	0.22682	0.21682	0.26252	0.25756

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

4 Conclusion

Our aim in this article was to econometrically test the merit of the hypothesis that the origins of Quebec's historical poverty are rooted in poor land endowments. We found, using the 1842 census data that offers the only consistent dataset to compare Quebec and Ontario, that geography offers at best a weak explanation. When there is a significant effect of geography, it is likely a byproduct of institutional factors. When we included the role of institutions such as seigneurial tenure, we not only found that it accounted for a much larger share of the differences than geography, we also found that it was through the institution of seigneurial tenure that geography generated effects. Indeed, areas under seigneurial tenure were subjected to greater barriers to entry in industry and greater barriers to worker mobility. This meant that factor price equilibriums would be different than in the economically freer areas. In the seigneurial areas, worker immobility meant that wages could not converge through arbitrage. This meant there would be more dispersion in wage rates within the seigneurial areas. Moreover, it also meant that differences in land quality would determine wage levels in seigneurial areas whereas worker

migration in non-seigneurial areas would have pushed workers to higher productivity areas. We find evidence for both mechanisms suggesting that we should downgrade the importance of geography in determining Quebec's historical poverty.

This result is a major development for Canadian economic history as regional differences constitute a major item of debate among Canadian economists (McInnis, 1968; Green, 1971; Bertram and Percy, 1979; Inwood and Irwin, 2002; Emery and Levitt, 2002; DeJuan and Tomljanovich, 2005; Geloso, 2017). However, that result should not be too surprising given how recent developments in data availability have allowed some initial econometric forays into formally assessing the empirical importance of geography in determining these differences. One good example is Chernoff (2014) who found that despite disadvantages in land endowments, Atlantic Canada performed quite well in the early day of convergence. This matches evidence showing that Atlantic Canada was relatively rich at the time (Gwyn, 1998). These results suggest that the decline of Atlantic Canada was a post-confederation development which limits the importance of geography as an explanation. Our results compares to those in that we too are diminishing the relevance of geography and asserting that other factors – namely institutions – are of greater importance. Combined to these works, our results should be a call to further revisit claims of the crucial role of geography in determining historical differences in living standards within Canada.

References

Altman, M. (1983). Seigniorial Tenure in New France, 1688-1739: An Essay on Income Distribution and Retarded Economic Development. *Historical Reflections/Réflexions historiques*, pages 335–375.

Altman, M. (1986). Resource endowments and location theory in economic history: a case study of Quebec and Ontario at the turn of the twentieth century. *Journal of Economic History*, pages 999–1009.

Altman, M. (1998). Land tenure, ethnicity, and the condition of agricultural income and productivity in mid-nineteenth-century quebec. *Agricultural history*, 72(4):708–762.

Armstrong, R. (1984a). *Structure and Change: An Economic History of Quebec*. Gage Publishing Co.

Armstrong, R. (1984b). The efficiency of Quebec farmers in 1851. *Histoire sociale/Social history*, 17(33):149–163.

Arsenault-Morin, A., Geloso, V., and Kufenko, V. (2017). The heights of French-Canadian convicts, 1780s–1820s. *Economics & Human Biology*, 26:126–136.

Bertram, G. W. and Percy, M. B. (1979). Real wage trends in Canada 1900-26: Some provisional estimates. *The Canadian Journal of Economics/Revue canadienne d'Economique*, 12(2):299–312.

Brodeur, A., Cook, N., and Heyes, A. (2020). A proposed specification check for p-hacking. In *AEA Papers and Proceedings*, volume 110, pages 66–69.

Chernoff, A. (2014). 1871 Productivity Differentials and the Decline of the Maritime Manufacturing Sector. *Acadiensis*, 43(1):65–88.

Clarke, J. (2001). *Land, power, and economics on the frontier of Upper Canada*. Number 194. McGill-Queen's Press-MQUP.

Conley, T. G. (1999). GMM estimation with cross sectional dependence. *Journal of Econometrics*, 92(1):1–45.

Courville, S. (1993). Tradition or Modernity? The Canadian Seigneury in the Durham Era: Another Perspective. In *Proceedings of the Meeting of the French Colonial Historical Society*, volume 17, pages 44–66.

Courville, S. (2008). *Québec: A Historical Geography*. UBC Press.

Curtis, B. (2002). *The politics of population: State formation, statistics, and the census of Canada, 1840-1875*. University of Toronto Press.

Davis, L. and Engerman, S. (1999). The economy of british north america: miles traveled, miles still to go. *The William and Mary Quarterly*, 56(1):9–22.

Dean, J. and Geloso, V. (2021). The linguistic wage gap in Quebec, 1901 to 1951. *Cliometrica*, pages 1–23.

DeJuan, J. and Tomljanovich, M. (2005). Income convergence across Canadian provinces in the 20th century: Almost but not quite there. *The Annals of Regional Science*, 39(3):567–592.

Dennison, T. (2011). *The institutional framework of Russian serfdom*. Cambridge University Press.

Desloges, Y. (2016). *Sous les cieux de Québec: météo et climat, 1534-1831*. Éditions du Septentrion.

Dufour, P. (1981). La construction navale à Québec, 1760-1825: sources inexplorées et nouvelles perspectives de recherches. *Revue d'histoire de l'Amérique française*, 35(2):231–251.

Egnal, M. (1996). *Divergent paths: How culture and institutions have shaped North American growth*. Oxford University Press.

Emery, J. H. and Levitt, C. (2002). Cost of living, real wages and real incomes in thirteen

Canadian cities, 1900–1950. *Canadian Journal of Economics/Revue canadienne d'économique*, 35(1):115–137.

Faucher, A. (1973). *Québec en Amérique au XIXe siècle*. Fides.

Faucher, A. and Lamontagne, M. (1971). Histoire de l'industrialisation. *Le «retard» économique du Québec et l'infériorité des Canadiens français, Montréal, Boréal Express*, page 40.

Fischer, G., Freddy, N., Sylvia, P., Edmar, T., Géza, T., Harrij, v. V., Luc, V., and David, W. (2012). Model documentation.

Fischer, G., Van Velthuizen, H., Shah, M., and Nachtergaele, F. O. (2002). Global agro-ecological assessment for agriculture in the 21st century: methodology and results.

Gagnon, J., Geloso, V., and Isabelle, M. (2020). The Incubated Revolution: Education, Cohort Effects, and the Linguistic Wage Gap in Quebec, 1970 to 2000. Technical report.

Geloso, V. (2017). *Rethinking Canadian Economic Growth and Development Since 1900: The Quebec Case*. Springer.

Geloso, V. (2020). Predation, Seigneurial Tenure, and Development in French Colonial America. *Social Science History*, 44(4):747–770.

Geloso, V., Hinton, M., and Kufenko, V. (2017). The equally "bad" French and English farmers of Quebec: New TFP measures from the 1831 census. *Historical Methods*, 50(3):170–189.

Geloso, V., Kufenko, V., and Arsenault Morin, A. (2018). Monopsony and industrial development in nineteenth century quebec: The impact of seigneurial tenure. *Available at SSRN 3270356*.

Geloso, V. and Lacombe, A. (2016). Why was flour of poor quality? The impact of seigneurial laws and price controls on flour in Quebec during the colonial era. *Agricultural History Review*, 64(2):181–195.

Geloso, V. and Macera, G. (2020). How poor were Quebec and Canada during the 1840s? *Social Science Quarterly*, 101(2):792–810.

Geloso, V. and Rouanet, L. (2020). Ethnogenesis and statelessness. *Available at SSRN 3448582*.

Geloso, V. J. (2019). Distinct within North America: living standards in French Canada, 1688–1775. *Cliometrica*, 13(2):277–321.

Green, A. G. (1971). *Regional aspects of Canada's economic growth*. University of Toronto Press.

Gwyn, J. (1998). *Excessive expectations: Maritime commerce and the economic development of Nova Scotia, 1740-1870*. McGill-Queen's Press-MQUP.

Halvorsen, R. and Palmquist, R. (1980). The interpretation of dummy variables in semilogarithmic equations. *American Economic Review*, 70(3):474–475.

Harris, C. (2009). *The Reluctant Land: Society, Space, and Environment in Canada before Confederation*. ubc Press.

Inwood, K. and Irwin, J. (2002). Land, income and regional inequality: New estimates of provincial incomes and growth in canada, 1871-1891. *Acadiensis*, 31(2):157–184.

Jones, R. L. (1942). French-Canadian Agriculture in the St. Lawrence Valley, 1815-1850. *Agricultural History*, 16(3):137–148.

Juhász, R. (2018). Temporary protection and technology adoption: Evidence from the Napoleonic blockade. *American Economic Review*, 108(11):3339–76.

Kelly, M. (2019). The standard errors of persistence.

Kerr, D. and Smyth, W. J. (1980). Agriculture, balanced growth, and social change in central canada since 1850: Some comments toward a more complete explanation. *Economic Development and Cultural Change*, 28(3):615–622.

Lavertue, R. (1984). L'histoire de l'agriculture québécoise au xixe siècle: une schématisation des

faits et des interprétations. *Cahiers de géographie du Québec*, 28(73-74):275–287.
Lewis, F. and McInnis, M. (1980). The efficiency of the French-Canadian farmer in the nineteenth century. *Journal of Economic History*, 40(3):497–514.
Lewis, F. and McInnis, M. (1984). Agricultural Output and Efficiency in Lower Canada, 1851. *Research in Economic History*, 9:45–87.
Lewis, F. D. (2001). Farm settlement with imperfect capital markets: a life-cycle application to Upper Canada, 1826–1851. *Canadian Journal of Economics/Revue canadienne d'économique*, 34(1):174–195.
Lewis, F. D. and Urquhart, M. C. (1999). Growth and the standard of living in a pioneer economy: Upper Canada, 1826 to 1851. *The William and Mary Quarterly*, 56(1):151–181.
McCallum, J. (1980). *Unequal beginnings: agriculture and economic development in Quebec and Ontario until 1870*, volume 244. University of Toronto Press.
McCannon, B. C. and Hall, J. C. (2021). Stay-at-home orders were issued earlier in economically unfree states. *Southern Economic Journal*, 87(4):1138–1151.
McInnis, M. (1968). The trend of regional income differentials in Canada. *Canadian Journal of Economics/Revue canadienne d'économique*, 1(2):440–470.
McInnis, R. (1981). Some Pitfalls in the 1851-1852 Census of Agriculture of Lower Canada. *Histoire sociale/Social History*, 14(27).
McInnis, R. M. (1992). *Perspectives on Ontario agriculture*. Langdale Press.
Migué, J. L. (1998). *Étatisme et déclin du Québec: bilan de la Révolution tranquille*. Editions Varia.
Ogilvie, S. (2001). The economic world of the Bohemian serf: economic concepts, preferences, and constraints on the estate of Friedland, 1583-1692. *Economic history review*, pages 430–453.
Olson, S. and Thornton, P. (2002). The challenge of the Irish Catholic community in nineteenth-century Montreal. *Histoire Sociale/Social History*.
Osborne, B., Robert, J.-C., and Sutherland, D. (1993). Population in the Canadas and the Maritimes to 1851. In *Historical Atlas of Canada, Volume 2*, page Plate 10.
Ouellet, F. (1966). *Histoire Économique Et Sociale Du Québec 1760-1850*. Fides.
Ouellet, F. (1976). Le mythe de" l'habitant sensible au marché". Commentaires sur la controverse Le Goff Wallot et Paquet. *Recherches sociographiques*, 17(1):115–132.
Ouellet, F. (1980). *Lower Canada 1791-1840: Social Change & Nationalism*. McClelland & Stewart.
Paquet, G. (1999). *Oublier la Révolution tranquille: pour une nouvelle socialité*. Liber Montréal.
Paquet, G. and Wallot, J.-P. (2007). *Un Québec moderne, 1760-1840: Essai d'histoire économique et sociale*. Édition Hurtubise HMH.
Percy, M. B. and Szostak, R. (1992). The political economy of the abolition of seigneurial tenure in canada east. *Explorations in Economic History*, 29(1):51–68.
Phillips, P. (1974). Land tenure and economic development: a comparison of Upper and Lower Canada. *Journal of Canadian Studies*, 9(2):35–45.
Pronovost, C. (1998). *La bourgeoisie marchande en milieu rural, 1720-1840*. Presses de l'Université Laval.
Raynauld, A. (1961). *Croissance et structure économiques de la province de Québec*. Ministère de l'industrie et du commerce.
Rothenberg, W. B. (1992). *From market-places to a market economy: The transformation of rural Massachusetts, 1750-1850*. University of Chicago Press.
Russell, P. A. (2012). *How agriculture made Canada: Farming in the nineteenth century*, volume 1. McGill-Queen's Press-MQUP.

Sala-i Martin, X. (1997). I Just Ran Two Million Regressions. *American Economic Review*, 87(2):178–183.

Schultz, T. (1964). *Transforming Traditional Agriculture*. Yale University Press.

Séguin, M. (1970). *La" nation canadienne" et l'agriculture (1760-1850): essai d'histoire économique*. Éditions Boréal express.

Taylor, N. (1960). French-Canadians as Industrial Entrepreneurs. *Journal of Political Economy*, 68(1):37–52.

A Summary Statistics

Table 7: Summary statistics

Variables	N	mean	sd	min	max
Cultural Diversity	101	0.166	0.174	0.000346	0.592
Distance to city	152	97,072	67,682	117.2	363,761
Distance to other towns	103	55.08	9.995	34.40	80.90
Distance to Water	152	0.210	0.226	0	1.297
Grain wage	100	0.530	0.170	0.153	1
Grain wage dispersion	99	0.264	0.137	0.0658	1.039
Upper Canada	152	0.401	0.492	0	1
Seigneurial	152	0.382	0.487	0	1
Latitude	152	45.13	1.433	42.56	48.86
Log of Wage	104	0.967	0.271	-0.186	1.792
Log of grain wage	100	-0.685	0.323	-1.876	0
Log(Wheat price)	142	1.655	0.169	0.982	2.201
Longitude	152	-75.27	3.841	-81.77	-67.44
Market potential	152	0.688	0.644	0.109	4
Market potential (10 biggest cities)	152	0.845	0.589	0.204	4
Of French descent (%)	122	0.276	0.385	0	1
Ruggedness	152	43,604	40,765	3,988	213,632
Wage	104	2.721	0.710	0.830	6
Wage dispersion	103	0.231	0.129	0.127	0.903
Wheat price	142	5.305	0.896	2.670	9.030
Wheat suitability	152	5.281	1.606	1.998	8
Wheat suitability (5km buffer)	152	5.550	1.804	0.166	8
Wheat suitability (15km buffer)	152	5.582	1.515	2.332	8
Wheat suitability (20km buffer)	152	5.609	1.431	2.996	7.926
Wheat suitability (50km buffer)	152	5.535	1.291	2.422	7.585

B Leave-one-out routine

Figure 3: Sensitivity analysis for Table 2.

Note: This figure displays the results of 104 regressions of the log of wage on "Seigneurial" dropping one observation of the sample at a time. The black lines represent the 5% and 1% significance thresholds and a coefficient size of zero respectively. t-statistics are computed using Conley standard errors as in Table 2.

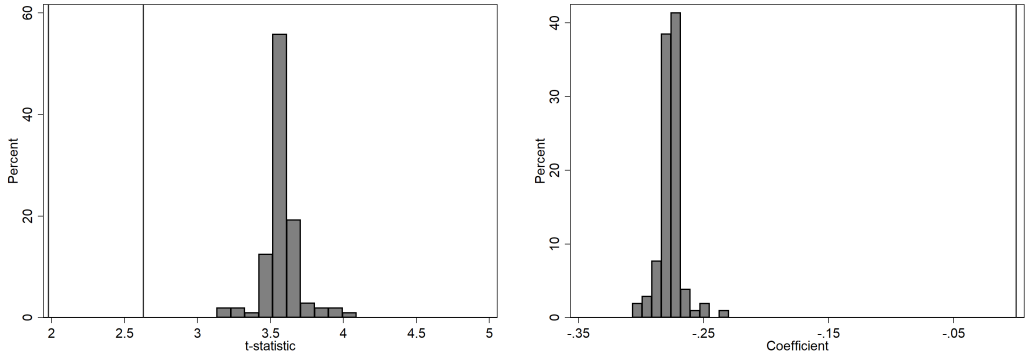


Figure 4: Sensitivity analysis for Table 4.

Note: This figure displays the results of 104 regressions of the log of wage on "Seigneurial × Wheat suitability" dropping one observation of the sample at a time. The black lines represent the 5% and 1% significance thresholds and a coefficient size of zero respectively. t-statistics are computed using Conley standard errors as in Table 4.

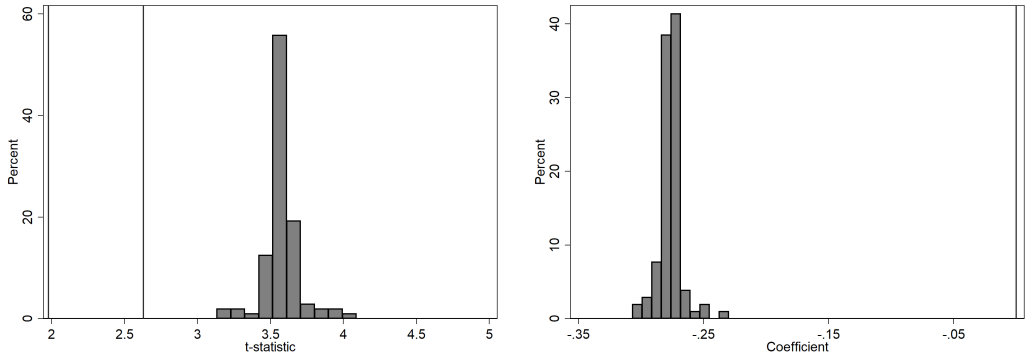


Figure 5: Sensitivity analysis for Table 5.

Note: This figure displays the results of 99 regressions of "Wage dispersion" on "Seigneurial" dropping one observation of the sample at a time. The black lines represent the 5% and 1% significance thresholds and a coefficient size of zero respectively. When dropping one observation of the sample at a time, we recomputed "Wage dispersion" as if the dropped observation was not part of our sample. t-statistics are computed using Conley standard errors as in Table 5.

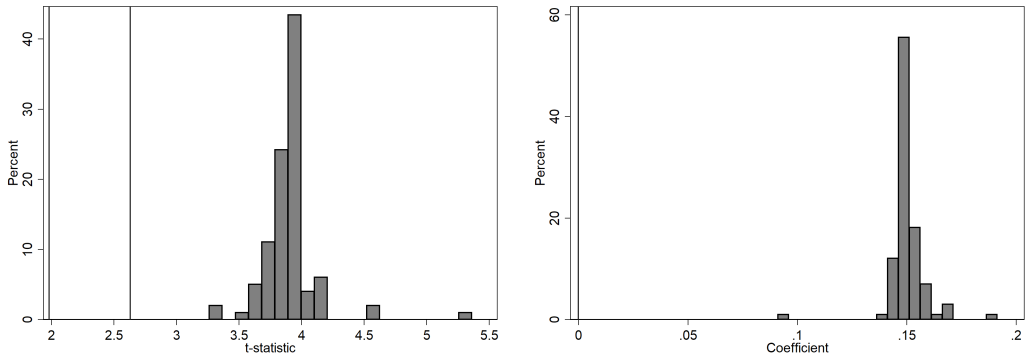
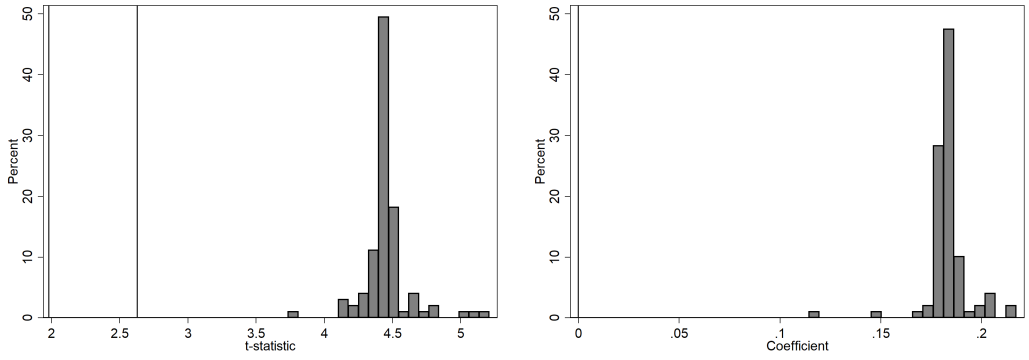


Figure 6: Sensitivity analysis for Table 6.

Note: This figure displays the results of 99 regressions of "Real Wage dispersion" on "Seigneurial" dropping one observation of the sample at a time. The black lines represent the 5% and 1% significance thresholds and a coefficient size of zero respectively. When dropping one observation of the sample at a time, we recomputed "Real Wage dispersion" as if the dropped observation was not part of our sample. t-statistics are computed using Conley standard errors as in Table 6.



C Selection of observables

Figure 7: Distribution of "Seigneurial" estimates and t-statistics across all combinations of controls (9 controls) from regressions on the Log of wage.

Note: This figure displays the results of $2^9 = 512$ regressions of the log of wage on "Seigneurial" using all possible combination of controls. To the controls used in Table 2 was added the variables: 1) "Ruggedness" which measures the average terrain ruggedness in a 10km buffer around each sub-districtip, 2)"Market potential (10 biggest cities)" which measures market potential using the 10 biggest cities instead of the 3 biggest ones, 3) "Distance to city" which measures the distance to the closest large city (Toronto, Quebec and Montréal). The upper-left panel shows the distribution of (robust) t-statistics for the ruggedness coefficient. The upper-right panel shows the distribution of estimates on the seigneurial coefficient. The number of observation used in all regressions in this table is 104. The blue lines represent, respectively, the coefficient size of regression 7 in Table 2 and the t-statistic. The black lines represent the 5% significance threshold and a coefficient size of zero respectively.

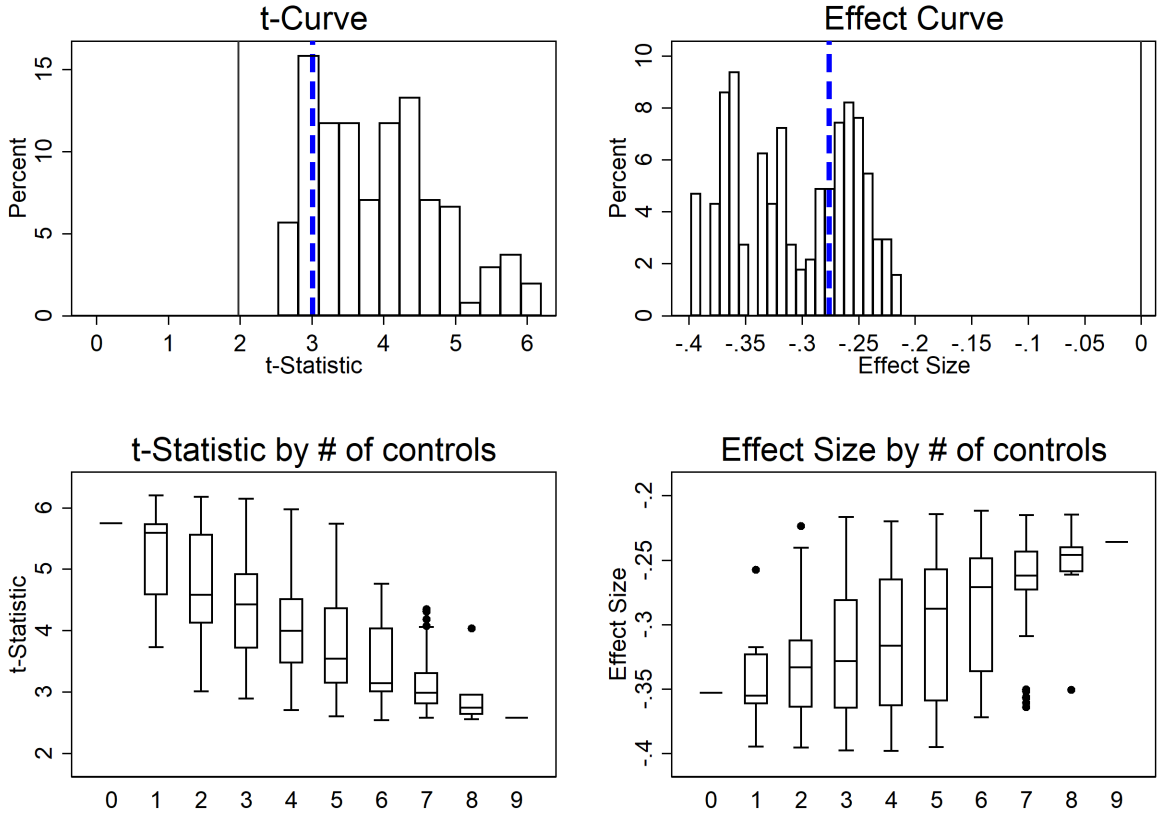
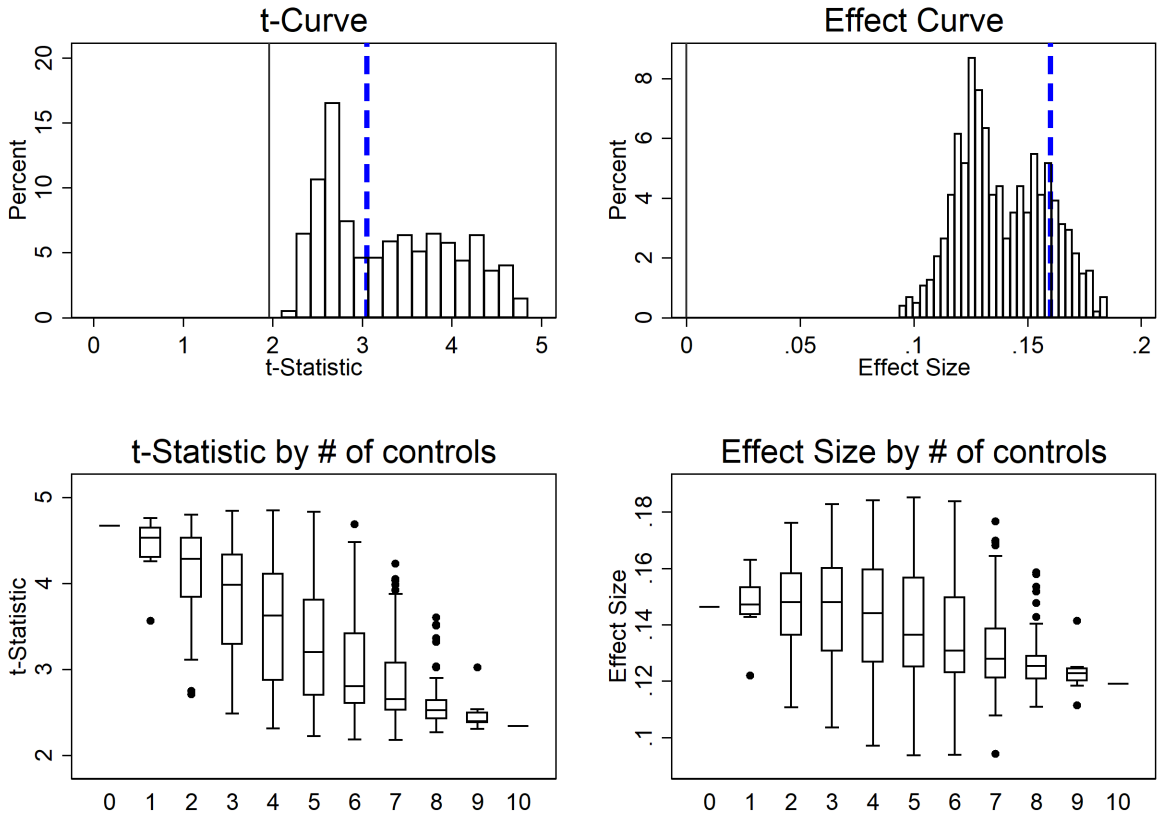


Figure 8: Distribution of "Seigneurial" estimates and t-statistics across all combinations of controls (9 controls) from regressions on the dispersion of wages.

Note: This figure displays the results of $2^{10} = 1024$ regressions of "wage dispersion" on "Seigneurial" using all possible combination of controls. To the controls used in Table 2 was added the variables: 1) "Ruggedness" which measures the average terrain ruggedness in a 10km buffer around each sub-district, 2)"Market potential (10 biggest cities)" which measures market potential using the 10 biggest cities instead of the 3 biggest ones, 3) "Distance to city" which measures the distance to the closest large city (Toronto, Quebec and Montréal), 4) A variable measuring the number of sub-districts within the 100km buffer used to measure the dispersion of wages. The upper-left panel shows the distribution of (robust) t-statistics for the ruggedness coefficient. The upper-right panel shows the distribution of estimates on the seigneurial coefficient. The number of observation used in all regressions in this table is 104. The blue lines represent, respectively, the coefficient size of regression (7) in Table 2 and the t-statistic. The black lines represent the 5% significance threshold and a coefficient size of zero respectively.



D Wheat prices and additional regressions

Table 8: Geography, institutions and wheat prices.

Note: This table displays the results of the cross-sectional regression of the natural logarithm of wheat prices on geographical and institutional characteristics.

Log(Wheat price)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Seigneurial	0.01482			-0.12081***	-0.12488***	-0.11872***	-0.09472***
	(0.06849)			(0.03324)	(0.02841)	(0.03647)	(0.03471)
Upper Canada		-0.14202***		-0.21700***	-0.18785***	-0.18551***	-0.00379
		(0.04116)		(0.04435)	(0.04161)	(0.04337)	(0.06149)
Wheat suitability			-0.03448***		-0.01780*	-0.01743*	-0.00780
			(0.01338)		(0.00985)	(0.00917)	(0.01032)
Distance to Water						0.02036	0.05745
						(0.06076)	(0.07721)
Market potential						-0.00063	0.00226
						(0.01650)	(0.01510)
Longitude							0.04183***
							(0.00914)
Latitude							-0.05004**
							(0.02311)
Observations	142	142	142	142	142	142	142
R-squared	0.16952	0.00183	0.10723	0.24408	0.26414	0.26473	0.32162

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

Table 9: Geography, institutions and wages (excluding Upper Canada dummy variable).

Note: This table displays similar results as in Tables 2 and 3 but excluding our "Upper Canada" dummy variable.

	Nominal Wage				*Grain Wage*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Seigneurial	-0.39509***	-0.34133***	-0.28572***	-0.29215***	-0.40713***	-0.34416***	-0.17277**	-0.19314***
	(0.07204)	(0.06369)	(0.07960)	(0.07419)	(0.09996)	(0.04357)	(0.06805)	(0.05770)
Wheat suitability	0.00052	-0.00396	-0.01432	-0.01251	0.04542**	0.04008	-0.01299	-0.01219
	(0.01147)	(0.01202)	(0.01644)	(0.01780)	(0.02260)	(0.02678)	(0.02122)	(0.02249)
Distance to Water	✓	✓	✓	✓	✓	✓	✓	✓
Market potential	✓	✓	✓	✓	✓	✓	✓	✓
Of French descent (%)		✓		✓		✓		✓
Longitude			✓	✓			✓	✓
Latitude			✓	✓			✓	✓
Observations	104	102	104	102	100	98	100	98
R-squared	0.27636	0.30925	0.33584	0.34534	0.32012	0.32757	0.45345	0.44970

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

E Alternative buffer thresholds

Table 10: Geography, institutions and development.

Note: This table reproduces the results from Table 2 using 5km, 15km, 20km and 50km buffers to measure "Wheat suitability" instead of a 10km buffer.

Log of Wage	(1)	(2)	(3)	(4)
		5km buffer		
Wheat suitability	0.01084	0.00233	-0.00559	-0.01341
	(0.01460)	(0.01103)	(0.00900)	(0.00846)
Seigneurial		-0.32494***	-0.37614***	-0.27545***
		(0.08964)	(0.09185)	(0.07788)
Upper Canada		0.04221	0.03229	0.06043
		(0.04956)	(0.05199)	(0.09479)
Observations	104	104	104	104
R-squared	0.00453	0.25028	0.27884	0.33903
		15km buffer		
Wheat suitability	0.02973	0.00711	-0.00605	-0.01691
	(0.02050)	(0.01848)	(0.01439)	(0.01410)
Seigneurial		-0.32664***	-0.37738***	-0.27867***
		(0.08844)	(0.09100)	(0.07715)
Upper Canada		0.03298	0.03471	0.06698
		(0.05865)	(0.05722)	(0.09451)
Observations	104	104	104	104
R-squared	0.02425	0.25102	0.27848	0.33810
		20km buffer		
Wheat suitability	0.03720	0.00850	-0.00830	-0.02637
	(0.02415)	(0.02439)	(0.01935)	(0.02144)
Seigneurial		-0.32655***	-0.37789***	-0.27617***
		(0.08799)	(0.09082)	(0.07625)
Upper Canada		0.03037	0.03850	0.06984
		(0.06439)	(0.05997)	(0.09147)
Observations	104	104	104	104
R-squared	0.03247	0.25110	0.27871	0.34096
		50km buffer		
Wheat suitability	0.06803**	0.04422	0.01905	-0.01291
	(0.03088)	(0.03172)	(0.03043)	(0.03795)
Seigneurial		-0.33234***	-0.37292***	-0.28369***
		(0.08409)	(0.08656)	(0.07693)
Upper Canada		-0.03727	-0.00717	0.07084
		(0.07444)	(0.07250)	(0.09675)
Observations	104	104	104	104
R-squared	0.08441	0.26405	0.27971	0.33468
Distance to Water			✓	✓
Market potential			✓	✓
Longitude				✓
Latitude				✓
*** p<0.01, ** p<0.05, * p<0.1				

F Alternative measures for wage dispersion measure

Figure 9: Rerunning specification (7) from table 5 using different thresholds for measuring wage dispersion.

Note: This figure displays the results of 351 regressions of "Wage dispersion" on "Seigneurial" where the threshold used to measure wage dispersion changes by 1km intervals between 50km and 400km. The black lines represent the 5% and 1% significance thresholds and a coefficient size of zero respectively. t-statistics are computed using Conley standard errors as in Table 5.